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Evolutionary Analysis in Law: Some Objections Considered

Owen D. Jones

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INTRODUCTION

Evolutionary analysis in law represents, in large measure, an effort to inform legal thinking with behavioral biology, in much the same way that we try to inform legal thinking with economics or psychology.[1] To the question "What can legal thinkers usefully learn from behavioral biology?" there are two typical answers: (1) very little; and (2) a great deal. Those subscribing to the first answer offer in support of their conclusions a variety of reasons, to several of which I respond below. I subscribe to the second answer.[2] And the

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[1] *See generally* Owen D. Jones, *Evolutionary Analysis in Law: An Introduction and Application to Child Abuse*, 75 N.C. L. REV. 1117 (1997) [hereinafter Jones, *Evolutionary Analysis in Law*].

[2] *See, e.g.*, Owen D. Jones, *Proprioception, Non-Law, and Biolegal History*, 53 FLA. L. REV. ___ (forthcoming 2001) (The Dunwody Distinguished Lecture in Law); Owen D. Jones, *Sex, Culture, and the Biology of Rape: Toward Explanation and Prevention*, 87 CAL. L. REV. 827 (1999) [hereinafter *Sex, Culture, and the Biology of Rape*]; Owen D. Jones, *Time-Shifted Rationality and the Law of Law's Leverage: Behavioral Economics Meets Behavioral Biology*, 95 NW. U. L. REV. 1141 (2001) [hereinafter Jones, *Time-Shifted Rationality*]; Owen D. Jones, *On The Nature of*

occasion of this conference provides an opportunity to explain why. I believe that the law stands to gain a great deal from the study of behavioral biology on the basis of three straightforward and interrelated lines of logic.

First, anything law achieves, it achieves by effecting changes in human behavior. The ability to deploy legal tools to effect these changes, at the least cost to society, is largely a function of the predictive power of the behavioral models on which law relies—those insights by which we may predict that if law moves this way, behavior will move that way, rather than some other way. Therefore, improvements to the behavioral models may yield improvements in the ability of law to effect desired changes in human behavior.

Second, evolutionary processes (such as natural and sexual selection) exert influences on the behavioral predispositions of all living organisms.[3] Humans are living organisms. Therefore, evolutionary processes exert influence on the behavioral predispositions of humans.

Norms: Biology, Morality, and The Disruption of Order, 98 MICH. L. REV. 2072 (2000) [hereinafter *On the Nature of Norms*] (book review). The idea that legal thinkers can gain from thinking about evolutionary processes is also a common theme among members of The Society for Evolutionary Analysis in Law (SEAL). *See* http://www.sealsite.org.

[3] For useful introductions to modern behavioral biology, written for the general audience, see generally TIMOTHY H. GOLDSMITH, THE BIOLOGICAL ROOTS OF HUMAN NATURE: FORGING LINKS BETWEEN EVOLUTION AND BEHAVIOR (1991); STEVEN PINKER, HOW THE MIND WORKS (1997); MATT RIDLEY, THE RED QUEEN: SEX AND THE EVOLUTION OF HUMAN NATURE (1994); ROBERT WRIGHT, THE MORAL ANIMAL: EVOLUTIONARY PSYCHOLOGY AND EVERYDAY LIFE (1994).

Accessible textbooks include: JOHN ALCOCK, ANIMAL BEHAVIOR: AN EVOLUTIONARY APPROACH (6th ed. 1998); DAVID BUSS, EVOLUTIONARY PSYCHOLOGY: THE NEW SCIENCE OF THE MIND (2000); MARTIN DALY & MARGO WILSON, SEX, EVOLUTION, AND BEHAVIOR (2d ed. 1983); SCOTT FREEMAN & JON C. HERRON, EVOLUTIONARY ANALYSIS (1998); DOUGLAS J. FUTUYMA, EVOLUTIONARY BIOLOGY (2d ed. 1986); TIMOTHY H. GOLDSMITH & WILLIAM F. ZIMMERMAN, BIOLOGY, EVOLUTION, AND HUMAN NATURE (2000); JAMES L. GOULD & CAROL GRANT GOULD, SEXUAL SELECTION (1989); J.R. KREBS & N.B. DAVIES, AN INTRODUCTION TO BEHAVIOURAL ECOLOGY (3d ed. 1993); MARK RIDLEY, EVOLUTION (1993); ROBERT TRIVERS, SOCIAL EVOLUTION (1985).

Introductions to law-relevant principles of behavioral biology, written specifically for legal thinkers without biology backgrounds, appear in Part I: A Primer in Law-Relevant Evolutionary Biology, in Jones, *Evolutionary Analysis in Law*, *supra* note 1 at 1127-57; Timothy H. Goldsmith & Owen D. Jones, *Evolutionary Biology and Behavior: A Brief Overview and Some Important Concepts*, 39 JURIMETRICS J. 131 (1999); William H. Rodgers, *Where Environmental Law and Biology Meet: Of Pandas' Thumbs, Statutory Sleepers, and Effective Law*, 65 U. COLO. L. REV. 25 (1993).

Third, and combining the conclusions of the prior two, if better behavioral models can yield more effective legal tools, and if human behavior is influenced by evolutionary processes, then greater knowledge of how evolutionary processes influence behavior may improve law's ability to regulate it.

An emerging and rapidly growing literature applies insights about human behavioral biology in efforts to make law, legal process, and the regulation of human behavior more effective.[4] Contexts include, for example, constitutional law, child abuse, employment law, environmental law, sexual aggression, political institutions, criminal law, property law, law and economics, norm origins, and the like.[5]

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[4] Some of this literature appears in bibliographic form on the "Readings" pages of the website of the *Society for Evolutionary Analysis in Law* (SEAL) *at* http://www.sealsite.org. *See also infra* note 5.

