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Book Review

A Big Batch of Mismatch

A review of Daniel E. Lieberman, *The Story of the Human Body: Evolution, Health, and Disease*. Pantheon: NY, 2013, 480 pp., US\$27.95, ISBN #978-0307379412 (Hardcover).

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Most readers of this journal believe that many aspects of our psychology and biology are mismatched to the modern environments we currently inhabit. The standard example is that we have persistent cravings for sugar, salt, fat, and starch because they served us well when we were hunter-gatherers, but these cravings often lead to grave health problems in post-industrial societies.

The mismatch perspective is pervasive, even central, to the fields of evolutionary psychology and evolutionary medicine. In fact, every year brings several new books on the topic. Thus, when we learn that a leading evolutionary anatomist, Daniel Lieberman, has written another mismatch book, *The Story of the Human Body*, two questions arise: First, does his perspective agree with ours, i.e., that mismatches are vitally important? Second, will his background allow him to teach us something new? The answers are emphatically “Yes” and “Yes.” Perhaps the book’s greatest contribution is its detailed treatment of various health-related mismatches and explanations of how the cultural solutions often produce unintended effects that exacerbate the underlying problems, a process Lieberman calls “dysevolution.”

Lieberman’s book has three parts. Part I, “Apes and Humans,” sets the stage, covering everything from our last common ancestor with chimpanzees and gorillas, roughly 8 million years ago, until the end of the paleolithic about 10,000 years ago. It’s the story of human evolution in 150 pages, explicating and unifying topics as diverse as recent fossil discoveries (e.g., “Hobbit of Flores”), Lieberman’s own groundbreaking work on adaptations for bipedal walking and running, and the evidence bearing on hominid foraging, life history, activity patterns, energetics, and culture. If you never took a top-quality human evolution class, Part I will do the job. If you have taken such a course, then this section will get you up to speed on the latest discoveries.

Part II, “Farming and the Industrial Revolution,” provides a tour of humans’ past 10,000 years, at least those populations that gave up the hunter-gatherer lifestyle and began to live in larger societies, including ones based on farming and, eventually, industrialized and post-industrialized economies. Lieberman reviews the circumstances and climatic catalysts for these key transitions, but he is most concerned with contrasting the behavioral ecology of hunter-gatherers with that of farmers and industrial and post-industrial workers. Perhaps most notably, compared to hunter-gatherers, farmers typically had calorie-rich but narrow diets that were deficient in key vitamins and minerals, and they generally lived at high population densities and in close proximity to domesticated, disease-transmitting animals. Post-industrial folks (i.e., readers of this journal) differ from hunter-gatherers in consuming more food, especially soft, low-fiber items, engaging in less physical activity, sleeping less, visually focusing on “close work” for extended periods (i.e., reading, crafting), and sitting, sleeping, and walking in highly-supportive chairs, beds, and shoes.

The contrasts between the hunter-gatherer and post-paleolithic lifestyles potentiate countless health-related mismatches. In some cases, populations did experience selection for genes related to immune function, thermoregulation, and metabolizing food. One example is that groups that domesticated milk-producing animals underwent selection to continue producing lactase in adulthood. Similarly, populations exposed to infectious diseases causing large losses of body fluid (e.g., diarrhea) may have undergone selection for mutations in the CF gene because it reduces risks of dehydration; unfortunately, homozygous carriers of the mutation suffer from cystic fibrosis. In other cases, cultural solutions were discovered to head off potential problems. Examples are that eyeglasses were invented to correct for myopia caused by close work, and civic engineers built sewer systems to eliminate cholera epidemics that became prevalent with high population densities, and they drained swamps where malaria-carrying mosquitoes proliferated.

And then there are other cases where cultural solutions, although ameliorating symptoms, exacerbate the underlying problems. Lieberman expends great effort considering such cases, which he refers to as “dysevolution.” One is that low fiber, high sugar diets combined with minimal physical activity makes us prone to Type 2 diabetes; anti-diabetes drugs counter disease symptoms, but usually not over the long-term, and the effectiveness of the drugs can undermine the motivation of patients to make lifestyle changes that can eliminate the disease. A second example is athletic shoes featuring thick heel cushioning, curved soles, and arch supports; these shoes make moving more comfortable, especially when heel striking, but they decrease sensory perception and, over the long-term, weaken the foot’s muscles and ligaments, thereby increasing susceptibility to injury and dependence on supportive shoes. Similarly, habitually sitting on supportive, comfortable chairs can weaken our trunk muscles and make us more likely to suffer lower back pain and to require back support. In addition, Lieberman reviews many cases, which although not properly described as dysevolution, entail cultural products increasing our comfort or pleasure in the short-term but leading to disease in the long-term. Products include mouth wash, antibacterial soaps, elevators, soft beds, hormonal birth control, abundant soft food, and the corresponding medical problems include asthma, osteoporosis, high blood pressure, atherosclerosis, breast and prostate cancer, and impacted wisdom teeth.

Part III, “The Present, the Future,” continues with the mismatch theme. Chapter 10 concentrates on obesity, Type 2 diabetes, and other diseases related to long-term positive energy balance. Chapters 11 and 12 focus on osteoporosis and other problems related to insufficient skeletal loading and physical activity (i.e., excess comfort). The 13th and final chapter considers four approaches to ameliorating mismatch diseases, especially non-infectious ones. First, Lieberman argues that “letting natural selection sort it out” will generally be ineffective. Second, he reaches the same conclusion for the promise of biomedical breakthroughs (i.e., miracle drugs), although he advocates for far more research on lifestyle interventions. Third, he draws on social science research (e.g., evolutionary psychology, behavioral economics) and argues that “educating and empowering” people will be mostly ineffective because humans aren’t predisposed to make rational, long-term choices in health-related domains. Finally, Lieberman advocates altering the environment in ways to encourage better lifestyle choices. Although he is wary of government dictating our behavior, he suggests that “libertarian paternalism” or “soft paternalism” would be acceptable to most citizens and likely to have a major impact. An example is taxing junk food and prohibiting children from consuming it at school.

Perhaps the greatest critiques one might level at Lieberman’s book are that its general thesis—that mismatches are prevalent and must be taken seriously—is old news, and that many of the examples have been previously discussed. These are not, however, potent critiques. In the first place, this thesis is deeply true and it thus warrants continual refinement and consideration; Lieberman certainly provides this, as his synthesis is skillful and engaging, especially in emphasizing the interplay of culture and morphology. Second, although many of the book’s examples will be familiar to evolutionists, we expect that many cases will not. Moreover, Lieberman’s presentation of these important cases is both unusually detailed and accessible: It’s a great resource.

The book also deserves praise in its nuanced and balanced presentation of controversial topics. For instance, it avoids simplistic claims, such as “farming was the worst mistake in the history of the human race” (Diamond, 1987) or that paleo-diets are either terrible or wonderful. Similarly, Lieberman’s practical advice, both for policy makers and individuals, is measured yet not timid. He doesn’t recommend you stop wearing shoes, but he does offer reasonable suggestions for adopting minimalist footwear and encouraging better foot development in children.

In sum, this book will be appreciated, we expect, by instructors writing lectures, researchers looking for inspiration, physicians treating patients, public officials making policy, and lay readers seeking to improve their health and understanding of human nature.

References

Diamond, J. (1987). The worst mistake in the history of the human race. *Discover*, 5, 64-66.