Annu. Rev. Environ. Resour. 2005. 30:335–72
doi: 10.1146/annurev.energy.30.050504.144444

First published online as a Review in Advance on July 25, 2005

ENVIRONMENTAL VALUES

Thomas Dietz,[1,2] Amy Fitzgerald,[2] and Rachael Shwom[1,2]
Environmental Science and Policy Program,[1] Department of Sociology,[2] Michigan State University, East Lansing, Michigan 48824; email: tdietz@msu.edu, Æte73@msu.edu, shwomrac@msu.edu

Key Words values, environment, pro-environmental behavior

■ **Abstract** Values are often invoked in discussions of how to develop a more sustainable relationship with the environment. There is a substantial literature on values that spans several disciplines. In philosophy, values are relatively stable principles that help us make decisions when our preferences are in conflict and thus convey some sense of what we consider good. In economics, the term *values* is usually used in discussions of social choice, where an assessment of the social value of various alternatives serves as a guide to the best choice under a utilitarian ethic (the greatest good for the greatest number). In sociology, social psychology, and political science, two major lines of research have addressed environmental values. One has focused on four value clusters: self-interest, altruism, traditionalism, and openness to change and found relatively consistent theoretical and empirical support for the relationship of values to environmentalism. The other line of research suggests that environmentalism emerges when basic material needs are met and that individuals and societies that are *postmaterialist* in their values are more likely to exhibit pro-environmental behaviors. The evidence in support of this argument is more equivocal. Overall, the idea that values, especially altruism, are related to environmentalism, seems well established, but little can be said about the causes of value change and of the overall effects of value change on changes in behavior.

CONTENTS

INTRODUCTION 336
Values and Environmentalism 336
Some Basic Concepts 337
THE VARIED USES OF THE IDEA OF VALUES 339
Values in Everyday Language 339
Values in Ethics 340
Values in Economics 341
THE PROBLEM OF ALTRUISM 343
Altruism and the Environment 344
Altruism in Evolutionary Theory 344
THE SOCIAL PSYCHOLOGY OF VALUES 345
Defining Values 345
Measuring Values 346

VALUES AND THE ENVIRONMENT 356
How Do Values Influence Environmentalism? 356
Altruism, Self-Interest, and Other Values 358
Risk and Technological Choice 359
Traditional Values and Openness to Change 359
Postmaterialist Theory 360
NEW DIRECTIONS 362
Values, Identity, and Emotions 362
Value Choice 363
Values and Discourse 363
Deploying Better Methods in the Study of Values 364
Value Heterogeneity 365
CONCLUSIONS 365

INTRODUCTION

Why does a commuter decide to drive alone in a car rather than carpooling or taking mass transit? Why do most land-use development patterns favor sprawl with its attendant environmental impacts over more environmentally benign forms of development? Why are most fisheries overexploited? The term *values* is frequently invoked in discussions of environmental problems such as these. Those concerned about human impact on the environment have often suggested that changes in values are a route to more sustainable behavior and policy. The assumptions behind these comments are that values influence our individual and collective decisions and that if our values changed we would make decisions that are more protective of the biophysical environment. However, these expressions of hope and frustration about values are seldom connected to the substantial body of research on values, nor are they precise about what forces influence human behavior or how value changes might be reflected in behavior. In this review, we examine social scientific research on values, focusing on work that relates values to our treatment of the biophysical environment.

Values and Environmentalism

At the core of this review is a tradition of research that measures individual values and considers their relationship to environmentally consequential behavior. [It is also possible to interpret the goals of national policies and international treaties and agreements as statements of values (1)]. But to understand this work and its relationship to the generic invocation of values in discussions of anthropogenic environmental change, we have to consider several other scholarly traditions that focus on values. In philosophy, the concept of values is central to many forms of ethical analysis. Indeed, one of the major journals in the field of environmental ethics is titled *Environmental Values*. Likewise, the concept of values is central to environmental economics, where much research is concerned with assigning value

to changes in the environment, the field of environmental valuation. Further, nearly all work on the problem of the commons considers the relative influence of altruism and self-interest in decision making (2). So, the concept of values is related to the broad literature on altruism in evolutionary theory and the social sciences. And even the tradition of research that forms the centerpiece of our discussion, the empirical study of values in sociology, social psychology, and political science, can be difficult to understand without some attention to how individual values relate to other important influences on individual behavior, such as beliefs, norms, and attitudes.

Unfortunately, these streams of research are not well integrated. In addition, as we move across the research traditions, the term values is used in somewhat different ways. Our major goals in this review are to clarify how the idea of values is used across these various fields of inquiry and to review the state of the social science literature dealing with values and the environment. Because we are bound to cover more ground than the social science literature per se, we do not review the empirical literature on values save where it deals directly with environmental decision making. A recent review by Hitlin & Piliavin (3) provides sound guidance regarding empirical values research not related to the environment. A number of key papers on values and the environment have recently been reprinted and overviewed by Kalof & Satterfield (4). Satterfield & Kalof (5) mapped the literature on values by contrasting axiomatic approaches that assume values can be established independent of individual human preferences with subjectivist approaches that focus on values as expressed by individuals. Their map covers the same terrain we cover but uses a different projection to lay out the landscape.

