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## **WORLD HISTORY FOR BEHAVIOR ANALYSTS: JARED DIAMOND'S *GUNS, GERMS, AND STEEL***

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Jared Diamond's Pulitzer Prize-winning book, *Guns, Germs, and Steel: The Fates of Human Societies*, contains two important messages for behavior analysts, one a statement of theoretical (and perhaps social-political) kinship and the other a suggestion about scientific methodology and subject matter. First, *Guns, Germs, and Steel* presents an environmentalist explanation of the dramatically different fates of the world's cultures that is compatible with the views of many behavior analysts, past and present. Second, Diamond's discussion of the book's methodology suggests useful new ways for behavior analysts to investigate important but currently neglected forms of individual behavior.

### **NATURE, NURTURE, AND HUMAN ACHIEVEMENT**

Among psychological theorists, behavior analysts tend to emphasize environmental causes. There is no inherent reason why behavior analysts should be found on the nurture end of the traditional nature-nurture continuum (nor, for that matter, on the liberal end of the liberal-conservative continuum). One might toil in the behavioral laboratory articulating the laws of learning, while granting those laws relatively little influence on the achievements of the species. Indeed, Richard Herrnstein's behavior analytic research contributed enormously to our understanding of the law of effect while his more widely read works emphasized the role of heredity in social problems and in the differing accomplishments of social groups (Herrnstein & Murray, 1994; Wilson & Herrnstein, 1985). Nonetheless, behavior analytic research highlights the power of environmental variables in the control of behavior. Genetic endowment is acknowledged as an important source of behavior in human and non-human species (Skinner, 1966), but relative to most other behavioral scientists, behavior analysts are more likely to attribute behavior to environmental contingencies than to lasting behavioral tendencies internal to the organism. Watsonian omnipotentiality is no longer widely endorsed; however, behavior analysts continue to reject theories of behavior that rely on traits and temperaments, arguing that these are circular constructs—explanatory fictions that have no reality beyond the behavior they seek

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to explain (Michael, 1993). Behavior analysts seek the sources of behavior in the environment; whereas to varying degrees, other behavior theorists look for the sources of behavior in the biology of the individual.<sup>2</sup>

Those who attempt to explain the successes or failures of various cultures of the world play out a similar nature-nurture conflict on a larger stage. Jared Diamond's *Guns, Germs, and Steel* is a four hundred-page answer to a question posed to him by a New Guinean friend and politician named Yali. As the two men walked on the beach, Yali asked, "Why is it that you white people developed so much cargo and brought it to New Guinea, but we black people had little cargo of our own?" (p. 14). Diamond, a biophysicologist who often traveled to New Guinea to conduct field research, had long thought the New Guinea people to be extremely intelligent, yet they live as hunter-gatherers, tribal farmers, and fishing people. The traditional answer to Yali's question, and one consistent with Herrnstein and Murray's (1994) *The Bell Curve*, would attribute differences in the success of cultures to genetics: Yali's people are less intelligent and less creative than Diamond's people, and the difference lies in the phylogeny of the two groups. By tracing what he modestly calls, "a brief history of everybody for the last 13,000 years," Diamond argues very compellingly that the great gulfs among cultures throughout the world are largely due to accidents of geography: "History followed different courses for different peoples because of differences among peoples' environments, not because of biological differences among peoples themselves" (p. 25). Just as the immediate environment affects an individual's behavior, the local habitat dramatically influences the development of a social group.

Diamond cites a number of factors that facilitate the more rapid advancement of a culture. One of the most important of these is the number of local plant and animal species available for domestication. An essential passage for all developing societies is the transition from a hunter-gatherer society to a food-producing society. Once nutrient rich plants have been domesticated and efficient methods of food production have been established, far less labor is required to obtain food for the group, and it is possible to establish a permanent location, rather than a nomadic existence dependent upon the local availability of food. When only a fraction of the population is required for food production and other essential functions, such as child rearing, those not engaged in these basic activities are able to take on other roles. Various trades are free to develop, and a wider system of mercantile exchange is possible. For a society to make the transition from food

