

## Column 70: Exploring Mysteries of Living: Disciplinary Overlaps and Green Engineering



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### **A Los Alamos member of The International Behaviorology Institute**

*Why these Columns?* Because human behavior causes global problems, and solving these problems requires changes in human behavior... So *everyone* benefits from knowing something about the natural science of human behavior (called behaviorology) that these columns relate. Having first appeared as newspaper columns, these columns began appearing on **BehaviorInfo.com** starting in 2020.

Beyond its immediate domain, behaviorology coordinates with other natural–science disciplines and even overlaps with some of these. Understanding these overlaps helps build our interconnected perspective.

Among the natural sciences, behaviorology is one of the foundation life sciences (along with biology) rather than one of the foundation physical sciences (such as physics or chemistry).

The life sciences stretch across a continuum of analysis levels, from molecules to cultures. We find the sub–cellular and cellular levels of the organism at one end of this continuum. In the middle we find the level of individual organisms. And on the other end we find the level of groups or populations of organisms, including cultures.

We use the name *biology* for the *sub–individual* disciplinary level of the life–science continuum. For the *individual* disciplinary level, we use the name *behaviorology*. However, no name has covered the natural–science, behavior–respecting *group or population* disciplinary level of the life–science continuum.

Sociology might have worked, but attempts to turn it into a natural science remain unsuccessful. Another discipline, anthropology, contains a possible contender. One anthropology area features a natural–science philosophy of science, namely the "cultural materialism" that Marvin Harris introduced in 1979 in his book *Cultural Materialism*.

However, no separate *disciplinary* name for a natural–science anthropology has arisen. So, since 1986, I have been using the term *culturology* as the label to fill this gap. This label provides a conveniently short replacement for “anthropology informed by cultural materialism.” Presumably, in due time, natural–science anthropologists will provide their preferred name for their discipline. Stay tuned.

Each of those three life–science disciplines studies functional relations at its own level of analysis. Biology studies the functional relations both in the history of species and in the physical and chemical processes of individuals from the sub–cellular parts to the whole organism.

Behaviorology studies the functional relations between environments (both internal and external) and the behavior (both overt and covert) of individual organisms during their lifetimes.

And culturology studies the functional relations in the behavior of social and cultural groups, particularly involving group–produced effects that can outlast the lifetimes of the individuals that make up the group (for example, education).

Each of those disciplines, however, also overlaps somewhat with the others. Biologists and behaviorologists share interests in the physiological mechanisms through which the body mediates behavior, particularly purely neural behavior.

Behaviorologists and culturologists, meanwhile, share interests in the operation of the laws of behavior because, while the same laws apply at both levels, outcomes can differ due to the complexity increment that comes from dealing with groups of interacting individuals rather than with single individuals.

Furthermore, some applied fields (that is, areas where one applies a foundation science discipline) of interest to behaviorologists, such as solving global problems, reside as well, if not more so, in the province of culturologists.

The study of ecosystems, species evolution, and the behavior of animals in groups by some biologists points to a disciplinary overlap also between biology and culturology. These disciplinary overlaps provide further areas for applications.

Developing the behaviorology–culturology overlap helps apply it to the cultural–practice engineering that supports solving global problems. We call this area *green contingency engineering*, an area particularly relevant to many pressing issues including the humane reduction of population levels and the building of sustainable lifestyles.

Perhaps the culture could currently derive the most benefits by first expanding behaviorology into this educational area, from which graduates could then extend it into the needed practical areas. Consider that a degree in *Behaviorology and Green Engineering* would include basic coverage of the full roundtable of foundation natural–science and engineering disciplines (for example, physics, chemistry, biology, behaviorology) so that graduates can contribute to any and every area of solutions for global problems.

We are sitting on the brink of a breakthrough to substantive successes in slowing global warming and solving global problems by building a more complete science and engineering team, a team with members from *all* the natural sciences, to address these concerns. How long will we merely sit on this brink?