Some Basic Concepts

The social science literature on values often makes use of terms that can be hard for the uninitiated reader to follow. One of our goals in this review is to provide guidance that focuses on the conceptual issues and major debates without becoming lost in the details. We begin our discussion with the relationship between values and decision making because that is how the idea of values is usually deployed in ethics—values are assumed to influence decisions. This is also how values are invoked in expressions of concern and hope about human impact on the environment. Changes in values are seen as leading to changes in decisions and thus to changes in behavior. However, as we detail below, decisions are influenced by more than values, and behaviors are not always the result of thoughtful decisions.

Most studies of individual environmental values use surveys and not direct observations of environmentally consequential behavior because social science research on the environment is generally not well funded and the observation of individual behavior is expensive. Values are most commonly related to either (*a*) self-reported behaviors (e.g., "Do you usually recycle newspapers?"), (*b*) behavioral intentions (e.g., "Would you be willing to sign a petition in favor of stricter environmental protection?"), or (*c*) other measures that express concern for the environment. Thus an important limit of the current literature is that very

few studies examine actual behavior, and the link between self-reported behavior or behavioral intentions and actual behavior is far from perfect (6). Another limit is that the relationship between values and behavior can be dependent upon the type of value(s) being examined (7). A growing and important area of research examines the relationship of values to stated willingness to pay or otherwise make sacrifices to protect the environment (e.g., "How much would you be willing to pay to protect watershed X from development?"). There is also research emerging on how values are related to perceptions of environmental and technological risk and to preferences regarding environmental policy. Finally, many studies simply link values to expressions of pro-environmental attitudes. Some recent contributions to the literature help us think about what might be influenced by values by categorizing environmentally consequential individual actions, such as consumer behavior and active and passive political support for the environmental movement and its goals (8, 9).

Although we emphasize choice in our discussion of values, it is critical to remember that many environmentally consequential behaviors are strongly influenced by factors outside an individual's control (10–13). For example, as individuals we have little influence on how much public transportation is available in our community, but transportation availability may dominate our decisions about commuting, regardless of our values. Guagnano et al. (14) offered an "Attitudes-Behaviors-Constraints" theory of pro-environmental behavior that emphasizes the interaction between attitudes and constraints in shaping behavior and that suggests that some inconsistencies in research on either attitudes or behavioral change may be the result of not taking adequate account of both attitudes and constraints as influences on behavior. Besides structural determinants of environmental decisions, interactions with others and the social context within which we act are also consequential. For example, the behaviors we observe of others who live in our neighborhood are likely to have substantial influence on us (15) especially when those observed behaviors are taken as norms describing how we should behave. (We return to the issue of norms below.) Some environmentally consequential decisions are affected by so many other considerations that the environmental component may be given little weight. For example, in deciding which house to buy, the ease of access to public transportation may be a consideration, but it may be swamped by neighborhood character, school quality, cost, and other matters. Yet that choice, once made, then influences all subsequent choices about commuting. Finally, some behaviors become so routine or are made so quickly that we may not reflect on our values (16). Thøgersen & Ölander (17) reminded us that pro-environmental behaviors can either mutually reinforce or negatively influence each other so they cannot be considered independent of one another. Despite these complications, the core arguments about values are that they influence individual decisions and that individual decisions are consequential in shaping individual, and ultimately group, behavior with regard to the environment.

Understanding the literature on environmental values, especially the relationship between discussions of values in environmental ethics and the social science

tradition, is easier if we keep in mind that the concept of values is often deployed to explain how we make new choices. The general argument is that environmental decisions often require us to make decisions about things we have not thought much about previously. The goods and services that flow from ecosystem functions are often taken for granted. New environmental issues emerge from new scientific research, and the environmental movement draws attention to problems not previously given much notice. Thus decision making about the environment often concerns an issue to which we have not given much previous thought (18). Whether such novel decisions actually reflect our values depends on the context in which we have the opportunity to reflect on our values. In some contexts, a quick decision seems appropriate, and that may lessen the influence of values or bias which values are given weight. We return to this issue below.

We begin our review with the common definition of values and then consider the use of the concept of values in ethics and in economics. Then, we elucidate how these approaches are related to the use of the term in sociology, social psychology, and political science. Because the literatures that engage with values in environmental ethics and environmental and resource economics are huge, we provide only a brief sketch of them. Our review is also limited to research that directly engages with social scientific theory, leaving aside ad hoc invocations of the term values in general analyses of environmental concern.

THE VARIED USES OF THE IDEA OF VALUES

Offering a definition seems a pedantic way to begin a discussion, but examining the most common meanings of values immediately leads us to some deep issues that occupy us throughout this essay. *Value* comes from the Latin *valere*–to be strong, to be worthy. The *New Shorter Oxford English Dictionary* (19) offers two columns of definitions for values. The second major definition is the one closest to our concerns:

> a. The worth, usefulness, or importance of a thing; relative merit or status according to the estimated desirability or utility of a thing. b. Estimate or opinion of, regard or liking for, a person or thing. c. The principles or moral standards of a person or social groups, the generally accepted or personally held judgment of what is valuable and important in life.

In everyday language, we use values in all three of these senses: what something is worth, opinions about that worth, and moral principles.