[5] *See, e.g.*, John O. McGinnis, *The Original Constitution and Our Origins*, 19 HARV. J.L. & PUB. POL'Y 251 (1996); Paul Rubin, *The State of Nature and the Evolution of Political Preferences*, 3 AM. L. & ECON. REV. 50 (2001); Todd Zywicki, *The Nature of the State and the State of Nature: A Comment on Grady and McGuire's "The Nature of Constitutions,"* 1 J. OF BIOECONOMICS 241 (1999); Mark Grady & Michael McGuire, *The Nature of Constitutions*, 1 J. OF BIOECONOMICS 227 (1999); Jones, *Evolutionary Analysis in Law, supra* note 1; Kingsley R. Browne, *Sex and Temperament in Modern Society: A Darwinian View of the Glass Ceiling and the Gender Gap*, 37 ARIZ. L. REV. 972 (1995); Jones, *Sex, Culture, and the Biology of Rape, supra* note 2; Raymond R. Coletta, *The Measuring Stick of Regulatory Takings: A Biological and Cultural Analysis*, 1 J. CONTEMP. L. 20 (1998); Jones, *Time-Shifted Rationality, supra* note 2; Jones, *On the Nature of Norms, supra* note 2; Owen D. Jones, *Law, Biology, and Emotions*, 39 JURIMETRICS J. 283 (1999); Deborah W. Denno, *Gender Differences in Biological and Sociological Predictors of Crime*, 22 VT. L. REV. 305 (1998); Lawrence Frolik, *The Biological Roots of the Undue Influence Doctrine: What's Love Got to Do With It?*, 57 U. PITT. L. REV. 841 (1996); Oliver Goodenough, *Biology, Behavior, and Criminal Law: Seeking a Responsible Approach to an Inevitable Interchange*, 22 VT. L. REV. 263 (1998); Mark Grady & Michael McGuire, *A Theory of the Origin of Natural Law*, 8 J. CONTEMP. LEGAL ISSUES 87 (1997); Cheryl Hanna, *Can A Biological Inquiry Help Reduce Male Violence Against Women?*, 22 VT. L. REV. 333 (1998); Rodgers, Jr., *supra* note 3; E. Donald Elliott, *The Tragi-Comedy of the Commons: Evolutionary Biology, Economics and Environmental Law*, 20 VA. ENVIR. L.J. 17 (2001); Jeffrey E. Stake, *Darwin, Donations, and the Illusion of Dead Hand Control*, 64 TUL. L. REV. 705 (1990); Jeffrey Evans Stake, *Are We Buyers or Hosts? A Memetic Approach to the First Amendment*, 52 ALA. L. REV. 1213 (2001); Owen D. Jones, *Proprioception, Non-Law, and Biolegal History*, 53 FLA. L. REV. ___ (forthcoming 2001); Bailey Kuklin, Evolution, Politics and Law (unpublished manuscript 2000) (on file with author); Paul Rubin, Darwinian Politics: The Evolution of Political Preferences (unpublished manuscript, on file with author); Todd J. Zywicki, *Evolutionary Biology and the Social Sciences*, 13 HUMANE STUD. REV. 1 (2000), *at* http://www.humanestudiesreview.org/fall2000-/secondframeset.html. (last visited Nov. 16, 2001).

My purpose here is not to reiterate or summarize those arguments (which, because of their length, detail, and often technical discussions, are best consulted separately) but rather to address some of the many concerns I have seen raised in writing, or at conferences, about efforts to draw useful insights about humans from the growing body of knowledge about biological influences on behavior.

I do not mean to suggest that all such concerns are categorically misguided. For there are a great many thoughtful and constructive critiques. But I do want to demonstrate that a number of commonly encountered concerns are misinformed or misleading, however well-intentioned their proponents may be. As legal thinkers evaluate the possible and future role for behavioral biology in law, they will need to separate the useful and appropriate cautions from the hyperbolic, and the logical and well-reasoned concerns from the baseless. I hope to offer, below, some discussion that may assist that effort.

I. SCOPE

The term behavioral biology encompasses many things, not all of which I intend to address. For purposes here, there are two principal components to behavioral biology. The first component is behavioral genetics. It mainly involves efforts to trace the different behaviors of different individuals to different genes among them.[6] This is, unfortunately, what most people call to mind when they encounter a discussion of the influences of biology on behavior. There is a role for behavioral genetics in law. I think, however, that the long-term promise of behavioral genetics for law is comparatively limited. Accordingly, it is not the component of behavioral biology I intend to discuss here.

The second component, more promising in my view, goes by many names. None of them are without drawbacks (traceable, in large measure, to somewhat arbitrary disciplinary divisions that do not square with behavioral

[6] More technically, it traces behavioral differences to different alleles (forms) of genes. For convenience, however, this Article adopts the common convention of referring to different alleles as different genes.

phenomena[7]). The names include behavioral ecology, evolutionary ecology, ethology, evolutionary biology, evolutionary psychology, evolutionary anthropology, and many others. But the overall enterprise transcends efforts to name it, and the shared, core idea follows this logic. Evolutionary processes (such as natural selection and sexual selection[8])—together with environmental and physical inputs—built the brains that yield behaviors. There is therefore a necessary and important relationship between the non-random operation of these evolutionary processes and observable human behaviors. For reasons explained below, that relationship yields widely-shared (often species-typical) heritable behavioral predispositions that are often highly condition-dependent. (That is, they are context-specific, rather than automatic.) As a consequence, some of the different behaviors we observe, from different individuals, can be traced *not* to different genes, but rather to widely-shared species-typical information-processing algorithms that encounter different environmental contexts.

This sounds more difficult than it is. To both clarify and oversimplify, one can consider that behavioral geneticists study how, when encountering the exact same environment, organism A will respond with behavior X, and organism B will respond with behavior Y, when A and B have different genes relevant to that behavior, manifested in slightly different neural architecture, brain structure, and function.

In important contrast to those interested in behavioral genetics, those interested in the evolutionary bases of species-typical behaviors study how, when encountering different environments, A and B may still respond with behaviors X and Y respectively, despite the fact that neither their genes nor their neural architectures differ materially. For example, evolutionary processes may have equipped the entire population with a conditional decisional rule that A and B share, which in over-simplified essence provides: "if in environment E, then employ behavior X, but if in environment F then employ behavior Y." Thus, the shared genetic influences on behavior can yield behaviors X and Y from individuals A and B not because of their genetic differences, but simply because they encountered environments E and F, respectively.

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[7] *See infra* section IV.A.

[8] For background on these processes, see *supra* note 3.

The behavior is enormously influenced by the environment, but the environment affects the probability of behavior in ways reflecting the influence of widely-shared behavioral predispositions. The distinction between behavioral genetics and behavioral ecology is difficult to overemphasize, and is illustrated in Figure 1.

To be clear, then, where I use the term behavioral biology here it will be to refer to this latter component of behavioral biology—this attention to evolved, condition-dependent, behavior-influencing algorithms that influence the way the brain processes information and increases or decreases the probabilities of various behaviors. An evolutionary analysis in law is, in part, the effort to bring that component of behavioral biology into legal thinking, with the emphasis on what can be learned about law-relevant human behaviors from the study of evolutionary processes that have influenced them.[9]

