Once More into the Breach: Revisiting the Metaphor of Mechanism in Evolutionary Psychological Explanations

Edwin E. Gantt
Jeffrey L. Thayne
Brigham Young University

Abstract

Recent decades have witnessed increased interest in evolutionary psychological explanations of all manner of human behavior. An example of this increased interest can be seen in Durrant and Ward (2012), who call for a more appreciation and systematic integration of evolutionary explanations in criminology. A central platform of their proposal assumes that the key to any adequate evolutionary explanation of human behavior is the causal presence of evolved psychological mechanisms. We contend, however, that any account of human behavior – criminological or otherwise – that relies on "psychological mechanisms" to account for either the transmission of psychological entities across generations or the current existence of such entities cannot in principle succeed because such explanations reflect a fundamental confusion between metaphors and mechanisms.

Recent decades have witnessed a veritable explosion of interest in evolutionary psychology and the attempt to explain all manner of human behavior in fundamentally evolutionary terms (see, e.g., Bjorklund & Pellegrini, 2001; Boakes, 1984; Buss, 1999, 2005; Crawford & Krebs, 2008; Dennett, 2006; Forgas, Haselton, & von Hippel, 2007). Drawing inspiration from the Darwinian theory of natural selection, many evolutionary psychologists argue that "all behavior owes its existence to underlying psychological

mechanisms" and that the central task of an evolutionarily informed social science is to "discover, describe, and explain the nature of those mechanisms" (Buss, 1995, p. 6). Consequently, evolutionary theorists have worked diligently to definitively identify the various "evolved psychological mechanisms" that would presumably account for the wide range of human cognitive, emotional, and social behavior.

One clear example of this strategy can be seen in the work of Durrant and Ward (2012) featured in this volume. These authors call for a "measured consideration of the role of evolutionary explanations in criminology" (p. 4), citing four principle reasons for such consideration. Briefly, the reasons offered are: (1) the increasing incorporation and acceptance of evolutionary psychological theories in the mainstream of psychological science, (2) a burgeoning track record of fruitful explanations of criminological phenomena (e.g., homicide, theft, drug use, rehabilitation, etc.) by means of evolutionary theories, (3) a growing sense that a more pluralistic approach to explanation in the social sciences will advance knowledge, and (4) the need to integrate theories of crime and punishment in a way that takes better account of biological, psychological, and sociological variables. The authors stated aim for their paper, then, is to "clarify the role of evolutionary explanations in criminology with a focus on how evolutionary approaches can be best integrated with mainstream criminological approaches" (p. 5). While acknowledging that many social scientists remain skeptical as to the viability of evolutionary explanations of behavior, Durrant and Ward (2012) claim that the key question at hand is "not *whether* evolutionary theory is relevant to an understanding of human behavior" (p. 8) but rather what role evolutionary accounts have to play in legitimate social science theorizing.

According to these authors, an adequate evolutionary understanding of the origins and nature of criminal behavior presumes not only that the physical characteristics of human beings have evolved through processes of natural and sexual selection, but that our psychological and, consequently, cultural characteristics did so as well (see also Roach & Pease, 2011). Thus, because of our evolutionary history, we possess a number of both

domain general and domain specific evolved psychological mechanisms that provide us with the capacity to use language, create and develop a wide diversity of cultural forms of life, engage in meaningful social and political relationships, and construct environments for subsequent generations that can then, in turn, shape human genetic and cultural evolution. In this model, the conceptual bridge that connects the fundamentally biological processes of Darwinian natural selection to the interpersonal vagaries and complexities of contemporary psychological life, as well as, ultimately, to the shaping of cultural life for untold generations to come, is the "evolved psychological mechanism" (and its presumed causal powers).

We will contend, however, that the search for "evolved psychological mechanisms" that can adequately account for either the transmission of psychological entities (i.e., emotions, intentions, ideas, behaviors, etc.) across generations or the current existence of such entities cannot in principle succeed. Thus, these authors are doomed to fail in their attempt to offer a viably scientific explanation of human criminal behavior, as are all other like-minded evolutionary psychologists who seek to do much the same thing with all sorts of other human behaviors. Because evolutionary psychological theories fundamentally rely on the metaphor of mechanism – rather than on actual mechanisms – such theories cannot justifiably be employed to draw the sorts of causal inferences that evolutionary psychologists wish to make regarding the origins and nature of human behavior (Gantt, Melling, & Reber, in press). Indeed, we argue that for the most part evolutionary psychologists (in this particular case Durrant and Ward) consistently confuse their metaphors for mechanisms, and in so doing ultimately render explanations of human behavior that are not only uninformative but also unscientific.