Values in Everyday Language

Consider the relationship between the worth of something and our assessment of that worth—the first versus the second definition of value. It is often suggested that some aspects of the biophysical environment, especially beautiful landscapes,

complex ecosystems, and rare species, have *intrinsic* value. That is, they have value independent of the values that humans assign to them. But others argue that this is not so, that values must always be assigned by humans. As a practical matter, there are no widely accepted methods for systematically quantifying intrinsic value other than by asking people about the values they assign to a landscape, ecosystem, or species, but this limitation in our methods does not obviate the deeper conceptual problem. The problem of intrinsic value has been a central debate in ethics for nearly a century (20). Arguments for intrinsic environmental values trace at least to Routley (21). [For a concise overview of these and related debates in environmental ethics see Brennan & Lo (22).] We engage these issues in our discussion of values in environmental ethics and environmental economics below.

The third definition, of values as moral principles, suggests standards about how we should value various states of the world and the actions of ourselves and others. It departs from the first two definitions in two ways. First, it alludes to the importance of the social group as the carrier of values. Second, it seems to refer to values in a more general sense than those that might be assigned to or inherent in a specific thing. The idea of values as a statement of how one should behave, or how the world should be, arose first in philosophy but is now also a theme in the social sciences. The issue of how individual values relate to the social group arises again below.

Values in Ethics

In his examination of theories about the origin of values, Joas (23) suggested that the use of the concept of values arose in economic life and thought in the eighteenth century, whereas the use of the idea in ethics began with German philosophy in the nineteenth century. [See Ostrom (24) for a discussion of the views of some early economic theorists.] In ethical theory, values influence how people make decisions. Ethical theories of value argue that people consider not just their immediate wants and desires, but they sometimes reflect on deeper concerns about what is important. This emphasis of the role of values in decision making is consonant with social science theory. The standard rational actor model, which dominates microeconomics and is influential in political science and sociology, assumes that we make decisions by weighing alternatives in comparison with our preferences. Then we choose the options that do the best job of matching our preferences. [Jaeger et al. (25) constructed a masterful overview of the rational actor model.] Although most accounts of the rational actor model do not incorporate values, Hechter (26) argued that values help give weight to preferences when we cannot find a choice that is better with regard to everything that we prefer. That is, values help us make choices when there are trade-offs.

John Dewey (27) moved from this view to a discussion of the importance of values in ethical conduct. For Dewey, values arise because it is common for our preferences to be in conflict during decision making. Our values, an abstract set of principles, allow us to resolve those conflicts by suggesting which preferences are

better. This differs from the basic account of the rational actor model by invoking moral considerations. Thus values are about what is desirable, whereas preferences are only about what is desired. This also suggests that values are deployed in a reflective process of self-examination rather than in a quick judgment. Dewey and his fellow pragmatist George Herbert Mead (28) also emphasized the importance of values in personal identity. When we think about who we are, we think about what things are of fundamental importance to us. Mead's thinking about the way in which personal identity is formed in interaction with others was a dominant influence on sociology, but the idea of values has not been emphasized by his followers. We mention this because, as we see below, most empirical work on values is conducted using either surveys or experiments, but the tradition of Mead emphasized in-depth interviews and participant observation. This approach has been neglected in research on values (but see Reference 29).

The issue of whether the environment and other species have intrinsic value or instead are of value only because they are means to human ends, referred to as *instrumental value*, is a central one in environmental ethics. In measuring values to inform policy decisions, we have no direct way of assessing intrinsic value but have to rely on observations of human behavior, including statements about intrinsic value or travel to sites that may have intrinsic value. The distinction between intrinsic and instrumental values has a parallel in the social sciences, where a distinction is sometimes made between instrumental values (means) and terminal values (30).

Values in Economics

The economics tradition is dominated by the rational actor model of human behavior (25). This model assumes that people make decisions by assessing what outcomes follow from various possible choices and examining the effect each outcome has on things the chooser desires, that is, the effect of a choice on his or her preferences. In the language of this approach, we make choices so as to maximize our utility (satisfaction), taking account of uncertainties as well as benefits and costs associated with each course of action. Economic theory has been silent about why people prefer what they prefer and has focused on how decisions are made given some set of preferences. Indeed, there are strong arguments in economic theory that people have clear preferences that are easily accessible when decisions must be made (31). If that is true, then values as the arbiters of preferences when it is hard to make decisions play little role. Thus, economics has not offered much insight into values in the sense we are discussing them here. (And there can be some confusion if we are not careful to use the term *preference* to refer to the specific things individuals want or desire and *values* to refer to more general assessments of what kinds of circumstances are seen as desirable by individuals.) However, the idea that values help resolve conflict among preferences, as suggested by Dewey, gives a sense of the relationship between values and preferences in a way that is consistent with the rational actor model.

The term values is more often engaged in economics as we move from the individual to the group. Economics has offered clear ideas about how to assess what society values in order to provide guidance to collective decision making. A utilitarian ethic suggests that the most appropriate decision is one that provides the greatest good to the greatest number (i.e., maximizes utility for the group). This is just the group level version of the rational actor model—as a group we want to make the choice that provides the most utility when we sum utility across all individuals.

