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Book reviews

G.T. Gardner, P.C. Stern, *Environmental problems and human behavior*, 2nd ed, Pearson Custom Publishing, Boston, MA, ISBN 0-536-68633-5, \$57.33, 2002 (371pp.).

R.S. Nickerson, *Psychology and environmental change*, Lawrence Erlbaum Associates, Mahwah, NJ, ISBN 0-8058-4096-6, \$89.95(cloth), \$37.50(paper), 2003 (318pp.).

Gerald T. Gardner is Professor of Psychology, University of Michigan-Dearborn. He received a Ph.D. from the University of Michigan in Experimental Psychology.

Paul C. Stern is director of the Committee on the Human Dimensions of Global Change at the US National Research Council. His recent publications include the co-edited volumes, *Decision Making for the Environment: Social and Behavioral Science Research Priorities* (2004), *The Drama of the Commons* (2002), and *New Tools for Environmental Protection: Education, Information, and Voluntary Measures* (2002), all published by National Academy Press.

Raymond S. Nickerson is Research Professor at Tufts University in Massachusetts. He was a founding editor of the *Journal of Experimental Psychology: Applied*, and has recently published *Cognition and Chance: The Psychology of Probabilistic Reasoning* (Erlbaum, 2004).

Environmental psychologists study the transaction between individuals and the physical environment. It is believed that individuals change the environment and are influenced by the environment. Traditionally, the focus in environmental psychology has been on how individuals perceive and react to their immediate physical surroundings. Environmental psychology textbooks typically focused on whether and how environmental factors affect human well-being, performance and behavior. For quite some time now, more and more environmental psychologists have been studying the effects of human behavior patterns on environmental resources and the quality of nature. Such studies focus on factors influencing environmental behavior and on strategies to promote conservation behavior. The body of literature on this topic is growing, and many interesting studies have been published in journals like *Journal of Environmental Psychology* and *Environment*

and Behavior. At environmental psychology conferences, more and more sessions are being devoted to this topic. Also, various universities teach courses in psychology and environmental change.

These developments warrant the publication of textbooks that are devoted to psychological research on environmental issues. Here, two recent texts are reviewed. In 2002, the second edition of the text by Gardner and Stern on behavioral aspects of environmental problems appeared, while in 2003, Nickerson published a text on psychology and environmental change. Both textbooks focus on how human behavior affects the natural environment and what can be done to protect the environment against behavioral causes of detrimental environmental change. However, the focus and intended audience for both textbooks are different.

Environmental problems and human behavior (Gardner & Stern, 2002) is intended for students in, e.g. environmental psychology, behavioral and social sciences, and is highly suitable for this purpose. The very readable text is well structured, and many vivid examples and illustrations are provided to further clarify the topics of interest. The second edition has been updated in a number of ways, although recent literature on some topics is hardly or not discussed in this second edition (e.g. the growing body of research on the role of habits and factors affecting environmental behavior, and recent literature on the biophilia hypothesis).

In the first chapter, Gardner and Stern briefly discuss global environmental problems and the behavioral dimension of these problems. Next, in Chapter 2, they claim that many environmental problems the world now faces can be characterized as commons dilemmas, in which behavior that makes sense from an individual point of view, when repeated by many other individuals, eventually proves disastrous to society. They briefly introduce four solution approaches, which are discussed in-depth in the next four chapters.

The first solution strategy, religious and moral approaches that focus on changing values, beliefs and worldviews, are explained in Chapter 3. The authors argue that the effectiveness of this strategy is seriously limited by structural conditions and other barriers that keep values and beliefs from being enacted as behavior. Moreover, basic values and beliefs usually change very slowly. However, public proenvironmental values and environmental worldviews are important to create

public support for restrictive governmental policies that may be effective in changing the behavior of many individuals at once. Chapter 4 discusses educational interventions, aimed at providing information and changing attitudes. Various information strategies are described, such as feedback, modeling, prompts and commitment. Also, critical keys for getting information used are discussed, as well as circumstances under which information may or may not be effective. Chapter 5 focuses on changing society's incentives that steer environmental behavior. The pros and cons of incentives are discussed, and general principles for designing effective incentives are provided. Advantages and limitations of community management strategies are discussed in Chapter 6. It is concluded that this strategy works best when environmental resources and pollution can be contained within a small geographic area. Unfortunately, the world's most pressing environmental problems are inherently global (e.g. climate change, ozone depletion), which limits the effectiveness of this strategy. In Chapter 7, principles for intervening to change environmentally destructive behavior are discussed. Gardner and Stern conclude that none of the four solution approaches will be effective by themselves in solving environmental problems. Rather, only a coordinated effort involving all, or at least most, of the four solution types will succeed. The different types of solutions may supplement and strengthen each other, as there is often more than one barrier to any proenvironmental behavior.