A Brief Bit of History

Though seldom noted in popular accounts of the rise and eventual near-universal acceptance of Darwinian theory in the biological sciences (as well as in the larger Western culture), Darwin's ground-breaking explanation of the origins of species by means of natural selection struggled to gain full acceptance in the scientific community of his day. There

was, as many early critics (both in and out of the biological sciences) noted – and, indeed, Darwin himself readily acknowledged – a serious problem with the theory insofar as it did not adequately provide for the actual physical mechanism by which rising generations inherited the various physical traits of preceding generations. That is, while Darwin argued that those physical traits of an organism that make it more likely to survive and successfully reproduce become more common in a population over successive generations via processes of natural selection, such processes were by themselves insufficient to fully account for the transmission of said characteristics. Indeed, as much subsequent research over the last century has shown, natural selection is really only one of the four fundamental forces of biological evolution – genetic drift, gene flow, and random mutation constituting the other three (see Barton, Briggs, Eisen, Goldstein, & Patel, 2007). Thus, while Darwinian natural selection might instigate the process by which physical characteristics are transmitted from one generation to another in species, without a clear empirical or material referent of some sort, the question of exactly how such characteristics were in fact "transmitted" remained a mystery, and the basic notion of "survival of the fittest" merely a potentially fruitful metaphor.[1]

Interestingly, the difficulty that Darwin and his intellectual descendants experienced in addressing this knotty explanatory problem actually led to a perceptible decline in the popularity of Darwin's theory in the late 19th and early 20th centuries (see Bowler, 2003). Indeed, some of Darwin's critics were fully convinced that the problem of the actual mechanics of transmission was so serious that it constituted a fatal flaw from which the theory could not hope to recover. Thus, contrary to the popular impression that Darwinian theories took the scientific world by storm and swept away all competitors almost

[1] For a detailed account of the reception of Darwin's work, and the intellectual debates surrounding it in both the 19th and 20th centuries, see Peter J. Bowler's (2003) *Evolution: The History of an Idea* and Edward J. Larson's (2004) *Evolution: The Remarkable History of a Scientific Theory*. For a more intimate description of how Darwin himself handled the various philosophical, theological, and scientific objections to his work see Adrian Desmond and James Moore (1991), *Darwin: The Life of a Tormented Evolutionist*.

immediately upon the publication of *The Origins of Species*, there were in fact a variety of other scientifically respectable theories – at least according to the science of the day – that were being hotly debated in the decades following Darwin's initial proposal, all equally eager to identify the missing mechanical link of evolution (e.g., Saltationism, Orthogenesis, Neo-Lamarckism, etc.).[2] Interestingly, although it is commonly assumed that the rediscovery of Mendel's laws of genetic inheritance at the beginning of the 20th century provided the immediate conceptual support Darwin's theory required, Mendel's work was actually first put forth as an alternative to Darwinism (Bowler, 2003). Indeed, it was not until the 1930's that the two theories were finally brought into accord whereby genetic inheritance was seen as providing the actual material mechanism for and scientifically acceptable solution to Darwin's transmission and selection problem (Larson, 2004).

The "modern synthesis" of Mendelian genetics and Darwinian selection theory was primarily brought about in Fisher's (1930) book *The Genetical Theory of Natural Selection*. In this work, Fisher successfully challenged the common scientific thinking of his day by arguing that Mendelian genetics and Darwinian natural selection were not only compatible, but in fact were both required in order to make adequate sense of evolution. As philosopher of science John Dupre (2003) has recently noted, "the result today is a richly articulated causal theory" in which "natural selection remains by far the most powerful – according to many the only – theory that provides an explanation of the adaptation of organisms to their environments" (p. 19). The linchpin that accounts for the modern rise of Darwinian evolutionary theory from being just one among many competing scientific theories of evolution in the early part of the 20th century – and a troubled one at that – to being almost universally embraced in the biological sciences today was Mendel's discovery of the gene and R. A. Fisher's subsequent deft weaving of the work of both Mendel and Darwin into one

[2] Indeed, it is indicative of the intellectual climate of the early part of the last century to note that one of the most popular biology textbooks of the 1930s, *Dynamic Biology*, only mentioned Darwinian evolutionary theory near the end of the book and concluded that "Darwin's theory, like that of Lamarck, is no longer generally accepted" (May, 1984, p. 307; cited in Witham, 2002, p. 153).

viable conceptual whole. Ultimately, it was the gene that served as the empirically demonstrable material referent necessary for transforming heredity by natural selection from merely being an intriguing metaphor into a verifiable mechanism. Once coupled with a clear material referent like the gene, natural selection was accepted as a properly mechanical means by which functional explanations of physical phenomena and events could be offered in science, and, thereby, became a powerful explanatory approach in the biological sciences. Absent a clear material referent, however, explanations invoking natural selection alone are rightly subject to considerable doubt, as the historical example of Darwin's theory makes clear.