The practical tool of utilitarian ethics is benefit-cost analysis (32). If we can analyze all outcomes of all possible courses of action and estimate the utility associated with each, we can then make the choice that provides the greatest good for the greatest number. Arrow's (33) analysis of preference aggregation strengthened the argument for using benefit-cost analysis for public decisions. He showed that, in order to add up utilities, we must have measurements of individual utilities that are cardinal numbers (numbers on which we can perform arithmetic). If we can only measure utilities as rank orderings ("I like this better than that"), then there is no ideal or even unique way to combine those individual choices to obtain a group choice. The outcome of our aggregation, our collective choice, depends on the rule we use to combine the individual preference orderings, with different voting rules potentially leading to different outcomes. This constraint encourages the search for measures of utility that are cardinal numbers.

Market prices of goods and services are cardinal numbers, and under some conditions, it can be shown that prices do reflect social values. In particular, if there are a large number of small producers and consumers in a market and there is no concentration of buying or selling power, if all goods and services have perfect substitutes, if all players have perfect information, if all players have equal access to means of production and resources, if any firm can enter or exit the market as it wishes, if transactions costs are minimal and the price is influenced by nothing but supply and demand, then prices reflect social value. Although no market matches these conditions perfectly, some markets may approximate them well enough that prices are a reasonably accurate reflection of social value (34). Thus prices give us cardinal numbers to use in aggregating preferences. But for many goods and services of environmental importance, the ideal conditions in which prices are an accurate reflection of social values are not present, and indeed, many goods and services that seem important have no market price at all. This is true for many ecosystem services, which are defined in the literature as the benefits obtained from ecosystems (35). For example, we may be able to determine the value to society of timber harvested from a forest by calculating the market value of the lumber that would result from the harvest. But we have no comparable market to give us the value of the flood prevention provided by leaving the forest standing, let alone for the value of the rare and even the common species that would be lost to the area if the forest is lumbered.

To provide estimates of value for things whose social value is not adequately captured by market prices, economists have developed a set of methods that are

referred to as *contingent valuation* (36). The basic logic of contingent valuation is to ask a representative sample of the public what they would be willing to pay to preserve or protect the state of the environment under consideration. So, in the forest example, we might conduct a survey asking people what they would be willing to pay to leave the forest as is, in comparison with some proposed change, such as a timber harvest. The values reported by the survey respondents are cardinal numbers and can be used to project the willingness to pay of the public overall, and that value can be compared with the value of the lumber that could be harvested. The comparison of the two numbers thus allows a comparison of the value to society of harvesting the forest versus not harvesting it. This is the logic of social valuation as it is commonly used in economics.

The literature on contingent valuation is too huge to review here (37). However, we mention contingent valuation because it represents one of the three major traditions in social science research with regard to values—it is the tradition that attempts to measure the social value of specific changes in the environment. We also mention it because some interesting work has begun attempting to link what people say in contingent valuation surveys to the kinds of individual values that are investigated by sociologists, social psychologists, and political scientists. We discuss this literature below. The core idea is that when posed with a contingent valuation question in a survey, people may need to consider their basic values to decide how much importance they assign to a change in the environment. Likewise, when making a purchase in the market, people may need to reference their values to decide what product to buy.

THE PROBLEM OF ALTRUISM

The problem of intrinsic versus instrumental value in environmental ethics relates to a core question in the study of behavior: To what degree can we expect to find altruism? Assigning intrinsic value to other species or ecosystems is saying that we should care about them regardless of the importance of those systems for humans. This point of view is often traced to Aldo Leopold's famous *land ethic*: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise" (38, p. 224). In this view, all human actions are to be judged as instruments for protecting the intrinsic value of the biotic community. Leopold argued that we should eschew self-interest and act for the good of the other, in this case, the whole biotic community. Because Leopold was trained in a human-centered utilitarian approach to resource management, this move toward nonanthropocentric values is a sharp rejection of the dominant paradigm of his time (39). Reflection on Leopold's essay by Heberlein (40) and by Dunlap & Van Liere (41) interjected value considerations and especially the idea of altruism into the social psychology of environmental concern. And it was Leopold who inspired Routley's (21) original call for a nonanthropocentric approach to environmental ethics.

But as influential as the nonanthropocentric tradition has been, there is a strong tradition of arguing for valuing the environment solely through human interests (e.g., References 42 and 43). This view suggests that the state of the biophysical environment and of other species can only have instrumental value. The environment matters only as a means toward human ends, although those ends may include contemplation of the beauty of nature or a sense of awe at the complexity and subtlety of evolutionary processes rather than direct satisfaction of material wants. The tension between anthropocentric and nonanthropocentric views of valuation inspired both theory and empirical research on the role of altruism in shaping environmentalism. In particular, the discussion of altruism has been expanded to contrast concern with other humans with concern that includes other species or the biosphere. Thus the concept of altruism has become central to discussions of environmental values.

Altruism and the Environment

Drawing on the work of Leopold, Dunlap, Van Liere, Heberlein and the overall tradition of research on altruism, Stern and colleagues (44, 45) and Merchant (46) suggested that there are at least three value bases for environmental concern: self-interest, humanistic altruism, and biospheric altruism. The self-interest basis of environmental concern comes from caring about the environment because it influences us and those we care about. This is the usual assumption of the rational actor model—that people make decisions based upon self-interest. The second reason to care about the environment is an altruism directed toward humans—social or humanistic altruism. This is altruism in the sense that our scope of concern is broadened from one's self and family to a larger community, possibly encompassing all of humanity. The third basis for concern is an altruism directed toward other species or the state of ecosystems themselves, beyond the benefits to humans of those species or ecosystems. This has been termed *biospheric altruism*. The first two approaches are anthropocentric and assign only instrumental values to other species or the environment, while biospheric altruism, like Leopold's land ethic, is an extension of concern beyond the boundary of Homo sapiens. Biospheric altruism acknowledges intrinsic value, whereas self-interest and humanistic altruism do not.