We have perhaps been sitting on that brink ever since Rachel Carson’s 1962 book, *Silent Spring*, appeared over 50 years ago. William Souder’s 2012 biography, *On a Farther*

*Shore: The Life and Legacy of Rachel Carson* (from Crown Publishers) takes us back to that time, refocusing our attention on *Silent Spring* as the origin of the movement to save and preserve our environment. (You can find Julianne Lutz Warren's review of Souder's biography on pages 146–147 of the March–April 2013 issue of *American Scientist* under the title “Crafting a narrative of care.”)

That biography also reiterates the legacy of controversy surrounding the movement from its very beginnings. The controversy is rooted in the notion that humans are supposedly the masters of nature, a notion that stems from the traditional but erroneous cultural view that we are somehow, usually agentially, above, or outside of, nature. This view continues to pressure us even as we finally set it aside and face current realities, that we are integral parts of nature, with the kind of humility that must be a part of long-term solutions.

Sitting on that brink, we have spent less time devising and implementing long-term solutions while spending more time arguing about short-term interests, an activity akin to fiddling while Rome burns. Can we now move beyond this brink, and work seriously, with all the relevant natural sciences including behaviorology on the long-term solutions instead?

Education comprises a helpful arena, and one with less controversy. Educational campaigns, about steps that ordinary citizens can individually take to help solve global problems, will be vital components in the efforts to clean up and protect our planetary home, especially if relevant and contingent reinforcers follow taking these steps.

Those individual steps differ from the large scale efforts that only governments are likely to manage successfully, such as replacing a country's aging electrical distribution grid (from production to distribution facilities, with AC from there to users) with a high voltage direct current grid that can spread out the energy production from renewable resources like solar or wind energy and thereby reduce storage needs.

Currently, educational campaigns stress some of the crucial *individual* behaviors that contribute to solutions for our problems.

For example the folks at the Environmental Defense Fund (EDF) broadly disseminate a range of materials. Among these are two lists of such behaviors, one containing ten “precycling” tips and the other presenting ten steps that fight global warming (with both lists still likely available at [www.edf.org](http://www.edf.org)).

Other organizations, such as the Union of Concerned Scientists (UCS) and the Natural Resources Defense Council (NRDC) provide similar and related materials.

To emphasize the importance of recognizing that *behavior* components comprise a major portion of the problems and their solutions that demand our attention, components for which behaviorology provides the relevant natural science, here is a quick version of the ten EDF steps that fight global warming: (1) Recycle used materials... (2) Wash clothes in colder water... (3) Install low-flow shower heads... (4) Run the dishwasher when full, and without heat... (5) Replace standard light bulbs with CFL or LED bulbs... (6) Plug window and door air leaks... (7) Replace appliances with energy efficient models... (8) Walk, bike, carpool, or use public transport... (9) Adjust the thermostat seasonally... (10) Share these simple steps with others...

Such intuitively composed lists can only get better as contingencies increase the exposure of authors to more behaviorological knowledge and skills. For example each of those ten steps involves an explicit *behavior* (that is, recycle, wash, install, and so on). Providing lists of behaviors, like that list, addresses the middle term in our fundamental three-term contingency regarding basic environment-behavior functional relations.

Additional steps concern also addressing, orchestrating, and engineering relevant aspects of the first term of the needed contingencies, which covers the stimulus changes that *evoke* these behaviors successfully. The "rules" of saying so help but are seldom enough, as we previously described.

And more steps concern addressing, orchestrating, and engineering relevant aspects of the third term of the needed contingencies, which covers the stimulus changes that *reinforce* these behaviors successfully.

The culture then increasingly supplies the full contingencies that generate and maintain these behaviors as increasingly standard, even institutionalized, cultural practices. With such practices we can begin to reverse the retardation of human intellectuality that the age-old cultural dalliance in superstition breeds, particularly with respect to the theological and secular purveying of agential superstitions, and the activities that these breed against the helpful cultural practice that we call natural science.

You can find more on culturology in Chapter six of the long 1992 paper by Fraley and Ledoux, "Origins, status, and mission of behaviorology." This paper is in my 2015 book of readings, *Origins and Components of Behaviorology—Third Edition*. An alternative summary paper, "Revisiting Culturology," appears in Part II of the book, *Explaining Mysteries of Living*, that collects all 72 of these columns in one volume. The "Books" page at [www.behaviorology.org](http://www.behaviorology.org) provides full descriptions of these books.

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