

Behavioral ecology and sociobiology in post-truth society

James F. A. Traniello¹ · Theo C. M. Bakker²

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William Whewell (1833) coined the term *scientist* to describe experts in the study of natural phenomena. “Nature,” he wrote, “is a collection of facts governed by laws....To ascertain such laws of nature is the peculiar business of science.” Today, scientists practice in a post-truth society in which troubling, and often disturbing, attitudes toward science have become commonplace. Science is being marginalized and suppressed (Vernon 2017). Concerns are raised about risks of human endangerment resulting from the disregard of science (Gross 2017). Parallels are drawn between the dissemination and growth of “fake news” and the spread of disease (Kucharski 2016). Higgins (2016) sounds the alarm: “Scientists ... should be shocked by the idea of post-truth, ... speak up when scientific findings are ignored,... keep reminding society of the importance of the social mission of science ...(and) publicly affirm the intellectual virtues (of) critical thinking, sustained inquiry and revision of beliefs on the basis of evidence.”

Behavioral ecologists and sociobiologists (herein behavioral ecologists) are scientists who seek to discover “laws of nature” governing the evolution and mechanisms of adaptive behavior by applying scientific methods. The work of behavioral ecologists is evidence-based and reflects sustained critical thinking to evaluate alternative hypotheses, not alternative facts. Like all scientists, behavioral ecologists are frustrated and distressed by the deconstruction of factual evidence and

the falsehoods and hoaxes that have virtually become everyday occurrences. Although the study of climate change has been the target of most high-profile assaults, skepticism is not restricted to atmospheric science or limited to specific research agendas. Online journalists attempt to throw truth and reality into question and undermine all science by challenging the peer review process. This attack on how ideas are critically evaluated, how data are validated, and the nature of proof is insidious.

What should behavioral ecologists do in the present social environment of denialism? How should we respond to science “losing its relevance as a source of truth” (Makri 2017)? The answer is that we should preach what we practice in a unified voice that is loud and clear. The study of adaptive behavior and its evolutionary history has deep meaning and global significance. We should persuasively state our case at every opportunity and create novel platforms to engage the public.

Behavior is central to all human endeavor and meaning. It integrates biology, social science, and the humanities and provides common ground to support innovative inquiry across academic disciplines (Wilson 1998). Behavior defines the nature of our humanity and sociality. Our understanding of universal traits such as altruism, cooperation, mate attraction and choice, parenting, consciousness, cognition, aggression, and social stress, among others (Snowdon 2003), benefits from scientific analysis. The current significance of human actions—including modern maladaptive behaviors—can best be understood by considering their historical origin in natural environments of adaptation and the conservation of ancestral genetic architectures (Liedtke et al. 2011).

The ecology of behavior is central to medicine and disease. Drug discovery is intrinsically linked to chemical ecology, which is founded in the natural history of herbivory and plant defenses (Caporale 1995; Meinwald and Eisner 2008). Behavioral assessments, informed by ecology, have been

✉ James F. A. Traniello
jfat@bu.edu

¹ Department of Biology, Boston University, 5 Cummington Mall, Boston, MA 02215, USA

² Institute for Evolutionary Biology and Ecology, University of Bonn, An der Immenburg 1, 53121 Bonn, Germany

important in identifying molecules of pharmacological value. Additionally, basic research on social affiliation using nontraditional model systems may have translational implications (Young and Barrett 2015). And as a “window on the brain,” behavior enables neuroscience to identify the functional circuitry of a remarkably complex organ system. Here, nontraditional model systems have also proven insightful (Marder 2002) and today, neurobiological research incorporates ecological and evolutionary analysis (Catania 2012). As a mechanism of environmental interaction, behavior underscores competition, predation, infection spread and control, and population dynamics and is a sentinel for impacts of anthropogenic change. Behavioral ecology is highly relevant to basic and applied conservation (Caro 1998; Caro and Sherman 2013; Wong and Candolin 2015).

Behavioral ecology has deep roots, traceable to the great debates between Georges Cuvier and Étienne Geoffroy Saint-Hilaire in the nineteenth century (Jaynes 1969). It has emerged as a highly successful and broadly influential science. Ethology, the parent science of behavioral ecology, was recognized in 1973 when Karl von Frisch, Konrad Lorenz, and Niko Tinbergen were awarded the Nobel Prize in Physiology or Medicine. The award tacitly acknowledged the significance of behavioral ecology through the recognition of Tinbergen’s pioneering studies of the adaptive significance and evolutionary history of behavior (Tinbergen 1963). *Sociobiology: The New Synthesis* (Wilson 1975) has been called the most important book on animal behavior of all time. *On Human Nature* (Wilson 1978) received a Pulitzer Prize. Sociobiological theory has since penetrated psychology, medicine, psychiatry, neuroscience, ecotoxicology, anthropology, political science, philosophy, religion, and music. Today, the integrative, diverse, and intellectually rich disciplines of behavioral ecology and sociobiology flourish (Bakker and Traniello 2016; Simmons 2014).

There is a pervasive need for the public to be able to recognize the importance of scientists and the need to be literate in science (Maienschein 1998) and evolution (Lerner 2000). This is a necessity, rather than an enrichment, in education. Basic science literacy impacts the understanding of climate change (Kahan et al. 2012) and informs public viewpoints of all other human challenges that will likely be resolved by the scientific community. Lerner (2000) notes that “those who do not have the scientist’s special knowledge, skills and experience cannot have equal voice in achieving a scientific consensus.” Science can be made more democratic through outreach programs initiated by behavioral ecologists. Behavioral ecologists must play a prominent role in ensuring a well-informed electorate. In these difficult times, we need to stay on message.

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