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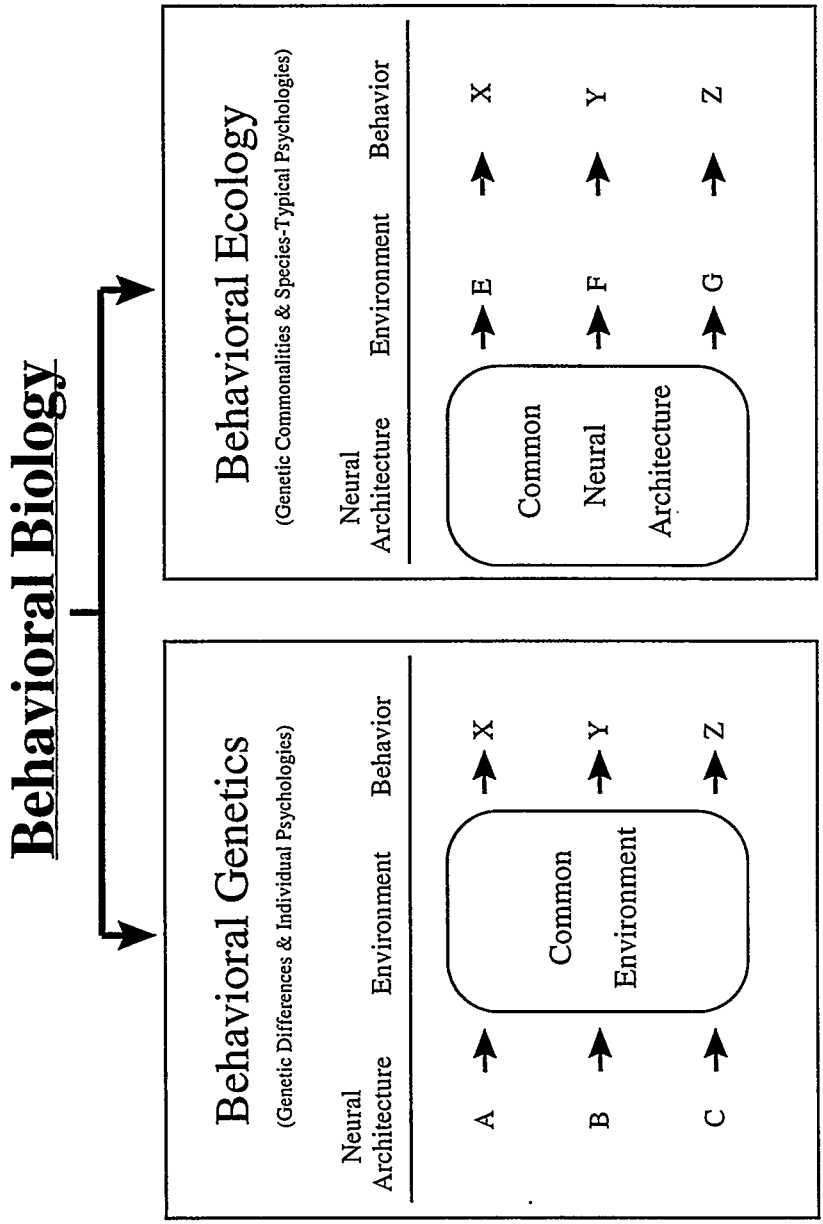
[9] The term evolutionary analysis in law first appears in Jones, *Evolutionary Analysis in Law*, *supra* note 1. This was not the first time that law and behavioral biology had been linked. The general idea that legal thinkers should take account of the influence of human biological heritage on human behavior relevant to law has been raised on numerous occasions, in a variety of contexts. Such work provides important background for all that I attempt here. *See, e.g.*, RICHARD ALEXANDER, DARWINISM AND HUMAN AFFAIRS (1979) (containing chapter on "Evolution, Law, and Justice"); JOHN H. BECKSTROM, EVOLUTIONARY JURISPRUDENCE: PROSPECTS AND LIMITATIONS ON THE USE OF MODERN DARWINISM THROUGHOUT THE LEGAL PROCESS (1989) (discussing advantages and limits of using evolutionary theory in legal thinking); THE SENSE OF JUSTICE: BIOLOGICAL FOUNDATIONS OF LAW (Roger Masters & Margaret Gruter eds., 1992); RICHARD A. POSNER, SEX AND REASON (1992); Amicus Brief of the Gruter Institute, *In Matter of Baby M.*, 537 A.2d 1227 (N.J. 1988); Browne, *supra* note 5; E. Donald Elliott, *Law and Biology: The New Synthesis?*, 41 ST. LOUIS U. L.J. 595 (1997); Robin Fox, *In the Matter of "Baby M": Report from the Gruter Institute for Law and Behavioral Research*, 7 POLITICS & THE LIFE SCIENCES 77 (1988); Frolik, *supra* note 5; Goodenough, *supra* note 5; Grady & McGuire, *supra* note 5; Margaret Gruter, *Law in Sociobiological Perspective*, 5 FLA. ST. U. L. REV. 181 (1977); Monika Gruter Morhenn & Margaret Gruter, *The Evolution of Law and Biology*, *in* EVOLUTIONARY APPROACHES IN THE BEHAVIORAL SCIENCES: TOWARD A BETTER UNDERSTANDING OF HUMAN NATURE 119 (Steven A. Peterson & Albert Somit eds., 2001); Hanna, *supra* note 5; McGinnis, *supra* note 5; William Rodgers, *Bringing People Back: Toward a Comprehensive Theory of Takings in Natural Resources Law*, 10 ECOLOGY L. Q. 205 (1982); Jeffrey E. Stake, *Darwin, Donations, and the Illusion of Dead Hand Control*, 64 TUL. L. REV. 705 (1990); Margo Wilson, *Impact of the Uncertainty of Paternity on Family Law*, 45 U. TORONTO FAC. L. REV. 217, 223 (1987); E. Donald Elliott & Roger Masters, Ethology of Law: Biological Bases of Legal Behavior, Seminar offered at Yale Law School (1988); Jones, *Evolutionary Analysis in Law*, *supra* note 1, at 1121-23 n.3.

I maintain a partial listing of many other sources relevant to the connection between law and evolution on the "Readings" page of the website for the *Society for Evolutionary Analysis in Law* (SEAL), *at* http://www.sealsite.org. Interest in these

FIGURE 1



topics has grown quickly, due in part to programs organized since 1981 by the *Gruter Institute for Law and Behavioral Research* (about which see http://www.gruter-institute.org) and more recently by the *Society for Evolutionary Analysis in Law*.

II. WHY LAW NEEDS BEHAVIORAL BIOLOGY

As mentioned above, the better law's model of behavior, the better law can help to fulfill the goals society assigns to it. Any model of behavior that ignores the biology of behavior—through the effect of evolutionary processes on brain function—is materially incomplete. There are at least two reasons.

First, all organisms, and all of their behaviors, are products of the interaction of environment and genes. Therefore, were legal thinkers to attend only to environmental influences (as they often do) or only to genetic influences (as, thankfully, they may never do) it would inevitably hamper development of an integrated and fully informed model of human behavior. It would be like trying to understand cake by studying only flour, or trying to understand lemonade by studying only sugar—necessary, but absurdly incomplete.

Second, all behavior is the product of two interrelated but very different kinds of causes: the immediate and the evolutionary. (Or, to use the biologists' terms of art, the "proximate" and the "ultimate."[10]) The effort of legal thinkers to understand causes of behavior is needlessly narrowed if it attends only to one of these two fundamental kinds of causes, the latter of which is a principal subject of behavioral biology.

