The Anthropocebo Effect

Humans are now described as a global geologic force. The Anthropocene, a period that begins concurrent with the industrial revolution, is characterized with steep line graphs of human population, water use, biodiversity loss, nitrogen run off, atmospheric carbon dioxide, etc. (Steffen et al. 2011). The data irrefutably establish humans as the dominant driver of environmental change and have led scientists to declarations such as "virtually all of nature is now domesticated" (Kareiva et al. 2007). The characteristics of the Anthropocene are worrisome, but Caro et al. (2012) expressed the additional concern that "the concept of pervasive human-caused change may cultivate hopelessness . . . and may even be an impetus for accelerated changes in land use motivated by profit." The Anthropocene is a dangerous era and, perhaps, a dangerous cultural frame.

Words matter to perception, and perception matters to behavior. In experiments in the United States and Canada, people perceived themselves as taller when they felt more powerful (not like "the little people") (Duguid & Goncalo 2012) and felt physically cold when excluded from social situations (e.g., "the cold shoulder") (Zhong & Leonardelli 2008). When undergraduates were primed with a text about determinism—that free will is an illusion because genes and environment determine behavior—they cheated significantly more in subsequent experiments than undergraduates who read a neutral text (Vohls & Schooler 2008). But are these correlates or causations? Which came first, the language, the feeling, or the behavior?

The power of positivity might seem hokey, but it has been repeatedly affirmed. In one medical study, a doctor confidently told some patients that they would get better in a few days (positive treatment) or that he was not certain whether their condition would improve (neutral treatment). The positive framing led 64% of patients to report getting better, significantly more than the 39% in the neutral treatment (Thomas 1987). This is a form of the placebo effect, which is most often used to describe the positive effects of an inert pill (a variation of the placebo effect that occurs only in cultures in which people believe taking a pill can cure an illness). The even stranger nocebo effect, where just mentioning the side effects of a treatment makes them more likely to occur, further demonstrates the power of the mind (Häuser et al. 2012). The anthropocebo effect is then what I call a psychological condition that exacerbates human-induced damage—a certain pessimism about humanity that leads us to accept humans as a geologic force and destruction as inevitable. How we frame willpower, medical examinations, medicines, and humanity all matter.

To be sure, there are other behavioral phenomena that could be evoked to justify environmental apathy long before the Anthropocene, including self-interest (which arguably leads to a tragedy of the commons) and high rates of discounting. Some might even argue that the Anthropocene framing makes humans so central and powerful that it could empower us to solve the problem, for instance, via rewilding (e.g., Donlan et al. 2005), "domesticat[ing] nature more wisely" (Kareiva et al. 2007), or managed relocation (Richardson et al. 2009). My sense, however, is that these are not the outcomes one can generally expect from Anthropocene framing.

I have seen symptoms of the anthropocebo effect in sources of cultural reflection in, for example, *The Onion*, which has run headlines such as "Rare Species of Frog May Hold Cure to . . . Ah, Never Mind, It's Extinct," and *New Yorker* cartoons, with captions such as "Tonight the part of the sea bass will be played by the chicken." I recently heard a prominent physics professor make the glib remark that our incapacity to solve climate change is genetic (recall the effects of deterministic framing on cheating). A cross-national survey showed that between 2008 and 2012, citizens of 12 countries, including the United States and China, increased their agreement with the statement that "the impact our society has on the environment is so severe that there is very little individuals can do about it" and reported only one country, India, where citizens' agreement decreased (Greendex 2012).

A further problem is that the description of the Anthropocene focuses on a series of indicators, but these rarely encompass nuances about the human populations that caused the steep increases in the indicators (e.g., overexploited fish stocks, dammed rivers, and McDonald's restaurants) (e.g., Rockström et al. 2009; Steffen et al. 2011). Not all humans are a geologic force—and a geologic force is not what humanity must be. That humans have become the main driver of environmental change is largely the result of specific cultures mixing with specific economic systems and mixing with specific technologies. For instance, when presented per capita, the wealthiest 600 million humans appear most responsible for carbon dioxide emissions. An individual emission cap

Conservation Biology, Volume 27, No. 5, 898–901

DOI: 10.1111/cobi.12097

of 10.8 t of CO_2 per year would allow us to meet a 13 Gt CO_2 reduction by 2030 (26 GtCO_2 were produced in 2003) and only affect 1.13 billion people (i.e., <15% of the projected 2030 population) (Chakravarty et al. 2009). And the problem of climate change is no more undermined by genetics than the problem of the growing hole in the ozone layer, which humans solved (Salby et al. 2011).