Gardner and Stern do not devote a separate chapter on factors influencing environmental behavior. Some relevant models and theories are mentioned briefly in the chapters on the four solution approaches. This makes sense in a way, since, in order to be effective, solution strategies should be targeted at factors that significantly affect the relevant behavior. However, I would have preferred a separate chapter on theories and models to explain environmental behavior, so as to provide students with a systematic and more complete overview of factors affecting environmental behavior. Such a chapter seems to be warranted since recently many studies have been conducted to better understand environmental behavior. This would enable them to discuss the growing body of research on this topic more systematically and thoroughly. They could have discussed which behavioral models may be most successful to explain different types of behavior, and clarified which solution approaches may be most effective in changing particular behavior, given the factors that significantly influence that behavior.

Chapter 8 goes into genetic behavioral predispositions and environmental behavior and risk perception. The authors argue that a discrepancy exists between genetic predispositions and 'space-age' cultural conditions of life, which may be playing a major role in environmental

problems. Furthermore, they describe the biophilia hypothesis. According to this hypothesis, humans have an innate need to be near natural stimuli. Deprivation of these stimuli may impair human emotional health. Chapter 9 focuses on perceptual and cognitive processes that affect people's reactions to environmental hazards. Gardner and Stern discuss several theories that explain why people underestimate or overreact to environmental risks and hazards. They present a modified protection-motivation theory that explains which perceptual/cognitive processes determine an individual's response to a threat or hazard, which in turn influences which coping strategy individuals choose.

In Chapter 10, Gardner and Stern argue that, in the past, many psychologists tended to study behaviors that are not very significant from an environmental point of view. Like Nickerson (see below), they argue that psychologists should use information from engineers, ecologists, and others familiar with the environmental impact of various behaviors. They reason that efficiency behavior (e.g. the adoption of energy-efficient equipment) is often more effective in reducing environmental impacts than curtailment behavior in which case existing equipment is used less extensively. Similarly, upstream solutions (e.g. waste prevention) are superior to downstream solutions (e.g. waste discarding). Like Nickerson, they stress that psychologists should also (and more often) study upstream solutions and the diffusion and adoption of environmentally sound technologies, products and services.

Chapter 11 discusses human interactions with complex technological systems. Gardner and Stern describe four counterintuitive properties of environmental systems, that may result in environmental catastrophes: (1) wide separation of symptoms and causes, (2) few leverage points, (3) contradiction between short-term and long-term solutions, and (4) unanticipated remote consequences. Because of these features, environmental systems are complex to understand. This may trigger inaccurate and inefficient decisions that harm human and the planet's long-term best interest. In Chapter 12, Gardner and Stern suggest that computer modeling may enhance our ability to understand and cope with complex systems, although obviously, such models can have important limits since they are simplified representations of reality. The authors end up with policy recommendations for environmental actions and measures, and stress that environmental problems can be controlled by carefully integrating multiple measures, using strategies drawn from all four types of solutions discussed in Chapters 3–6 of the text. They conclude that 'the role played by psychology and by individual behaviors, while important, is limited: Changes in individual actions of large actors, including political and other institutions, are also critical to the sustainability revolution. But even the actions of these large

actors can be significantly affected by the political actions of an informed and concerned public (p. 342). So, indeed, psychologists have an important role to play to safeguard environmental qualities, in close cooperation with scientists from other disciplines.

In his book *Psychology and environmental change*, Nickerson (2003) aims to stimulate greater interest among research psychologists in environmental issues. Nickerson's book is based on firm empirical evidence. It is a pity, though, that, in many cases, relatively few recent references are given and that recent research results are underrepresented.

Like Gardner and Stern, Nickerson first discusses the role of psychology in understanding and managing environmental problems. According to Nickerson, psychologists can make important contributions to understand environmentally detrimental behavior and to its modification. He states that 'inasmuch as behavior is influenced by knowledge, beliefs, attitudes, values, and desires, efforts to change behavior in ways that would benefit the environment will have to take cognitive and affective variables into account' (p. 9). Next, a thorough description is given of environmental problems and behavioral causes of environmental change, among which global warming, acid rain, air pollution and urban smog, ozone depletion, water contamination and depletion, waste and deforestation (Chapter 2). Nickerson discusses these problems far more in-depth than Gardner and Stern. Chapters 1 and 2 are highly relevant to any scientist interested in studying environmental issues, since from a policy point of view, it would be preferable that behavioral scientists focus on behaviors that have a relatively high environmental impact. This is also stressed by Gardner and Stern, who convincingly illustrate that for a long time, psychologists tended to devote a great proportion of their research efforts to behaviors having a relatively low environmental impact.

Nickerson then devotes five chapters to strategies to promote conservation behavior. In Chapter 4, he discusses attitude change. He reasons that attitude changes may result in behavior changes, since attitudes, values and beliefs are important determinants of environmental behavior. Like Gardner and Stern, he argues that attitudes may also have a less direct (but no less important) impact on the environment, i.e. strongly expressed attitudes can have an effect on policies that have far reaching environmental implications. In Chapter 4, Nickerson discusses many relevant issues, e.g. environmental concern, environmental quality assessment, contingent valuation, the attitude-behavior gap, landscape preferences and restorative environments. However, in some instances, he only touches upon these issues or even only provides list of relevant references on an issue, without indicating the main conclusions from the relevant literature (e.g. p. 79).