The net result is this. While the human brain is remarkable, it is also corporeal. Brains exist because natural selection has favored information-processing, behavior-biasing machines, the benefits of which (measured in contributions to genetic fitness[11]) have historically exceeded the costs (measured

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[10] *See, e.g.*, John Alcock & Paul Sherman, *The Utility of the Proximate-Ultimate Dichotomy in Ethology*, 96 ETHOLOGY 58 (1994).

[11] It is important to note that genetic success, or "fitness," is not measured in offspring alone, because offspring are not the only genetic relatives an individual has. Since relatives other than offspring, such as siblings and parents, also share genes with an individual (because of recent shared ancestors), their own reproductive success can in some circumstances contribute to an individual's fitness. When calculating fitness, one therefore needs to take account of the extent to which an individual has increased the reproductive success of its relatives (discounted by their degree of relatedness), beyond the reproductive success those relatives would have had in the absence of the individual's contributions. This cumulative, additive calculation of fitness, which takes account of both direct and indirect replication of genes, is known as "inclusive fitness." *See* ALCOCK, *supra* note 3, at 561-69. Consequently, an organism can increase its overall genetic success by increasing its inclusive fitness, even if it does not itself have offspring.

in, for example, energy, as well as the material necessary for building and running a large and energy-hungry brain[12]).

The patterns in which brains process information that lead to behaviors are inevitably affected by evolutionary processes. For there are many more ways for an organism to meet an environmental challenge disastrously than there are ways to ensure continued survival and eventual reproduction. Those genetically influenced physical processing architectures that tended to yield behaviors that tended, on average, to lead to reproductive success simply tend, in turn, to become widespread in populations.[13] (This shared neural networking is sometimes referred to as a species-typical psychology or an evolved psychology.) If legal thinkers are charged with regulating behaviors, and if understanding the causes of behaviors aids in regulating them, then familiarity with behavioral biology should be important to legal thinkers.

Some of the premises of this line of reasoning are not without their critics. As always, some criticism is constructive, and some not. In my view, a great deal of the constructive criticism has already been incorporated into the recent work of evolutionary biologists and psychologists. A not inconsiderable portion of the remaining criticism is, however, unsound and more likely to mislead than to help. Consequently, what follows offers several observations for those unaccustomed to thinking about evolutionary analysis in law.

This is by no means, of course, an exhaustive treatment. In particular, I want to avoid simply reiterating the best-known and most frequently-identified flaws in fact or logic that

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[12] The human brain's unique capacities are, in part, a function of its size. Yet its size requires that human babies be born less physically developed, and therefore more vulnerable, than other primate babies—lest larger cranial size pose even greater birthing problems than it already does. In addition, the brain requires remarkable quantities of energy to run: roughly twenty percent of all calories consumed, despite being only two percent of body mass. PATRICIA SMITH CHURCHLAND, NEUROPHILOSOPHY 36-37 (1986). This is roughly twenty-two times as much energy as that required to nourish an equivalent weight of muscle, at rest. STEVEN MITHEN, THE PREHISTORY OF MIND 11 (1996). *See also* Adam Gifford, Jr., *Being and Time: On the Nature and the Evolution of Institutions*, 1 J. BIOECONOMICS 127, 136-37 (1999).

[13] Technically, and because of inevitable time lag between environmental changes and adaptation, what matters is the extent to which such behaviors tended to increase reproductive success in deep ancestral, rather than current, environments. Different adaptations arose at different times, obviously, but the relevant time for a given adaptation is often referred to as the EEA—the Environment of Evolutionary Adaptation.

are apparent in a number of common objections to evolutionary reasoning.[14] Instead, I want first to address briefly some of the more systemic and surface barriers to integrating behavioral biology into law, in furtherance of evolutionary analysis in law. I will then explore some of the deeper, subsurface conditions that I believe are fundamental predicates to those more observable, surface ones.

III. SURFACE BARRIERS TO INTEGRATION

A. *Unsupported Claims of Ad Hocery*

Critics sometimes fault evolutionists for seeking to explain everything in evolutionary terms, on the premise that a principle that explains everything explains nothing. The criticism has intuitive appeal and, in some instances, it has undoubtedly helped to chasten theorists against too-facile hypotheses, which sometimes seem to be ad hoc. The challenge, of course, is to distinguish between more and less legitimate hypotheses. And in our efforts to do so, three things bear noting.

First, it is quite clear that an effort to reconcile every observable behavior with evolutionary history is insufficient to render resultant explanations ad hoc. By comparison, we observe that rocks fall, birds fly, and hot air balloons rise. But no one would ever fault a physicist for claiming that each of these phenomena—no matter how disparate—must either reconcile with the theory of gravity or force the most fundamental reevaluation. We make this strong claim because the theory of gravity, while not perfect, is backed by such overwhelming evidence that we consider it very robust. The

[14] For instance, I trust that most readers will be familiar with the proposition that any attempt to reason directly from a description to a normative conclusion (from an "is" to an "ought") is impermissible, since explanation is not justification, in either logic or in law. Also, I trust it is evident, without further explanation, that accusing behavioral biologists of genetic determinism is naive, since no credible behavioral biologist believes that genes rigidly determine human behavior. For lengthier discussion of these and related points, see Jones, *Sex, Culture, and The Biology of Rape*, *supra* note 2, at 877-80, 893-95.

first time we see a balloon rise as a rock falls we may be puzzled, but no one would either abandon the theory of gravity or declaim its practitioners for attempting to sweep too much under its auspices. Attraction of object to object by gravitational forces is foundational, and while it may take time to puzzle out how things may rise or fall, we are confident that the mechanisms by which they do so reflect the relentless effects of gravity.

Similarly, it is not only acceptable but presently required, given the current state of science and the dictates of logic, that we start from the presumption that all human behavior, whether rational or irrational, cooperative or competitive, must in the end reconcile with known evolutionary processes—or force the most sweeping and fundamental revision. While there are still debates about details of evolution on the margin (just as there continue to be debates among those studying gravity), the theory of evolution by natural selection is no less robust than the theory of gravitational attraction of mass to mass. We may not know by what precise pathways natural selection leaves a big-brained species capable of consciousness. That it has, however, remains undisputed. We may not yet discern the cognitive processes by which we reach specific decisions, develop our various preferences, or give content to emotional realities. But the conclusion that the cognitive processes must inevitably reflect both the guiding and scarring of natural selection and other evolutionary processes has not been significantly challenged by any comprehensive, alternative, non-supernatural theory.