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<sup>2</sup> The behaviorist's greater emphasis on environmental determinants of behavior may simply be a response to the reinforcement contingencies. Assuming the behavior of behavior analysts (i.e., behavior analytic behavior) is reinforced by the discovery of the variables that control behavior, the manipulation of environmental variables often provides more immediate reinforcement than the development of drug therapies or genetic treatments. Watson's famous statement about the power of behaviorism (1924), may have been more an expression of exuberance produced by a rich schedule of reinforcement than a sober assessment of the power and limits of environmental control.

gathering to food production through the planting of crops, either the group must domesticate edible local species or it must adopt crops domesticated elsewhere through contact with another group. Both of these methods are dependent on the local geography. Independent domestication of plants depends on the nature of local species eligible for domestication. For example, as early as 8500 BC, in southwest Asia, local species allowed the independent domestication of wheat, peas, and olives. By comparison, in what is now the eastern United States, only sunflower and goosefoot were independently domesticated—and then not until 2500 BC (Diamond, 1998, p. 100). Adoption of a crop domesticated elsewhere depends on having contact with other groups—something that is also greatly affected by geography—and on the local climate being comparable to the site of original domestication.

The domestication of animals has multiple effects on the development of a culture. Small animals can be eaten as a protein-rich contribution to food production, and large animals can provide domestic labor in support of agriculture, as well as transportation in support of trade. The domestication of animals, combined with a more stationary, village-based society, led to greater exposure to disease. Living with animals meant people were subjected to many of the diseases they carry, and rather than weakening a culture, exposure to disease was a fortifying process. When two cultures come into contact, the future of each depends on surviving this encounter. When European travelers first landed in North and South America, they found a land dominated by tribal hunter-gather societies, and within a remarkably short time, these native groups were largely wiped out. Some of this destruction was leveled through armed conflict in which the native groups were outclassed by European guns, but by far the greatest damage came from germs acquired from domesticated animals. Over many generations, the Europeans had developed resistances to all these diseases, but the American natives, who lacked this history of exposure to disease, were wiped out by the thousands. Thus, the area that is now the United States was taken from its pre-Columbian inhabitants more effectively through the devastation of European germs than of European guns.

Any examination of Yali's question must address the phenomena of the Fertile Crescent. Why, of all locations, did this area in southwest Asia become the source of such early and complete development of food production and other technologies, eventually making Europe the home of the most dominant cultures on the globe? A particularly dramatic example of European dominance was the outcome of the clash between the Old and New worlds. Why did Hernán Cortés land on the Mexican coast and conquer the Aztecs? Similarly, why did Francisco Pizarro arrive at Cajamarca, Peru and, with a mere force of 168 men, defeat Atahualpa and an army of 80,000 Incas? The immediate reasons are that the invading forces were equipped with swords, guns, horses, and ships. In addition, they brought small pox and other diseases that, in time, killed many more Native Americans than died in battle. But why did these invasions, and the massive population shift that followed them, not happen in the opposite direction? What produced the cultural differences that allowed the Spanish to travel to the New

World, rather than the Incas and Aztecs landing in Europe? Why was it not the native Americans fighting on horseback and the Europeans on foot? Why was it not Cortés and his men dying of smallpox instead of the Aztecs?

Much of the answer can be found in the substantially greater food production in the Fertile Crescent and elsewhere in Europe. The Fertile Crescent and the greater Mediterranean area to which it belongs, is the largest area of Mediterranean climate on the globe, and it had many plants suitable for domestication. For example, of the Earth's 56 varieties of large seeded grasses, which yield great amounts of food per acre of planting, 32 are native to the Mediterranean area. By comparison, only 11 are native to the Americas. By the beginning of the European conquest of the Americas in 1492, hunter-gather societies represented a larger proportion of the Americas than of Europe, but farming was widespread on both sides of the Atlantic. Europe enjoyed a more dramatic advantage in animal species suitable for domestication. Europe and the Fertile Crescent were the home of 13 domesticated mammal species; whereas, the Americas had only one large domesticated species: the llama. In Europe, animals provided dietary protein (from meat and milk), wool, hides, and animals were widely used for land transportation of people and goods, as power sources for agriculture, and as vehicles of war. In the Americas, the llama was of far more limited value.