What the brief historical analysis here suggests is that there is a strong precedent for questioning theories that lack a material referent or physical mechanism to account for observed phenomena. For this reason, perhaps we should take a closer look at the nature and viability of the proposed "evolved psychological mechanisms" that constitute a central conceptual conceit of Durrant and Ward's (2012) evolutionary approach to explanation in criminology. Durrant and Ward (2012) identify the notion that "humans possess a number of both domain general and domain specific psychological mechanisms" as one of three foundational assumptions that form the basis of evolutionary behavioral science and which, thereby, "allow us to talk sensibly about an evolved human nature" (p. 8). Presumably, the existence of the sorts of psychological mechanisms these authors propose "allow us to talk sensibly about an evolved human nature" because such mechanisms *qua* mechanisms allow us to identify the underlying causal origins of human conduct. Sensibly, in this sense then, means efficient causal – a common mode of scientific explanation in both contemporary natural and social science (Bishop, 2007), and certainly the mode preferred by evolutionary psychologists (Menuge, 2004; Tallis, 2011).[3] However, this very claim raises a few

[3] This is not to say, however, that such is the best or only mode of explanation. However, a detailed analysis of alternative modes of explanation and understanding in the natural and social sciences is well beyond the scope of the present paper. The interested reader is referred to works by Bishop (2007), Cornwell (2004), Hiley, Bohman, and Shusterman (1991), Illari, Russo, and Williamson

important questions: Do explanations invoking "psychological mechanisms," evolved or otherwise, in fact allow us to talk sensibly – that is, scientifically (i.e., in strictly material and efficient causal terms) – about human nature and behavior? Or, is talk of psychological mechanisms and their presumed causal efficacy really just talk that has been hypnotized by the vibrancy of a widely accepted metaphor, and which, as such, does not allow for any genuinely causal trajectories to be drawn between the distinct ontological domains of biology and psychology?

Mechanisms and Metaphors

The complex role that metaphor has played in the history of scientific theorizing, in general, and in the theorizing of the social sciences, in particular, has been explored in great detail by a number of scholars (see, e.g., Brown, 2003; Hallyn, 2000; Leary, 1990). Although there are significant differences of opinion among these scholars regarding the nature, utility, and proper role of metaphor in scientific theorizing, there is nonetheless a fairly solid agreement that while metaphors are an inescapable feature of all scientific theorizing, they in no way constitute the material or empirical referents necessary to support the sorts of mechanical and casual explanations that many scientists wish to make using them. Indeed, the very concept of mechanism present in so many psychological explanations of thought and behavior – and which is a hallmark of most evolutionary psychological explanations – is itself a metaphor (Leary, 1990). A mechanism is, after all, simply a physical object of one sort or another, a piece of machinery designed to transform input forces and movement into a desired set of output forces and movement (Uicker, Pennock, & Shigley, 2011). As such, then, a mechanism is most often just one piece of a larger process or mechanical system (e.g., the winding mechanism of a clock, the hinge mechanism of a door, etc.).

(2011), and Trigg (2001) for more detailed treatments of the question of explanation in the natural and social sciences.