Second, it would be gross error to assume that, simply because every behavior must square with evolutionary history or overthrow it, each causal hypothesis is as easy as another, affording no basis for preference or rejection. One occasionally hears the view that evolutionary theories may be disregarded, because their explanations necessarily cut equally in opposite directions, offering no measure of comparative probabilities. The criticism seems to be based on the mistaken belief that one can always construct two equally plausible evolutionary accounts that could explain both what is observed and the opposite of what is observed.

For example, a critic might think that natural selection is just as likely to have favored perfect rationality as irrationality, and conclude on that basis that evolutionary theorizing can offer nothing reliable at present to the study of irrationality. After all, would it not be adaptive to be able to reason without logical flaws? But such thinking would reflect a serious misapprehension of the very basics of evolutionary processes. Specifically, the fact that natural selection would have favored a trait, if it arose, says precisely nothing about the likelihood that the trait exists. Evolution is path-dependent (you must always get here from there), with natural selection inexorably sifting among contemporaneously existing heritable traits (varying by genetic mutation and recombination). Such sifting favors reproductively useful traits, but it does not create them. For, as biologist Richard Dawkins once put it, no one would expect pigs to have wings, even if they would come in handy from time to time. And, similarly, natural selection cannot build an all-purpose optimizing machine, even if it would be beneficial to have one.

Natural selection cannot look forward. Problems do not generate mutational solutions. And natural selection never guarantees optimality. Whatever heritable abilities exist exist only because they were left over after alternative traits, somewhat less likely to contribute to reproductive success, were gradually swept away in the relentless process that affords compounded gains over time to even small reproductive advantages. We have absolutely no reason to believe that natural selection has afforded humans an optimal brain, or one capable of choosing and inclined to choose the most appropriate behavior for achieving any end—even reproductive success. It just doesn't work that way. Consequently, evolutionary hypotheses are always seriously constrained by the empirical facts of our own evolutionary history, by the limits of what evolution can achieve, and the significantly channeled processes by which it achieves anything. It is simply not the case that evolutionary thinking renders any possible hypothesis equally likely.

B. *Unsupported Specificity Thresholds*

Some have argued that the utility of behavioral biology in law is severely limited because its predictions are insufficiently specific. There are three principal replies.

First, insufficiently specific compared to what? Certainly less specific predictions are less valuable than more specific predictions, in those cases in which the predictions, while varying in specificity, are equally accurate. For example, if the prediction that it will rain on a given day is consistently correct, and so is the prediction that it will begin to rain on a given day at a certain time, plus or minus thirty minutes, the method for generating the latter prediction will be more useful in predicting tomorrow's precipitation. Nevertheless, it should be obvious that even the most general predictions are valuable if they are more accurate than alternative predictions—particularly when there are none. And there are certainly numerous law-relevant contexts in which there are at present simply no systematic ways of predicting important behavioral phenomena.[15]

Second, we should not categorically disparage the value of predictions that lack the specificity we would ideally prefer. The fact that behavioral biology is unlikely to ever predict with both specificity and certainty that person X will behave in way Y in response to environmental factor Z does little to erode its overall value. This is because there frequently is great value in even general predictions. Consider meteorology. Learning that there is a 50% probability of rain, sometime today or tomorrow, somewhere in the general region, has proven value.[16] Consider medicine. Being told that there is, historically, a roughly 1 in 200 probability that a given treatment will succeed is useful to know, even if one cannot know for certain how a given body, of given age, given sex, given weight, a given medical history, and a given diet will respond. Consider geology. Even the most general predictions of whether a volcano is likely to be active, whether an earthquake is more likely to strike here than there, or whether oil is more likely there than here are all valuable—

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[15] *See, e.g.*, Jones, *Time-Shifted Rationality*, *supra* note 2.

[16] *See* David L. Faigman, *To Have and Have Not: Assessing the Value of Social Science to the Law as Science and Policy*, 38 EMORY L.J. 1005, 1047 (1989) ("meteorology is [another] example of the value of even uncertain predictions.").

often extremely valuable—despite their characteristic imprecision. And consider the marketplace. We routinely feel justified consulting various economic indicators, to glean an important sense of what the future may hold, despite the fact that predictions are notoriously uncertain and imprecise. Certainty and narrow specificity are by no means prerequisites for value.

Third, we should not establish a higher specificity threshold for behavioral biology than for other disciplines upon which law regularly relies. The disciplines of psychology, sociology, psychiatry, and even toxicology often provide insights afforded some deference by the law, despite the fact that their predictions are often quite general, and, like predictions generated by behavioral biology, only probabilistic.

C. *Unsupported Claims of Reductionism*

Some claim that humans are too complex for behavioral biology to offer any worthwhile insights. In the breathless rhetoric of some romantics, human life is just far too artistically rich and complicated to be usefully broken down into pieces and studied. The following comment is typical: "[L]iving organisms must be understood not as reducible to their genes but as following a lifeline trajectory, simultaneously product and process, being and becoming."[17] This moving appeal to transcendental duality and its categorical imperviousness to consideration of divisible elements is, I believe, quite overstated.

First, there simply are no dark devils out there actually claiming such an extreme position—that humans are "reducible to their genes." Damning the reductionism of behavioral biology is, in my view, to point an unloaded finger at no one.

Second, and relatedly, the epithet "reductionist" is hurled rather indiscriminately and over-broadly at anyone suggesting human behavior is materially influenced by evolutionary processes. Of course there may be some accounts

[17] Hilary Rose & Steven Rose, *Introduction in* ALAS POOR DARWIN 1, 14 (Hilary Rose & Steven Rose eds., 2000) (summarizing Steven Rose's arguments in his own chapter, later in the book).

that surface, typically in the works of people who are not behavioral biologists, claiming that people are mere puppets of string-pulling genes, utterly devoid of free will. But these views are confused, incredible, rare, and insignificant for any practical purpose. And there are many ways to attend to the evolved components of a species-typical human psychology without overreducing. No one believes the essence of humanity resides in the proper understanding of the electron orbits of which the body is comprised. Similarly, no one thinks the study of copper, steel, and other components would afford full appreciation of a high performance sports car. Likewise, no one thinks humans are mere automata, wholly definable as the sum of their DNA. Nevertheless, bodies, brains, and cars are all composed of constituent elements. And they are all products of knowable processes that leave them designed to perform certain tasks. The anti-reductionist position has some virtues, for it cautions us against neglecting the whole for the parts. But no competent understanding of the whole can ignore the parts. Studying the influences of evolutionary processes on gene frequencies, and of gene frequencies on human behavior, is not in itself improperly reductionistic.

D. *Overzealous Belief in Empiricism*

Sometimes one hears skepticism of evolutionism wrapped in empiricism. This stems, apparently, from a belief that if one collects data, and studies it closely enough, relevant patterns of human behavior can be observed, and predictions will ensue with greater reliability than those a theory (like that undergirding behavioral biology) can provide. Such an approach is evident, for example, in the effort of some behavioral law and economics scholars to introduce more cognitive psychology into law. There is no question: empirical work is often important and useful. It can yield new insights, as well as accurate, data-driven predictions. Nonetheless, there are three responses to this approach.