As the literature on values has evolved, multiple terms have been deployed to label the same concept. Thus humanistic altruism has also been called social altruism or simply altruism. Biospheric altruism has been called biocentrism. To further complicate matters, measures of each of these concepts are sometimes labeled with other terms. To avoid confusion we use the terms self-interest, humanistic altruism, and biospheric altruism throughout the review, indicating when necessary their relationship to other terms found in the literature.

Altruism in Evolutionary Theory

Altruism toward conspecifics has long been posited as a reasonable ethical stance, but analyses of genetic evolution have suggested that, even if such behavior is

laudable, it is rare. Natural selection acting on genes tends to favor the selfish individual over the altruist so that, over time, altruism becomes increasingly rare and self-interest common. There are a few mechanisms that expand on narrow self-interest, such as looking out for kin (47) or acting altruistically when reciprocity can be expected (48), but these are exceptions to the general pattern. Altruism might also be favored if natural selection acted strongly on groups (i.e., groups reproduced themselves or went extinct as a unit) rather than primarily on the individuals. Sober & Wilson (49) detailed the history of the long debate on this "group selection" argument.

However, the models that posit altruism as rare and self-interest as dominant have all assumed that behavior is shaped only by genes and experience. That is certainly true for most species; but for Homo sapiens, culture is a major influence on behavior (50, pp. 1–57). The evolutionary dynamics of culture are such that altruism, rather than being a rare and ephemeral characteristic, may be commonplace, although the scope of altruism may be circumscribed and altruism may coexist with rather than wholly displace self-interest (41, pp. 191–236). In the language of values, altruism is about the scope of outcomes that one values in making decisions. Self-interest implies assigning weight only to outcomes for oneself and close kin. Social altruism implies assigning weight to a broader group of humans, including perhaps all of humanity. Biospheric altruism implies assigning weight to other species, ecosystems, and perhaps the biosphere itself.

The environmental ethics literature is proscriptive, offering arguments about how we ought to think about and value the environment. But the core of the social science tradition of research on values is descriptive, offering analyses of how we do think about the environment. In both literatures, as well as in the literature on evolutionary theory, the issue of altruism is central, although as described below, other values also seem to influence decisions about the environment. The social science literature provides us with evidence about the kinds of values people actually bring to bear in making decisions about the environment.

THE SOCIAL PSYCHOLOGY OF VALUES

The idea that altruism is a basis for environmentalism was the starting point for empirical work linking environmentalism and values. But the broader social science literature suggested other value concepts that might be related to environmentalism. As a result, a rich literature examining how individiual values relate to environmentalism has emerged. We explore that literature here.

Defining Values

Schwartz & Bilsky (51) presented a definition of values that encompasses much of the work that preceded them: "According to the literature, values are (a) concepts or beliefs, (b) about desirable end states or behaviors, (c) that transcend

specific situations, (d) guide selection or evaluation of behavior and events, and (e) are ordered by relative importance" (p. 551). Hitlin & Piliavin (3), in an excellent overview of values research and theory in sociology, noted that values differ from four other social psychological constructs, whereas Frannson & Gärling (52) discussed values in the context of other concepts that measure environmentalism.

Values differ from attitudes in that *attitudes* are positive or negative evaluations of something quite specific. We might value wilderness, and we might oppose a proposal for oil development in a wildlife refuge. The former is more general and would be considered a value; the latter is more specific and considered an attitude. The term *trait* refers to psychological characteristics such as authoritarianism or risk aversion. Traits differ from values in that, while traits may influence behavior, they are not necessarily desirable and are not the products, even hypothetically, of reflection. *Norms* are "ought to" statements (53). Thus one might value efficiency in resource use and have a norm that "everyone ought to recycle paper." *Needs* refer to biologically based demands on the individual. Thus we may value ecosystems but have a need for various ecosystem services, such as food or water. We add *preferences* to Hitlin and Piliavin's list, which are specific rankings or ratings of possible outcomes from a decision. So we might value pristine habitat and have a preference for a particular tract of land to remain undeveloped rather than for it to be developed. As noted above, Dewey argued that values are used to help make decisions when preferences conflict. *Beliefs* are understandings about the state of the world; they are facts as an individual perceives them. Two people might differ in their beliefs about the impacts of climate change on endangered species, or they might differ in the values they assign to the perpetuation of rare species, or both. *Worldviews* are generalized beliefs. We might hold the specific belief that climate change leads to loss of habitat and thus species loss in boreal regions and a worldview that human actions often cause substantial harm to the environment. Finally, *roles* can be thought of as ways of behaving and making decisions that vary across social situations. For example, at home the role of parent may dominate and with it an emphasis on protecting the environment for the next generation, whereas at work the role of business professional might dominate and long-term concerns would be given less weight than immediate economic performance.