Granted, the term mechanism has come to be used – especially by psychologists – in a much more conceptually expansive way than merely as a reference to some specific material entity or device for facilitating the transfer of forces and movement (Norkus, 2005). Since Descartes first introduced the metaphor of mechanism in the 17th century, and later psychologists took up the metaphor as foundational to a science of "mental mechanics" (Leary, 1990, p. 17), we have come to invoke all manner of psychological mechanisms, behavioral mechanisms, societal mechanisms, intrapsychic mechanisms, and mechanisms of cultural transmission and transformation in our attempts to account for a vast array of individual acts and interpersonal events (Norkus, 2005). However, this simply reflects an instance of disciplinary over-reach, wherein the viable concepts from one science (i.e., Engineering), concerned with one ontological realm (i.e., the physical), are misappropriated for service in an entirely different science (i.e., Psychology) concerned with an entirely different ontological realm (i.e., the psychological and sociocultural). This blurring of conceptual boundaries happens because of a disciplinary tendency to uncritically allow our metaphors to concretize and then get away from us. The psyche – contrary to some elaborate attempts to paint it as such – is not in fact a physical thing and, thus, is not the sort of thing populated by, constituted of, or originating in mechanisms (Robinson, 2009; see also Gantt, Melling, and Reber, in press). Of course, this is not to say that the psyche is fundamentally independent of the physicality or mechanicity of the brain – only that the psyche is not identical with or adequately reducible to the physics of the brain. As such, then, there is no such thing as a materially real or empirically-verifiable psychological mechanism (Tallis, 2011). Indeed, the term itself is little more than a conceptual oxymoron, and, therefore, not a viable explanatory construct for any psychology that seeks to ground itself in either the materialist metaphysics of evolutionary theory or the positivist philosophy of contemporary natural science.

Ironically, it is one of evolutionary psychology's most ardent advocates who (perhaps unintentionally) provides an important caution concerning the explanatory viability of

evolved psychological mechanisms. Daniel Dennett (1995), in his book *Darwin's Dangerous Idea: Evolution and the Meanings of Life*, famously distinguished between "skyhooks" and "cranes" as a means of judging the plausibility of scientific explanations, particularly Darwinian explanations of speciation, life, and meaning. Dennett (1995) quotes the Oxford English Dictionary, which defines a skyhook as "an imaginary contrivance for attachment to the sky" or "an imaginary means of suspension in the sky." Dennett (1995) writes:

> The skyhook concept is perhaps a descendant of the *deus ex machina* of ancient Greek dramaturgy: when second-rate playwrights found their plots leading their heroes into inescapable difficulties, they were often tempted to crank down a god onto the scene, like Superman, to save the situation supernaturally. . . . Skyhooks would be wonderful things to have, great for lifting unwieldy objects out of difficult circumstances, and speeding up all sorts of construction projects. Sad to say, they are impossible. (p. 74)

In sharp contrast to the "impossible" (i.e., magical) powers of a skyhook, Dennett (1995) argues:

> Cranes can do the lifting work our imaginary skyhooks might do, and they do it in an honest, non-question-begging fashion. They are expensive, however. They have to be designed and built, from everyday parts already on hand, and they have to be located on a firm base of existing ground. Skyhooks are miraculous lifters, unsupported and insupportable. Cranes are no less excellent as lifters, and they have the decided advantage of being real. . . . It is time for some more careful definitions. Let us understand that a *skyhook* is a "mind-first" force or power or process, an exception to the principle that all design, and apparent design, is ultimately the result of mindless, motiveless mechanicity. A *crane,* in contrast, is a subprocess or special feature of a design process that can be demonstrated to permit the local speeding up of the basic, slow process of natural selection, *and* that can be

> demonstrated to be itself the predictable (or retrospectively explicable) product of the basic process. (pp. 74-75)

Here we can see Dennett's recognition[4] that the only sorts of explanations that should count for the evolutionary theorist as being properly scientific are those that directly connect events in the world to those material conditions which are capable of producing them. And Dennett (1995) argues that Darwin's idea of natural selection, coupled with Mendelian genetics, provides an account that is grounded in precisely this way. According to Dennett, explanations that are not grounded in material, efficient causal processes are ultimately "skyhooks" and not cranes.

Obviously, there is nothing whatsoever wrong with postulating the existence of as-yet-undiscovered mechanisms of change or the tendering hypotheses that call for close empirical examination. There is, likewise, nothing inherently wrong with employing a metaphor drawn from everyday common experience in one's attempt to make sense of complex and difficult phenomena. Such is, in many ways, key to the entire scientific enterprise, especially in social sciences (see, e.g., Brown, 2003; Leary, 1990). The problem here is that attempts to offer evolutionary accounts of the origins and nature of human behavior, such as those proposed by Durrant and Ward, can never rise above the metaphorical because they are in principle trying to account for phenomena (intentions, desires, emotions, perspectives, thoughts, interpretations, etc.) which have no direct material – and, therefore, no genuinely mechanical – causal referents.[5]

Because there is no clear material or efficient causal referent to the metaphor of a psychological mechanism, explanations invoking psychological mechanisms are simply

[4] Sadly, this recognition is one that Dennett himself all-too-frequently forgets, particularly in his accounts of the evolutionary origins of such human phenomena as consciousness, moral agency and religion (see, e.g., Dennett, 1991, 2003, 2006).