First, data and statistics neither compile nor explain themselves. The data are a function of the way we choose among infinite possibilities what data to collect, and how to organize that data. These processes, in turn, often reflect presuppositions that may be wrong. And false suppositions can

unintendedly obscure law-relevant behavior patterns.[18] A wholly data-driven approach is often a trial-and-error approach—sure to yield some useful insights, but incapable of reaching them as quickly as empirical work that is firmly grounded in, informed by, and partnered with robust theory.

Second, people are often loathe to ascribe legal relevance to data, however clear, without plausible causal explanations. Suppose, for example, that someone produced unimpeachable data indicating that over the last ten years 100% of the jurors who wore an orange tie during voir dire for a criminal case voted to convict. Few would argue that when a prospective juror wears an orange tie it should now provide a basis for the judge to strike the juror for cause. Contrast, however, the probable practical implications if similarly strong data correlated reflexive votes to convict to membership in the (hypothetical) anti-crime vigilante group: Protectors of the Realm. Hesitation to ascribe legal relevance to data lacking causal explanations is especially probable when data are inconsistent with firmly held presuppositions. But a moment's reflection makes obvious that people are often similarly skeptical even absent any presuppositions whatsoever. We are simply often skeptical of data disembodied from plausible causal mechanisms.

Third, it is important to remember that behavioral biology is itself a highly empirical enterprise. Articles expanding our knowledge about biological influences on behavior appear in dozens of peer-reviewed journals, report thousands of findings annually, and are based on behavioral observations, hypothesis testing, and both.

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[18] Jones, *Evolutionary Analysis in Law, supra* note 1, at 1229-31. For example, before biologists and evolutionary psychologists published theories and evidence regarding evolved discriminative parental solicitude, and evolved (and highly context specific) predispositions toward infanticide of unrelated but unweaned infants, no one bothered to collect child abuse data in a systematic way that differentiated stepparents from natural parents. People had been studying child abuse for decades, without thinking to collect and scrutinize information on the kinship variable. Data on relatedness was an obvious prerequisite to analysis of victimization rates and comparative risks. Eventually, and as predicted by those studying the biology of behavior, it was shown that patterns of child abuse and infanticide in humans closely follow predictable patterns of neglect and infanticide in all the many other species in which the behaviors regularly occur. For an overview of this research, see *id.*

E. *Fears of Misuse*

Most people are clearly more comfortable swallowing unpronounceable chemicals in a drug, developed with imperfect knowledge of physiological biology, than they are swallowing the idea that the legal system might be improved, by efforts reflecting an imperfect knowledge of behavioral biology. I submit that this is rather peculiar.

Part of the explanation for this peculiarity likely lies in widespread fears of the public misuse of biological information. The potential for misusing behavioral biology is undeniable. Though this, alone, is insufficient to support any conclusion. (For, after all, many common features of daily life, such as electricity, can be both dangerous and useful.) The oft-voiced fear of misuse could usefully be divided into two main kinds: the unfounded fears and the founded fears.

Unfounded fears of misuse tend to flow from all-too-common mistakes of fact, as when people harbor mistaken assumptions about behavioral biology and conclude that biological knowledge (as they perceive it to be) should be excluded from some arena of human affairs. For example, people often incorrectly assume that any invocation of behavioral biology would necessarily invoke behavioral genetics, with its emphasis on difference, rather than commonality. They therefore presume that behavioral biology will most often be used, if at all, in the courtroom—to exculpate, or to mitigate the sentences of, criminal defendants. This factual assumption is wrong, rendering such concerns, however sincere, unfounded.

Founded fears of misuse come in two very different kinds, often lumped together in discourse: (1) fears of innocent misuse; and (2) fears of intentional misuse. Innocent misuses might stem either from people in some position of influence or power who misunderstand behavioral biology and therefore misuse its insights, or from people who fully and accurately appreciate the biology, yet inadvertently misuse it nonetheless. Intentional misuses would be those in which people invoke the perceived authority of biology to further pernicious ends, whether they understand the biology or not.

Members of society, and scholars in particular, should remain vigilant for misuse, and take reasonable precautions to prevent it. But the fact of the matter is that *every* useful tool—mechanical or disciplinary—can be misunderstood or misused. Behavioral biology is not unique in this regard. And one appropriate answer to misunderstanding or misuse of potentially valuable tools is education, caution, and oversight—not the wholesale exclusion for which some commentators argue. If the potential dangers of misusing evolutionary analysis in law are particularly troubling, let us improve the systems by which we educate people about behavioral biology and oversee legal decision-making processes. Improvements to these systems will decrease the probabilities that people will misunderstand or misuse behavioral biology.

F. *Unbalanced Attention to Costs*

One possible response to my argument that fears of misuse must be tempered is that our caution should rise in proportion to the costs of error. If, by virtue of incorporating bio-behavioral information into the process by which we regulate the behavior of human beings with the tools of law, we may harm the very citizens we seek to protect, and whose economic and personal thriving we seek to encourage, then we must tread timidly. I am not yet persuaded. At least not in the absence of more rigorous cost-benefit analysis than has ever been offered.

Here is why. It is true that the costs of misuse of different tools can vary considerably. (Compare, for example, misusing a blender to misusing a nuclear reactor.) But these potential costs of use can never legitimately be considered in isolation. There are equally important costs to foregone use, as well, and these are routinely ignored. To illustrate, consider that most people tend to care more about one life lost to a prematurely approved drug than to two lives lost on account of failing to receive a drug whose governmental approval was unduly delayed. If one cares principally about lost lives, this makes no sense.

Just as there is no way to conclude that the costs of relying on a false positive categorically exceed the costs of relying on a false negative, there is no way to conclude—*a priori*—that the costs of informing legal efforts to regulate behavior with behavioral biology categorically exceed the costs of not so informing legal efforts, if that would have yielded benefits. That is, no argument from a parade of horribles, following further integration of biology into law, can be persuasive without comparing that parade to the parade of horribles the *absence* of such integration would continue to allow.

We live in a world that contains—despite its many loves, virtues, and beauties—violent international and domestic confrontations, sexual coercion, deception, avarice, theft, environmental degradation, and zero-sum quests for status, to name but a few. It is entirely unclear to me that, in the end, even the imperfect introduction of behavioral biology into legal thinking would be more costly than unduly delaying that introduction, if the window on human behavior thereby gained may afford us some meaningful opportunity to reduce behaviors that we deem detrimental, and to encourage behaviors we deem constructive.

IV. UNDERLYING BARRIERS TO INTEGRATION

The foregoing concerns, significant as they are, nonetheless represent, in my view, mere surface manifestations of four far deeper problems. I call these: Tortured Taxonomy; Excessive Exceptionalism; the Burden of Proof Switcheroo; and the Argument from Missing Mechanism.