Measuring Values

The social psychological literature is empirical as well as theoretical. Over the last 35 years, social psychologists have developed several approaches to measuring individual values. The way values are measured in an empirical study provides the working definition of values in that study. So to understand the literature on values and environmentalism, it is essential to understand what is actually being measured in the empirical literature as well as the strengths and limits of the most common approaches. We review the major approaches below.

THE ROKEACH/SCHWARTZ APPROACH Rokeach (54) effectively launched empirical work on values. According to Rokeach, values are "enduring beliefs that a specific mode of conduct is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence" (55, p. 160). To measure these values, Rokeach developed the Rokeach Value System. This approach provided the basis for most subsequent work on values measurement. It has been elaborated and extended by Schwartz & Bilsky (51, 56) into what are now the most commonly used measures of values. The Schwartz Value Survey contains 56 survey items that participants are asked to rate along a 9-point scale, indicating how important each stated value is as a guiding principle in their life. (See Table 1.) In the original scale, the values were ranked by respondents, but recent applications ask respondents to rate each value statement independent of the others (57).

In most samples, statistical analyses of the Schwartz items reveal 10 groupings of items that are called value types: power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, conformity, and security. (See Figure 1.) These ten types arrange themselves into four clusters that reflect two dimensions. One dimension is referred to as *self-enhancement* versus *self-transcendence*. This dimension entails the pursuit of self-interest on one hand and the concern for the welfare of others on the other. It captures the distinction between self-interest and altruism but not the distinction between humanistic and biospheric altruism. The other dimension is referred to as *openness to change* versus *conservation*. (Because the term *conservation* would lead to confusion in applications of the Schwartz approach to environmental issues, the literature on environmental values often uses the term *traditionalism* after one of the value types composing this cluster.) This dimension encompasses the tension between readiness for new experiences and self-restriction.

Schwartz and his collaborators have found roughly the same value structure in approximately 70 different samples from widely different cultural groups around the globe, although all are literate samples (7, 58–60). It seems that although different contemporary cultures may rank the importance of various values differently, the structure of values is nearly universal in the modern world. Bok (61) has argued that uncovering common values cross-culturally is a pressing issue because societies urgently need common ground for cross-cultural dialogues about how to deal with hazards that span national boundaries, such as environmental degradation. Thus the Schwartz approach to value measurement has considerable appeal both because one of its dimensions matches the concern with altruism and self-interest in the conceptual literature on values and the environment and because it appears to be applicable across a broad range of contemporary literate cultures. This has led to its frequent use in research on environmental values. Recently, Schwartz and his collaborators (62, 63) have modified their approach slightly, but the modified value measures have not been applied to the study of environmentalism, so we do not describe them in detail here.

Stern et al. (18) supplemented the original Schwartz items with two items to better capture the distinction between humanistic and biospheric altruism. They

TABLE 1 Items from Shalom Schwartz's Value Survey[a]

1. Equality (equal opportunity for all)
2. Inner harmony (at peace with myself)
3. Social power (control over others, dominance)
4. Pleasure (gratification of desires)
5. Freedom (freedom of action and thought)
6. A spiritual life (emphasis on spiritual not material matters)
7. Sense of belonging (feeling that others care about me)
8. Social order (stability of society)
9. An exciting life (stimulating experiences)
10. Meaning in life (a purpose in life)
11. Politeness (courtesy, good manners)
12. Wealth (material possessions, money)
13. National security (protection of my nation from enemies)
14. Self-respect (belief in one's own worth)
15. Reciprocation of favors (avoidance of indebtedness)
16. Creativity (uniqueness, imagination)
17. A world at peace (free of war and conflict)
18. Respect for tradition (preservation of time-honored customs)
19. Mature love (deep emotional and spiritual intimacy)
20. Self-discipline (self-restraint, resistance to temptation)
21. Detachment (from worldly concerns)
22. Family security (safety for loved ones)
23. Social recognition (respect, approval by others)
24. Unity with nature (fitting into nature)
25. A varied life (filled with challenge, novelty, and change)
26. Wisdom (a mature understanding of life)
27. Authority (the right to lead or command)
28. True friendship (close, supportive friends)
29. A world of beauty (beauty of nature and the arts)
30. Social justice (correcting injustice, care for the weak)
31. Independent (self-reliant, self-sufficient)
32. Moderate (avoiding extremes of feeling and action)
33. Loyal (faithful to my friends, group)
34. Ambitious (hard-working, aspiring)
35. Broadminded (tolerant of different ideas and beliefs)
36. Humble (modest, self-effacing)

(*Continued*)

TABLE 1 (*Continued*)

37.	Daring (seeking adventure, risk)
38.	Protecting the environment (preserving nature)
39.	Influential (having an impact on people and events)
40.	Honoring of parents and elders (showing respect)
41.	Choosing own goals (selecting own purposes)
42.	Healthy (not being sick physically or mentally)
43.	Capable (competent, effective, efficient)
44.	Accepting my portion in life (submitting to life's circumstances)
45.	Honest (genuine, sincere)
46.	Preserving my public image (protecting my "face")
47.	Obedient (dutiful, meeting obligations)
48.	Intelligent (logical, thinking)
49.	Helpful (working for the welfare of others)
50.	Enjoying life (enjoying food, sex, leisure)
51.	Devout (holding to religious faith and belief)
52.	Responsible (dependable, reliable)
53.	Curious (interested in everything, exploring)
54.	Forgiving (willing to pardon others)
55.	Successful (achieving goals)
56.	Clean (neat, tidy)

[a]Adapted from Reference 57a.

also offered a short version of the values scale that might be more suitable for survey research than the list of 56 items Schwartz typically uses (64). (See Table 2.) However, the short scale, which uses only 15 items to capture 5 aspects of values, although convenient to use, often proves substantially less reliable (has more measurement error) than longer versions.