[5] Again, as noted above, this is not to say that material reality is not a condition for the existence of psychological traits or social life, but rather only that psychological phenomena can never be adequately or sufficiently reduced to or explained by material reality.

examples of assuming that a "skyhook" can do the heavy lifting of actual scientific explanation. The psychological mechanisms that Durrant and Ward (2012) claim constitute a key explanatory necessity of an evolutionary account of criminology cannot (in principle) be "demonstrated to be themselves the predictable (or retrospectively explicable) product of the basic [biological] processes" of Mendelian genetics. As Uicker, Pennock, and Shigley (2011) note in their widely respected textbook on the fundamentals of mechanical engineering, mechanisms – as parts of larger mechanical systems – require direct links that "must be connected together in some manner to transmit motion from the *driver*, or input motion, to the *follower*, or output" (p. 8; italics in the original). Absent such direct connecting links, the mechanism does not exist as a mechanism and cannot serve any genuinely mechanical or causal function. Thus, the metaphor of the mechanism breaks down in evolutionary psychological explanations of behavior precisely because no such direct connecting linkage between the physical and the psychological can be either rationally or empirically established.[6] And, further complicating the explanatory project of evolutionary psychology, is the fact that no direct causal link between any specific human act and the psychological mechanism(s) presumably responsible for such act can be drawn either.

To presume that invoking a psychological mechanism, evolved or otherwise, provides an adequate account for the origins and nature of a given psychological phenomenon is to erroneously assume that no significant gap exists between the realm of the truly mechanical and material and the immaterial realm of the psychological and social. It is to assume that material conditions and processes can create psychological entities (i.e., psychological mechanisms) which, while profoundly other than material in terms of their essence, functioning, and manifestation, nonetheless retain all those material qualities that would

[6] Indeed, as Tallis (2011), Bennett and Hacker (2003), Beauregard and O'Leary (2008), Legrenzi and Umilta (2011), and Robinson (2008) have all convincingly demonstrated, the clearest and most compelling logical and empirical evidence we have is quite simply that mind is not brain, nor can it be adequately derived from brain.

allow for the efficient causal production of events in the world. What began as the metaphor of the mechanism has now become the mechanism itself!

Ultimately, evolutionary psychological metaphors also fail to provide compelling functional explanations of human behavior (Buller, 2005; Richardson, 2007). They demonstrate neither the mathematical cogency of quantitative genetics nor the parsimony and predictive power of operant conditioning (see Gantt, Melling, & Reber, in press). They also lack the conceptual origins of a material and mechanistic analog like the computing machine and fail to clearly intimate potential material referents in the brain that may eventually support a properly mechanistic account of the phenomenon (Tallis, 2011). Thus, evolutionary psychological accounts of culture, social behavior and psychological life – despite the prevalent and accepted rhetorical use of mechanical terms – originate in and allude to immaterial and non-mechanistic human phenomena and experiences, and, as such, are far removed from the material referents and mechanistic analogs necessary to mechanistic or functional explanatory force.

Conclusion

In the end, then, the "evolved psychological mechanisms" which evolutionary psychologists like Durrant and Ward assume to be central keys to adequate explanation of human behavior are in fact not mechanisms at all, but mechanical metaphors that remain metaphors no matter how much one might wish to imbue them with necessary causal power or hope they possess actual material reality. Indeed, and perhaps most significantly for the case we are making here, a central basic claim of Durrant and Ward's proposed evolutionary approach to criminology – that is, that any adequate explanation of human criminal behavior must assume the existence and operation of certain evolved psychological mechanisms – lacks scientific merit because there are no such things as psychological mechanisms, expect in the most metaphorical sense. As demonstrated above, a mechanism is a bit of machinery, an assemblage of moving parts, a system of material components operating in sequence or in conjunction, or a material linkage or ordered

sequence of events in a biological, chemical, or physical process. Thus, to speak of a "psychological mechanism" is to employ a metaphor to make what is at best a tenuous comparison between the characteristics and operations of two fundamentally distinct ontological realms (i.e., the psychological or cultural and the physical). And to speak of an "evolved psychological mechanism" is to speak nonsense, insofar as mechanisms are material things, not psychological ones, and psychological things do not evolve – except, again, in a purely metaphorical sense. Ultimately, however, evolutionary metaphors, no matter how seductive, intriguing, or persistently or confidently employed, cannot sustain the heavy conceptual weight required of the sorts of scientific explanation to which evolutionary psychologists aspire.

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