A. *Tortured Taxonomy*

Path dependence is the tendency of arbitrary or later-obsolesced initial choices or developments to lock in, impervious to superior alternatives that come along.[19]

[19] The QWERTY keyboard is the classic example. For more on path dependence, see generally Mark J. Roe, *Chaos and Evolution in Law and Economics*, 109 HARV. L. REV. 641 (1996); Clayton P. Gillette, *Lock-In Effects in Law and Norms*, 78 B.U. L. REV. 813 (1998); Oona A. Hathaway, *Path Dependence in the Law: The*

Nowhere, in my view, are the pernicious effects and enduring costs of path dependence more obvious than in our inherited taxonomy of university departments. In particular, the historical division of the natural sciences (including the life sciences, such as biology) from the social sciences (such as sociology and anthropology) continues to yield much mischief, as those attempting to learn something about human behavior, specifically, leave unconsulted those who actually specialize in the study of behavior, generally.

True, division of academic labor, when investigating the world's phenomena, yields some notable efficiencies. But there are at least four separate problems with Tortured Taxonomy that give rise to some of the surface barriers to integration mentioned above in Part III.

First, the neat division of labor was never intended to suggest the neat division of reality. And the academic tail has come to wag our understanding of the dog. Increasingly, it seems, academics expect reality to conform to our own discipline's necessarily limited models, rather than trying to synthesize knowledge among disciplines to bring the models closer to reality. This is a variation of the problem: when you have but a hammer, everything's a nail.

Second, taxonomic divisions generate tribal vocabularies, rendering inter-disciplinary communication difficult, and giving rise to misunderstandings that generate needless hostilities. One example: the word "strategies" in the biological term of art "reproductive strategies" was misunderstood by non-biologists to carry a positive normative connotation. An entire volume of essays, wholly misbegotten, ensued.[20] Another example: the word "theory" in the term of art

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Course and Pattern of Legal Change in a Common Law System, 86 IOWA L. REV. 601 (2001); Frederick W. Lambert, *Path Dependent Inefficiency in the Corporate Contract: The Uncertain Case with Less Certain Implications*, 23 DEL. J. CORP. L. 1077 (1998).

[20] In 1983, psychology Professor Delbert D. Thiessen was invited to give a "Fellow's Address" at the meeting of the Division for Comparative and Physiological Psychology at the annual convention of the American Psychological Association. He entitled his talk "Rape as a Reproductive Strategy: Our Evolutionary Legacy." In advance of the talk, several critics charged that the title, as publicized, was offensive because it suggested that rape was an *acceptable* method for procreating. Hostile reaction inspired a small book from the critics: VIOLENCE AGAINST WOMEN: A CRITIQUE OF THE SOCIOBIOLOGY OF RAPE (Suzanne R. Sunday & Ethel Tobach eds., 1985) [hereinafter VIOLENCE AGAINST WOMEN], in which some history of this episode is recounted. This unfortunate incident is traceable, in large part, to the cross-

"evolutionary theory" is routinely misunderstood as suggesting something purely hypothetical—the result of mere conjecture and opinion—as the term often implies in many other disciplines (including, of course, law).

Third, taxonomic divisions yield not only a plethora of different methods of inquiry (not, in itself, necessarily a problem) but also a lack of familiarity with the methods of other disciplines. For example, scientific method is more often adverted to than understood, with the result that the significance of findings and the implications of scientific studies are often over- or under-credited by those in non-scientific disciplines.

Fourth, and relatedly, the taxonomic divisions we continue to maintain unduly obscure important disciplinary content from related but nearly hermetically sealed disciplines. A startling example is the long history, within several disciplines, of claims that only the human species exhibits sexual aggression. This has long been known to be unequivocally false, as evidenced by numerous articles in the biological literature.[21]

B. *Excessive Exceptionalism*

Much of the criticism of evolutionary perspectives on human behavior appears to flow from misplaced pride. Behavioral biology explores commonalities between humans and other animals. And we simply don't like that. Indeed, it appears that many people's pride has ossified to the point that they prefer to ignore or deny that *Homo sapiens sapiens* is just

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disciplinary ambiguity of the term of art "reproductive strategy"—which has a normative implication in lay minds, and no such implication to evolutionists. *See, e.g.*, Julie Blackman, *The Language of Sexual Violence: More Than a Matter of Semantics*, *in* VIOLENCE AGAINST WOMEN, *supra*, at 115, 126 ("Strategies and legacies are connotatively positive . . . .").

[21] However people may differ on whether forced copulation in other species should or should not be labeled rape, and however people may disagree on whether or not the study of forced copulation in the many other species in which it occurs can yield useful insights about patterns of human rape, the fact remains that forced copulation does occur in many other species, including some of our closest primate relatives. For an overview, see Jones, *Sex, Culture, and the Biology of Rape*, *supra* note 2. *See also* Owen D. Jones, *Law and the Biology of Rape: Reflections on Transitions*, 11 HASTINGS WOMEN'S L. J. 151 (2000); Owen D. Jones, *Realities of Rape: Of Science and Politics, Causes and Meanings*, 86 CORNELL L. REV. 1386 (2001).

one species among many primate species, and one kind of animal, among millions. It is a strong accusation to say that pride is a principal barrier to wider acceptance of behavioral biology, but I believe it is an accurate one.

All species are unique, of course, by definition. But we have generally preferred to believe, *pace* Orwell, that some species are more unique than others, and that our own uniqueness is—well—unique. When Copernicus revealed as false our belief that Earth was the center of everything, we retreated to the less bold claim that we, among all life, sprang full-blown from time—the favored creature of a special Creator. When Darwin shrank the probability of that toward zero, we retreated into successively more humble claims. We thought ourselves the only tool users . . . until many other species were found to use tools.[22] We thought ourselves alone capable of culture . . . until we found unequivocal evidence of intergenerational transmission and local variation of culture in other animals.[23] More recently, even our basic patterns of rhythms, tones, and repetitions in music have been shown to share deep commonalities with the songs of other creatures, from birds to whales.[24]

Human history is nothing if not a study in hubris. And we likely resist evolutionary perspectives on human behavior because the supposedly unique origin of our behavior is our last conceit. There is, I submit, some pathos in this. We would immediately label as absurd the idea that human anatomy is wholly unlike the anatomy of other animals. There are

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[22] Species as diverse as chimpanzees and crows have demonstrated the abilities not only to use tools, but to fashion them from raw materials. *See, e.g.*, Yukimaru Sugiyama, *Tool Use by Wild Chimpanzees*, 367 NATURE 327 (1994); Gavin R. Hunt, *Manufacture and Use of Hook-Tools by New Caledonian Crows*, 379 NATURE 249 (1996).