One complexity of the empirical literature arises from the distinction between the theory of values developed to explain environmentalism, which emphasizes self-interest, humanistic altruism, and biospheric altruism, and the Schwartz value measures. For example, one of the Schwartz value dimensions corresponds nicely to the distinction between self-interest and altruism, with altruism, which Schwartz calls self-transcendence, composed of the value types benevolence and universalism. So some research has used those measures. Other studies have used items developed by Stern, Dietz, and Guagnano (64). These items modify the original Schwartz items to capture the biospheric-humanistic distinction. In addition, some researchers have examined the influence of traditional values and openness to change on environmentalism. Stern, Dietz, and Guagnano used items

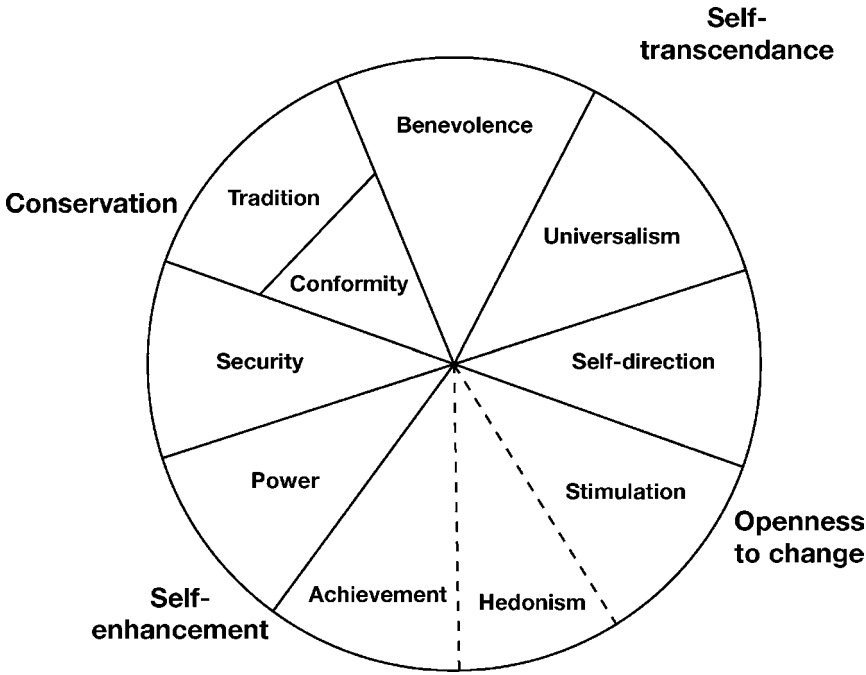

Figure 1 Schwartz and coworkers' (57a) theoretical model of relations among his 10 motivational types of values. Reproduced with permission from the *Personality and Social Psychology Bulletin*.

from Schwartz's value types conformity and security to measure tradition. (The items used for traditionalism do not, ironically, include items from the value type Schwartz labeled tradition because these items were not as reliable indicators of the general orientation as those from the other two clusters.) Still others have used various value types from the full list of 10 developed by Schwartz and his colleagues.

Thompson & Barton (65) have proposed an alternative set of items to measure values. One set of items measure what they term *ecocentrism*, which is similar to biospheric altruism. However, they posit as a polar opposite *anthropocentrism*, which is composed of items that tap a sense that the value of nature is dependent on human use and combines self-interest and humanistic altruism. Some studies using these measures consider ecocentrism and anthropocentrism as two separate measures, so that an individual has scores on each. Other studies [e.g., Vaske & Donnelly (66)] assume a single continuous measure ranging from high ecocentrism to high anthropocentrism. Vaske & Donnelly have noted, however, that not all research related to wildlife has substantiated the existence of such a continuum and that such failures have occurred when sampling developing countries. McFarlane

TABLE 2 The brief value scales[a]

Biospheric values
Protecting the environment, preserving nature[b]
Unity with nature, fitting into nature
Respecting the earth, harmony with other species
Altruistic values
A world at peace, free of war and conflict[b]
Social justice, correcting injustice, care for the weak[b]
Equality, equal justice for all
Self-transcendence (or biospheric-altruistic) values
Six-item scale including all items above
Conservation (or traditional) values
Honoring parents and elders, showing respect
Family security, safety for loved ones
Self-discipline, self-restraint, resistance to temptation
Self-enhancement (or egoistic) values
Authority, the right to lead or command
Influential, having an impact on people and events
Wealth, material possessions, money
Openness to change values
A varied life, filled with challenge, novelty, and change
An exciting life, stimulating experiences
Curious, interested in everything, exploring

[a]The use of these brief scales has not demonstrated consistent reliability. Adapted from Reference 64.

[b]Items in a three-item scale of overall altruism.