In addition, the presence or absence of obstacles to the transportation of technologies within these two areas of the world caused many of the differences in food production and cultural development. If a culture is to benefit from technologies invented elsewhere, it must have contact with other groups. In particular, the adoption of domesticated plants and animals for food production requires a similar climate and growing season. In a very simple, yet important contribution to our understanding of world history, Diamond suggests that the shapes of the world's continents have had substantial influence on the fate of cultures. Europe and Asia are essentially one huge land mass that Diamond calls Eurasia and what is unique about Eurasia, besides its massive size, is its horizontal placement across the globe. The size of the continent allowed for eventual contact among many different cultures, and most importantly, its East-West orientation meant that crops or animals domesticated in one area could more easily be transported to other areas. A crop domesticated in northern China could be grown successfully in the Middle East or Western Europe. In contrast, climate differences often prevented crops domesticated in central America—on a vertically oriented continent—from being grown just a few hundred miles north or south. Thus, cultures in the vertical continents of the Americas and Africa could domesticate local species, but they were much less likely to be able to benefit from advances in food production elsewhere on the continent.

The New World was defeated by the old because of earlier and more extensive availability of plants and animals that could be domesticated. Commerce flourished, and a variety of trades and technical advances emerged, including steel armor and weapons. Domesticated animals gave Europeans their most powerful weapons for conquest of the New World: resistances to smallpox, measles, typhus, cholera, malaria and other diseases.

Geographical isolation of social groups is a general theme in *Guns, Germs, and Steel*. Island cultures, like those native to Australia and Yali's New Guinea, failed to develop rapidly due the lack of contact with other groups. Geographical isolation results in limited transfer of technologies and domesticated crops and animals. Some of these island environments, like New Guinea, are mountainous and incompatible with agricultural food production. As a result, hunting and gathering are the most effective methods of supplying food to the group.

In some cases, cultural trends have been the result of political, rather than geographical isolation. In the great expanse of Eurasia, it was western Europe not China that became dominant. Food production emerged as early in China as it did in the Fertile Crescent, and China gave rise to a variety of plants, animals, and technologies. It is here that iron casting, the compass, gunpowder, paper, and printing first emerged. Yet, by the time of Columbus' voyage to the New World, China had lost its cultural advantage. Diamond's explanation for this anomaly is that, early in its history, China established a kind of political unity that made it possible for a single governmental edict to end the Chinese exploration of the world by sea or cease the development of an elaborate water-driven spinning machine. China gave up all mechanical devices by the end of the 15<sup>th</sup> Century, and stopped its technological development just when an industrial revolution became possible. In contrast to this political unity and isolation, Europe was populated by many diverse nations. It was far more difficult to prevent the communication and adoption of new technologies, and as a result, Europe became the most industrialized and technologically advanced area on the globe.

So, Diamond answers Yali's question by saying that the visible differences in the successes of the world's cultures are not a function of the genetic endowment of its people. Cultures grow in environments that support them. If a group was fortunate enough to find itself in a location that supported early domestication of plants and animals, it flourished. Diamond's position is a kind of environmental determinism that will be comfortably embraced by many radical behaviorists. Furthermore, the similarity between Diamond's analysis of cultural history and a behavior analytic view of individual behavior is underscored by the kinds of objections Diamond anticipates. For example, near the end of the book, he introduces the term "geographic determinism" as a description of his basic thesis, and he quickly acknowledges:

The label seems to have unpleasant connotations, such as that human creativity counts for nothing, or that we humans are passive robots helplessly programmed by climate, fauna, and flora. Of course, these fears are misplaced. Without human inventiveness, all of us would still be cutting our meat with stone tools and eating it raw, like our ancestors of a million years ago. All human societies contain inventive people. It's just that some environments provide more starting materials, and more favorable conditions for utilizing inventions, than do other environments. (p. 408)

This passage suggests that Diamond may not be a radical behaviorist with respect to his view of individual human behavior, but he does hold an environmentally deterministic view of world history. Furthermore, Diamond's

environmentally deterministic account, like the strongly environmentalist stance of many of behavior analysts, makes racist interpretations of the differing fates of the peoples of the world more difficult.

