

## Bibliography

- King, J.J., 1989. *The Environmental Dictionary*. New York: Executive Enterprises.
- NARA, 1992-3. *The United States Government Manual*. Washington, DC: National Archives and Records Administration, Office of the Federal Register.

## Cross-references

- Convention on International Trade in Endangered Species (CITES)
- Conventions for Environmental Protection
- Environmental Policy
- United Nations Conference on Environment and Development (UNCED)
- United Nations Environment Programme (UNEP)
- United States Federal Agencies and Control

---

## ENVIRONMENTAL PSYCHOLOGY

---

Environmental psychology examines the interrelationship between environments and human behavior. The field defines the term 'environment' very broadly to include all that is natural on the planet as well as social settings, built environments, learning environments and informational environments. When solving problems that involve human-environment interactions, whether they are global or local, one must have a model of human nature that predicts the environmental conditions under which humans will behave in a decent and creative manner. With such a model one can design, manage, protect or restore environments that enhance reasonable behavior, predict what the likely outcome will be when these conditions are not met, and diagnose problem situations. The field develops such a model of human nature while retaining a broad and inherently multidisciplinary focus. It explores such dissimilar issues as common property resource management, way-finding in complex settings, the effect of environmental stress on human performance, the characteristics of restorative environments, human information processing, and the promotion of durable conservation behavior. The field of environmental psychology recognizes the need to be problem-oriented, using, as needed, the theories and methods of related disciplines, such as psychology, sociology, anthropology, biology and ecology. The field founded the Environmental Design Research Association, publishes in numerous journals including *Environment and Behavior* and the *Journal of Environmental Psychology*, and has been reviewed several times in the *Annual Review of Psychology*. A handbook of the field was published in 1987 (Stokols and Altman, 1987).

There are several recurrent elements in the research literature that help to define this relatively new field (see Garling and Golledge, 1993; Kaplan and Kaplan, 1982).

### Attention

Understanding human behavior starts with understanding how people notice the environment. This includes at least two kinds of stimuli: those that involuntarily, even distractingly, command human notice, and those places, things or ideas to which humans must voluntarily, and with some effort (and resulting fatigue), direct their awareness. Restoring and enhancing people's capacity voluntarily to direct their attention is a major factor in maintaining human effectiveness.

### Perception and cognitive maps

How people image the natural and built environment has been an interest of this field from its beginning. Information is stored in the brain as spatial networks called *cognitive maps*. These structures link one's recall of experiences with perception of present events, ideas and emotions. It is through these neural networks that humans know and think about the environment, plan and carry out their plans. Interestingly, what humans know about an environment is both more than external reality, in that they perceive with prior knowledge and expectations, and less than external reality, in that they record only a portion of the entire visual frame yet recall it as complete and continuous.

### Preferred environments

People tend to seek out places where they feel competent and confident, places where they can make sense of the environment while also being engaged with it. Research has expanded the notion of preference to include coherence (a sense that things in the environment hang together) and legibility (the inference that one can explore an environment without becoming lost) as contributors to environmental comprehension. Being involved and wanting to explore an environment requires that it have complexity (containing enough variety to make it worth learning about) and mystery (the prospect of gaining more information about it). Preserving, restoring and creating a preferred environment is thought to increase one's sense of well-being and behavioral effectiveness.

### Environmental stress and coping

Along with the common environmental stressors (such as noise and climatic extremes), some experts in the field define stress as the failure of preference, including in the definition such cognitive stressors as prolonged uncertainty, lack of predictability and stimulus overload. Research has identified numerous behavioral and cognitive outcomes, including physical illness, diminished altruism, helplessness and attentional fatigue. Coping with stress involves a number of options. Humans can change their physical or social settings to create more supportive environments (e.g., territories and smaller-scaled settings) where they can manage the flow of information or stress-inducing stimuli. People can also endure the stressful period, incurring mental costs that they deal with later, in restorative settings (e.g., natural areas, privacy, and solitude). Moreover, they can seek to interpret or make sense of a situation as a way to defuse its stressful effects, often sharing these interpretations as a part of their culture.

### Participation

The field is committed to enhancing citizen involvement in environmental design, management and restoration efforts. It is concerned not only with helping citizens to comprehend environmental issues, but to insure their early and genuine participation in the design, modification and management of environments.

### Conservation behavior

The field has also played a major role in bringing psychological knowledge to bear upon the issue of developing an ecologically

sustainable society. It explores environmental attitudes, perceptions and values, and devises intervention techniques for promoting environmentally appropriate behavior.

Raymond K. DeYoung

### Bibliography

- Garling, T., and Golledge, R. (eds), 1993. *Behavior and Environment: Psychological and Geographical Approaches*. Amsterdam: North Holland.
- Kaplan, S., and Kaplan, R., 1982. *Cognition and Environment*. New York: Praeger.
- Stokols, D., and Altman, I. (eds), 1987. *Handbook of Environmental Psychology*. New York: Wiley.