[23] A recent study addressing all accumulated reports of chimpanzee cultural transmission showed that we are not alone in having intergenerational and non-genetic transmission of novel information and forms of behavior. *See generally* Frans B. M. de Waal, *Cultural Primatology Comes of Age*, 399 NATURE 635 (1999); Andrew Whiten et al., *Cultures in Chimpanzees*, 399 NATURE 682 (1999); Andrew Whiten & Christopher Boesch, *The Cultures of Chimpanzees*, SCI. AM. 61 (Jan. 2001); FRANS DE WAAL, THE APE AND THE SUSHI MASTER: CULTURAL REFLECTIONS BY A PRIMATOLOGIST (2001).

[24] *See generally* Patricia M. Gray et al., *The Music of Nature and the Nature of Music*, 291 SCIENCE 52 (2001); Mark Jude Tramo, *Music of the Hemispheres*, 291 SCIENCE 54 (2001).

recognized and accepted commonalities in the way nervous systems work, the way hearts function, or the common origins and composition of skeletal structure. If radiation kills rats, maybe it will kill humans too. If megadoses of a substance cause cancer in mice, perhaps the substance will adversely affect humans, too. We accept that evolutionary processes operate universally, on all life, when generating physical form. And yet, in contrast, we balk at the notion of behavioral commonalities. When other species are shown to behave irrationally, to abuse offspring, to display sexual aggression, or to aid others in times of need,[25] we have rushed to ignore it—assuming that our own behaviors spring from wholly unique founts of origin.

The dichotomy between form and behavior, however, is artificial. The form of any animal is worthless (not to mention quickly dead) without a suite of inherited behavioral predispositions making the heart beat, the antibodies attack, the stomach churn, and the adults prefer sex to suicide. The fact that these predispositions are varied, subtle, and context-specific rather than automatic, and probabilistic rather than deterministic, does not mean they are non-existent, unknowable, or random. Often, these patterns of behavior are not only consistent with what is known about evolutionary processes, but also strikingly consistent with behavioral patterns in other animals. Were we to become more accepting of this fact, it might lead us to re-think some of our approaches to the legal control of human behavior, perhaps leading to more effective and efficient achievement of our own pre-articulated goals.

C. *The Burden of Proof Switcheroo*

If there is one lesson for future rhetoriticians from the history of criticisms leveled at evolutionists (other than be sure to cast the first and catchiest slogans) it is this: put the burden of proof on those with whom you disagree. As lawyers well know, who bears the burden of proof, and what standard must be met to meet that burden, are often dispositive matters.

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[25] *See* sources cited *supra* note 2.

What bears proving is a function of one's prior presumption, the default position to be maintained if the burden of proof is not carried. For many people skeptical of the utility of behavioral biology, apparently, the proper presumption is that all important human behaviors are learned, or socioculturally constructed, unless proven otherwise. (This is a variation on the theme: if it walks like a duck, and talks like a duck, it is probably a social construction of a duck.)

This switcheroo is illogical and improper. It gets the burden of proof precisely backwards. What bears proving is not that human behavior is importantly influenced by a suite of evolved predispositions, as are the behaviors of all other living organisms, but that it is not. The burden of proof switcheroo is, in large measure, a product of latent Excessive Exceptionalism. But as that exceptionalism is misplaced, so too are a number of the presumptions that have driven self-congratulatory resistance to human behavioral biology.

When there is a sound theoretical basis for how a behavioral predisposition (say, affection for healthy offspring, or any of the other basic emotions) has arisen evolutionarily, when there is abundant observational or experimental evidence that relevant species display that predisposition in patterns predicted by hypotheses derived from the theoretical foundation, and when humans, too, display the same patterns, then the proper presumption is that humans do so influenced, in part and importantly, by similarly evolved behavioral predispositions.

This is, of course, reasoning that relies on the higher value of parsimony, in scientific method, than of its many alternatives. There is no reason to believe that a more parsimonious explanation is necessarily true. But there is ample reason to believe that the more parsimonious explanations should provide the presumption that determines the allocation of the burden of proof.

I am not suggesting that calculating presumption is simple or formulaic. There are many different factors, in addition to those mentioned above, that can have bearing on the allocation, and suggest that common patterns or features can be the result of different evolutionary pathways. Nonetheless, it is quite clear that the burden of proof

switcheroo has too hastily, too often, and too often unjustifiably been used to protect the suspiciously convenient and demonstrably preferred bastion of human exceptionalism that those most resistant to bio-behavioral science fight to preserve.

D. *The Argument From Missing Mechanism*

A variation on the Burden of Proof Switcheroo is what might be called The Argument from Missing Mechanism. It goes like this: if you cannot identify which alleles yield X behavior, then you have no business arguing that we should believe that X behavior is biologically influenced. This is patently absurd.

Surely the more information biologists can provide about mechanisms the more thoroughly we can understand behavioral phenomena, and the more confidence we can have in believing that the phenomena are significantly influenced by genetic or evolutionary processes. But it does not follow that identifying a mechanism is a prerequisite to proper confidence in a conclusion.

For example, there are a great many phenomena that we have every reason to believe are genetically influenced, despite the fact we haven't any clue precisely how. We do not know which genes are responsible for hunger, for the suckling behavior of an infant, for the erection of an adult male, for the reflex that withdraws us from hot surfaces, for sleep, for sexual desire, and the like. And yet no one seriously doubts that these are all influenced by a suite of genes widespread throughout our species.

The confidence comes from triangulating many different facts. These include the evolutionary significance of the behavior, the extent to which the behavior is widespread in the animal kingdom generally, and closer relatives in particular, and, importantly, the absence of a plausible and parsimonious alternative explanation.

CONCLUSION

That evolutionary analysis in law can provide useful insights, by integrating behavioral biology with existing models of behavior, is clear. While none pretend that it offers talismanic, magical qualities, it is hard to ignore the fact that behavior is fundamentally a biological phenomenon, and hard to argue that less knowledge of behavior is more useful than more knowledge.

As with any invocation of evolution, and as with any attempt to argue that the study of biology can yield important insights into human behavior, there will always be critics. Critics are useful for chastening unbridled enthusiasm, which unchecked might sweep some unsound conclusions along in the eddy formed by brisk progress. Critics usefully sharpen thinking, force reflection, and urge caution in the use of any tool, perspective, or insight that can be misused. And it is important to take sound criticism seriously.

Unfortunately, a great deal of criticism is, in this context, simply unsound. As discussed above, such criticism often sounds persuasive, because it garners adherents by bashing straw men positions everyone loves to hate and few, if any, actually espouse. It is often cloaked in thoroughly anachronistic rhetoric of human exceptionalism that reflects more human pride than human sense. There are many new opportunities for useful evolutionary analysis in law and this is a good time to pursue them. In doing so we should be mindful of sound criticism—but alert for flawed contentions that, unnoticed, might over-deter.