### **HISTORICAL SCIENCE AND THE ANALYSIS OF INDIVIDUAL BEHAVIOR**

Finally, at the end of *Guns, Germs, and Steel*, Diamond discusses his methodology, and in this section there is a second message of value for behavior analysts. He describes his book as a work of “historical science” (p. 421). Although the study of human history is typically classified as one of the humanities, or at best a social science, Diamond argues that it does not differ in any substantial way from many other historical sciences that lie within the natural science category. Among these are astronomy, climatology, ecology, evolutionary biology, geology, and paleontology. Like these other fields, historical science cannot definitively identify causal variables because the events in question have already happened and the variables that controlled them cannot be manipulated. Yet, Diamond argues that a close examination of natural experiments, a technique often used in the “historical natural sciences,” can provide strong indications of the forces at work. In Diamond’s case, he has examined natural experiments such as the differences between contemporary New Guinean and American societies, and the differences between the Old and New Worlds at the end of the 15<sup>th</sup> and beginning of the 16<sup>th</sup> Centuries.

Although behavior analysis is a natural science firmly rooted in the experimental tradition, behavior analysts are also concerned with events outside the laboratory where the controlling variables cannot always be manipulated. Behavior analysts acknowledge that methods like those employed by Diamond are necessary for the investigation of groups and cultures (Lamal, 1999), but is there a role for the methods of historical science in the investigation of individual behavior? Many of the principles of behavior discovered in the laboratory undoubtedly control the behavior of both individuals and groups in natural settings, but experimentation is often impossible for practical or ethical reasons. For example, human aggression is an important social problem, but ethical problems make it impossible to study all but the most limited forms of aggression in the laboratory. The experimental study of aggression outside the laboratory suffers from both ethical and methodological problems. Yet this is an area of great social importance that might benefit from the attention of behavior analysts.

Behavior analytic ideas could be introduced into new areas of public dialogue if more behavior analysts followed Diamond’s lead and conducted scientific histories. In the past, Skinner’s interpretations of social institutions and everyday behavior served a similar function (e.g., 1953, 1971), but greater use of natural behavioral experiments could be of great benefit. Investigations of the effects of social policy initiatives in education, health, or public safety could be examined in this way, but behavioral biographies of individuals whose lives have been natural experiments might also be a useful exercise. A small scale example of this kind of analysis is Skinner’s interpretation of the behavior of the gunman who killed

several people in 1966 by shooting from a tower on the campus of the University of Texas (Skinner, 1980, p. 4).

Additional use of natural experiments and behavioral case studies would also help to strengthen behavior analysis by augmenting the search for the causes of social problems and by placing greater emphasis on prevention. Perhaps the most important reason that behaviorism has survived the cognitive and neuroscience revolutions is that even psychologists of differing points of view acknowledge that behavior analysis has produced many useful applications in education and the treatment of psychological problems (e.g., Weston, 2001). But, like the field of medicine, applied behavior analysis can be criticized for placing too much emphasis on treatment and not enough on the prevention of social problems. In several areas where the important variables are relatively clear, such as driving (Geller & Lehman, 1991) and occupational safety (Sulzer-Azaroff, 1992), behavior analysts have made important contributions to the prevention of social problems. Furthermore, much of applied behavior analysis is aimed at the treatment of problems that are likely to have primarily genetic, rather than behavioral, origins (e.g., autism). But there are many other problems, such as aggression, crime, and alcohol and drug addiction, for which important environmental variables have yet to be articulated. Careful use of behavioral case studies and natural experiments might help uncover potential causes and lead to useful prevention strategies.

Some may say that behavioral histories and other interpretive extensions of laboratory principles represent dangerous transitions from the methods of science into the realm of unsubstantiated argument (McDowell, 1996). But scientific experiments are also a form of argument, and although experiments offer empirical evidence obtained under controlled conditions, their scope is limited and their results are not infallible. Other forms of evidence-based argument, like those employed by Diamond in *Guns, Germs, and Steel*, should also have a place in behavior analysis. Certainly, these new methodologies will come with many hazards, but perhaps the benefits of extending behavior analysis into new areas of public discourse would be worth the risks.

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