Chapter 5 is devoted to applied behavior analysis. According to Nickerson, it is sometimes more cost effective to try to change behavior directly, and that attitude change is likely to follow the change in behavior. Behavior may be modified via the use of incentives or disincentives (antecedent manipulations) and rewards and punishments (contingency manipulations). Behavioral consequences are modified in such a way that environmentally benign behavior becomes more attractive than environmentally destructive behavior. Example strategies are legislation and governmental regulations, tax deductions, taxation, and persuasion. He then discusses behavior change programs in various domains, among which energy conservation, transportation behavior, recycling, and littering. Nickerson reasons that incentives should not be too strong, since it may undermine people's intrinsic motivation to act. In the concluding section, he describes the difference between extrinsic and intrinsic motivation. Extrinsic motivation depends on incentives for specific behavior or rewards that can be anticipated for engaging in such behavior. Intrinsic motivation is associated with behavior that is valued for its own sake. In general, Nickerson argues, compared to extrinsic motivation, intrinsic motivation is more likely to move people to engage in environmentally sound behavior.

Nickerson concludes that in general, a combination of the strategies discussed in Chapter 4 and 5 would be the best strategy, targeting both attitudes and behavior, since both attitudes and behavior should be consistent if the behavior change is to be sustained. Also, like Gardner and Stern, he argues that behavioral changes are not sufficient to address environmental problems, and stresses that psychologists can also have an impact by making technology and its products more environmentally benign or beneficial. This is elaborated in the next three chapters. Chapter 6 demonstrates that technological enhancements may be very effective in managing environmental problems. Psychologists are especially needed with regard to the marketability of environmentally sound technologies, by examining which factors affect the acceptability and adoption of such technologies. However, Nickerson mainly discusses which technological changes are feasible in different domains, while one would expect a thorough discussion of the diffusion and adoption of innovations as well, since this is of special interest to behavioral and social scientists. Furthermore, Nickerson highlights the possible contribution of scholars advancing a human factors approach, especially to reduce technological risks, by studying people-machine interactions and ways to improve equipment design. Chapter 7 discusses the substitution of resource-light for resource-heavy technologies. This chapter reviews recent literature that highlights the opportunities information technologies may provide to reduce energy and material demands.

Chapter 8 elaborates on environmentally friendly design. From an environmental point of view, equipment should be maintainable, repairable, recyclable and disposable, and products should be evaluated in terms of the efficiency with which they use natural resources. This is not an easy task, though. For example, does one weight different environmental impacts? And does one obtain ready access to the large amount of information on environmental change? This chapter also highlights the importance of interdisciplinary research.

The last chapters focus on the opportunities for psychological research to decrease detrimental impacts of human behavior on the environment. Chapter 9 concentrates on consumer behavior and consumer education. Nickerson concludes that consumer psychology takes consumption as given, and little attention is being paid to the role of environmental concerns. Unfortunately, a discussion of studies on consumer behavior from an environmental psychology point of view is lacking in this chapter. Chapter 10 gives a brief description of some relevant aspects with regard to environmental risk assessment. Among other things, the difference between expert versus lay perceptions of risks is discussed, as well as the limitation of expert opinions. In Chapter 11, Nickerson explains why economic cost–benefit analyses are problematic. For example, some environmental costs are difficult to quantify, and it is hard to give due weight to uncertain and long term consequences and to compare costs and benefits across generations. He argues that costs and benefits should be established by taking human values and preferences into account, which implies that it is a psychological problem as well. Chapter 12 gives a nice description of the literature on common dilemmas relevant to the environment, in which individual and collective interests are at odds. Nickerson discusses various ways to deal with commons dilemmas. In the last chapter, Nickerson argues that environmental change should be higher on the priority list for psychologists. He makes an appropriate plea for theory development and integration of research results in the field and for communicating practical implications of research results.

In conclusion, both texts convincingly demonstrate how psychologists can make important contributions to

solve environmental problems by contributing to an understanding of environmentally detrimental behavior and to its modification. Both stress the need for interdisciplinary research, e.g. for evaluating the environmental impacts of various products and services that provides important guidelines for selecting target behaviors to be understood and changed. Such information may help psychologists focus more strongly on behaviors that are significant from an environmental point of view. Both texts provide a broad coverage of the topics of interests to psychologists and other behavioral and social scientists interested in environmental change, although in both texts, some relevant topics are ignored or only touched upon. In part, both texts discuss the same topics, e.g. behavioral causes of environmental problems, commons dilemmas, and risk perceptions. However, as described above, the content and perspective of both books differ, which makes the texts complementary rather than competing. Nickerson's book provides a thorough literature review which is probably especially of interest to scholars interested in environmental issues and psychology, while the text by Gardner and Stern provides many vivid examples, is easy to read, and is well suited for undergraduate courses in environmental psychology. Nickerson more strongly focuses on the role of technological enhancements and human factors research, while Gardner and Stern discuss possible strategies for behavior change more thoroughly. For sure, scholars and practitioners interested in a psychological perspective on environmental problems will appreciate both books.

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