To minimize the nocebo effect, psychologists recommend that doctors communicate differently. For example, when prior to an epidural the local anesthetic was framed as something that would make the patient more comfortable during the procedure, the patient felt less pain than when the same injection was framed as "a big bee sting" or "the worst part" of the procedure (Häuser et al. 2012). Similarly, if we hope to prevent the anthropocebo effect, we must also communicate differently—in a way that both concedes responsibility and encourages solutions. Science and the language scientists use help shape how we see ourselves. Consider what the theory of natural selection did to our view of humans in the biological world or how the social construct of race influenced society. We should be attuned to the new era of Anthropocene not only as a geological phenomenon but also as a possibly dangerous way of perceiving ourselves.

Jennifer Jacquet*

Environmental Studies, New York University, 285 Mercer Street, New York, NY 10003, USA, email jacquet@nyu.edu

*A nascent version of the ideas expressed here appeared at edge.org.

Literature Cited

Caro, T., J. Darwin, T. Forrester, C. Ledoux-Bloom, and C. Wells. 2012. Conservation in the Anthropocene. Conservation Biology **26:**185–188.

Chakravarty, S., A. Chikkatur, H. de Coninck, S. Pacala, R. Socolow, and M. Tavoni. 2009. Sharing global CO2 emission reductions among one billion high emitters. Proceedings of the National Academy of Sciences **106:**11884–11888.

Duguid, M. M., and J. A. Goncalo. 2012. Living large: the powerful overestimate their own height. Psychological Science **23:**36–40.

Donlan, J., et al. 2005. Re-wilding North America. Nature **436:**913–914.

Greendex. 2012. Consumer choice and the environment – a worldwide tracking survey. GlobeScan, Toronto. Available from http://environment.nationalgeographic.com/environment/greendex/ (accessed March 2013).

Häuser, W., E. Hansen, and P. Enck. 2012. Nocebo phenomena in medicine: their relevance in everyday clinical practice. Deutsches Ärzteblatt International **109:**459–465.

Kareiva, P., S. Watts, R. McDonald, and T. Boucher. 2007. Domesticated nature: shaping landscapes and ecosystems for human welfare. Science **316:**1866–1869.

Richardson, D. M., et al. 2009. Multidimensional evaluation of managed relocation. Proceedings of the National Academy of Sciences **106:**9721–9724.

Rockström, J., et al. 2009. A safe operating space for humanity. Nature **461:**472–475.

Salby, M., E. Titova, and L. Deschamps. 2011. Rebound of Antarctic ozone. Geophysical Research Letters **38:**L09702.

Steffen, W., J. Grinevald, P. Crutzen, and J. McNeill. 2011. The Anthropocene: conceptual and historical perspectives. Philosophical Transactions of the Royal Society A **369:**842–867.

Thomas, K. B. 1987. General practice consultations: Is there any point in being positive? British Medical Journal (Clinical Research Ed.) **294:**1200–1202.

Vohls, K. D., and J. W. Schooler. 2008. The value of believing in free will. Psychological Science **19:**49–54.

Zhong, C.-B., and G. J. Leonardelli. 2008. Cold and lonely: Does social exclusion literally feel cold? Psychological Science **19:**838–842.

Implications of Ash Dieback for Associated Epiphytes

Ash dieback is a degenerative tree disease caused by the wind-dispersed asexual anamorph (*Chalara fraxinea*) of the sexually reproducing ascomycete fungus *Hymenoscyphus pseudoalbidus* (Bakys et al. 2009; Queloz et al. 2011). The fungus has infected native ash (*Fraxinus excelsior*) throughout Europe (Pautasso et al. 2013), and its recent arrival and subsequent spread in Britain has generated a groundswell of scientific comment (Nature 2012), rapid policy response (DEFRA 2013), and public interest (BBC 2012). Commentary has focused on the potential effect of dieback on Britain's ash tree population. However, model projections for woodlands in Sweden show ash dieback will affect other organisms as well. For example, by affecting their host tree the disease could reduce lichen epiphyte diversity by as much as 38% (Jönsson & Thor 2012). This statistic highlights the seriousness of the effects of dieback on guilds for which ash is a primary habitat.

We examined 168,816 records (1961–2010) in the British Lichen Society database (http://www.britishlichensociety.org.uk/recording-mapping/bls-databases) for which a lichen species occurrence had been confirmed on an identified tree species. There were 536 lichen species recorded that are associated with ash. Of these, 3 are critically endangered, 9 are endangered, 20 are vulnerable, and 52 are near threatened according to a recent assessment of the British lichen flora for which IUCN guidelines were used (Woods & Coppins 2012).

Epiphytes with $\geq$10 records provided a preliminary measure of the extent to which a lichen species was associated with a given tree species. Of those epiphytes assigned to an IUCN (International Union for Conservation of Nature) threat category, 6 were estimated to have $\geq$50% of their known records from ash, in rank order from most to least dependent: *Wadeana dendrographa, Catapyrenium psoromoides, Caloplaca flavorubescens, Fuscopannaria ignobilis, Leptogium saturninum*, *Physcia clementei*.

We calculated the relative frequencies of occurrence for lichens among a selection of native British trees and