### Cross-references

Biocentrism, Anthropocentrism, Technocentrism  
 Bioregionalism  
 Environment, Environmentalism  
 Environmental Ethics  
 Environmental Perception

---

**ENVIRONMENTAL REMOTE SENSING** – See  
 REMOTE SENSING (ENVIRONMENTAL);  
 SATELLITES, EARTH RESOURCES,  
 METEOROLOGICAL

---

### ENVIRONMENTAL SCIENCE

---

Environmental science is a multidisciplinary inquiry that deals primarily with the variety of environmental problems caused by humans as they live their lives: satisfying needs and wants, processing materials, and releasing unwanted products back into the environment. It is a relatively recent field of study that emerged from recognition of the multiple, interrelated impacts caused by the complex interactions between humans and the Earth environments in which they live. No single disciplinary orientation can capture or comprehensively examine such complex cause-and-effect relationships. Some general areas of study (e.g., environmental impact assessment, pollution prevention, and waste management) are identified closely as environmental science rather than with any specific discipline.

Environmental science is based on a number of disciplinary traditions, including physics, chemistry, biology, geography, geology, soil science, hydrology, various engineering fields (especially sanitary engineering, or what is now often called environmental engineering), and ecology. Scientists working on environmental problems may come from or even work in any or all of these disciplines, but as an identifiably separate field, environmental science is adisciplinary. All of the specific sciences, including the social sciences, contribute to it and an environmental scientist may be trained in any one of them or in several. The emergence of a separately identifiable environmental science, however, is based on the admission that the problems addressed cannot be solved within the bounds of any of the traditional disciplines.

By definition, environmental science is applied, because it has emerged as a response to environmental problems, such

as air or water pollution. Environmental scientists usually work to solve or remedy specific problems, including an increasingly important effort to prevent them. This focus means that environmental scientists are proactive, often even normative, in their viewpoints, as they work under the assumption that the systems of interest should be ordered and should operate in certain ways.

Environmental science emerged from public interest in environmental problems with the development of environmentalism and with the creation of a more widely accepted environmental ethic in societies. Unlike most sciences, then, environmental science, as it exists in the late 20th century, is more a product of public awareness and recognition than it is of disciplinary acceptance. There are and have been many 'sciences of the environment,' but environmental science signifies more than the contributions of specific fields of inquiry: It represents a societal commitment, a view among the peoples of the planet that it is important to study and understand how humans affect the environment, while continuing to depend on it as the source of all goods.

Environmental science is a true science, but one in which culture and tradition play important roles in aiding the understanding of topics of interest, principally the impacts of humans on Earth environments and the problems that result from those impacts. Consequently, it is less experimental and predictive, and more descriptive and synthetic, than other scientific disciplines, and it takes data, information and insights from a wide array of disciplinary traditions.

Further information can be gained from Jorgensen (1989), Wakeford and Walters (1995), and Watt (1973).

William W. Budd and Gerald L. Young

### Bibliography

- Jorgensen, S.E., 1989. *Principles of Environmental Science and Technology* (2nd edn). New York: Elsevier, 627 pp.
- Wakeford, T., and Walters, M. (eds), 1995. *Science for the Earth: Can Science Make the World a Better Place?* New York: Wiley, 370 pp.
- Watt, K., 1973. *Principles of Environmental Science*. New York: McGraw-Hill, 319 pp.

### Cross-references

Environmental Education  
 Environmental Impact Analysis (EIA), Statement (EIS)  
 Gaia Hypothesis  
 Systems Analysis

---

### ENVIRONMENTAL SECURITY

---

Among nine different definitions of *security*, the *Oxford English Dictionary* offers four that are relevant to environment. These are 'safety, the condition of being protected from or not exposed to danger,' 'freedom from doubt,' 'freedom from care, anxiety, or apprehension,' and 'the quality of being securely fixed or attached.' Environmental security is a complex issue which involves societal efforts to protect ecological systems, to render their future secure and to ensure their stability. It also involves the repercussions of the state of the environment upon national and international strategic issues. Hence it is closely tied to politics, military strategy and world trade (Brown, 1992).

ENCYCLOPEDIA OF EARTH SCIENCES SERIES

ENCYCLOPEDIA  
*of* ENVIRONMENTAL  
SCIENCE

*edited by*

**DAVID E. ALEXANDER**

University of Massachusetts

*and*

**RHODES W. FAIRBRIDGE**

NASA – Goddard Institute for Space Studies



**KLUWER ACADEMIC PUBLISHERS**  
DORDRECHT | BOSTON | LONDON