& Boxall (67) also identified two factors that correspond to the biocentric and anthropocentric value dimensions and found support for the cognitive hierarchy model, indicated by a strong association between forest values and attitudes. Schultz and coworkers (68, 69) have clarified the relationship between this work (65–67) and the work in the Schwartz tradition by emphasizing the distinction between values, as we are defining them, and *concerns*. Concerns are based in values but are conceptually distinct from them—a concern reflects both a sense that something is important and a belief that it may be at risk. Schultz provided a scale for measuring egoistic, altruistic, and biospheric concerns, corresponding to the self-interest, humanistic altruism, and biospheric altruism values.

Finally, some research on concerns with wildlife or natural resources has used a set of value measures developed with little reference to the research on the value measurement we describe. Kellert and coworkers (70–72) developed value measures in a series of studies for the U.S. Fish and Wildlife Service that have been used in his own work (73) and that of others (74–76). Kellert & Wilson (77) argued that some of these values have genetic roots, an argument that has been labeled the *biophilia hypothesis*. As is often the case with arguments about the genetic

determinants of complex cultural phenomena, the hypothesis is not easy to test and is not formulated in a way that takes account of cultural evolutionary processes (50).

Axelrod (78) departs from the Rokeach/Schwartz tradition to delineate three value domains: economic, social, and universal. He used a questionnaire to assess the respondents' value orientations, and then had his sample react to different scenarios, describe the factors that influenced their decision, and rate how important various reasons were in making their decisions. He found that individuals who fell into his universal category were more likely to respond in an environmentally friendly way than those who fell into the economic category. He also found that the responses of the participants who were categorized as socially oriented varied depending upon the social justice implications of the scenarios. Finally, he found that only the responses of the economic category of participants were affected by contextual manipulations.

This diversity of measurement approaches hampers making comparisons across studies. Schwartz and his collaborators continue to develop their refinement of the Rokeach approach. But they have not focused on altruism, which is central to the theoretical arguments linking values to environmentalism, so their work has to be supplemented if its potential for the study of environmentalism is to be realized. Careful development and testing of a scale that draws on both the recent developments in Schwartz's approach while expanding its ability to capture altruism would be of great value.

MEASURING VALUES BY REGRESSION The Schwartz value items are the most common method for examining the relationship between values. However, there are other approaches. In their original paper on values and the environment, Stern et al. (44) offered a model of the influence of values and beliefs on decisions to take action:

$$M = \mathrm{V}_{\mathrm{ego}} AC_{ego} + \mathrm{V}_{\mathrm{soc}} AC_{soc} + \mathrm{V}_{\mathrm{bio}} AC_{bio}$$

In this model, M is the motivation to take a course of action. $\mathrm{V}_{\mathrm{ego}}$ is the weight given to self-interest (i.e., self-interest as a value), $\mathrm{V}_{\mathrm{soc}}$ is the weight given to other humans (i.e., humanistic altruism), and $\mathrm{V}_{\mathrm{bio}}$ is the weight given to other species, ecosystems, or the biosphere (i.e., biospheric altruism). AC_{ego} represents an individual's awareness of consequences of the course of action for oneself, AC_{soc} represents an individual's awareness of consequences of the course of action for others, and AC_{bio} represents an individual's awareness of consequences for the course of action for other species, ecosystems, or the biosphere. (We discuss the concept of *awareness of consequences* in more detail below.) Thus the motivation to act is the sum of perceived consequences times the values associated with those consequences. If M and the various perceived consequences are measured for individuals, then the value weights associated with each type of belief can be estimated with a regression equation. Gärling et al. (79) used this approach in

examining the effects of altruism and self-interest on pro-environmental behavioral intentions in Sweden. The regression approach to measuring values is more flexible than the use of the Schwartz value items and can be simpler to implement in a survey. However, the simple regression formulation only yields the average value weight (the regression coefficient) for the entire sample (more complex designs can yield value weights for groups or even for individuals). The Schwartz items have the added advantage of linking to a growing cross-national comparative literature on surveys, including values other than those related to altruism and self-interest.

MEASURING VALUES BY EXPERIMENTS Yet another approach to values measurement, focused precisely on altruism and self-interest, has been developed in experimental-psychology literature (80, 81). Subjects in an experiment play a game in which players may act altruistically toward other players, or with strict self-interest, or in some cases even act to punish other players. For example, in the "dictator" game, one player divides a sum of money between another player and themselves. A purely self-interested player would keep all the money for themselves offering nothing for the other player. The more the player allocates to the other, the more altruistic she or he would be. In fact, across several experiments, the dictator on average allocates 20% of the money to the other player. (80, p. 62).

The experimental approach is powerful in that it measures actual behavior in allocating resources within the experiment, whereas the survey-based methods may be subject to measurement error because of the discrepancy between how people respond to surveys and how they actually behave. However, Schwartz (82) has found that behavior in experiments that allows the display of altruism and self-interest matched the value priorities assigned by individuals in his survey-based measurement. Demonstrations of altruism in the experiments were most strongly positively correlated with the *benevolence* value type and most negatively correlated with the *power* value type, with other value types falling in between. For example, the value types benevolence and *universalism*, which are the logical components of altruism, were correlated 0.38 and 0.32 with actual cooperation. The experimental approach to measurement has the disadvantage of requiring complicated interactions of subjects and thus is difficult to implement with a representative or large sample. Although experiments have strong internal validity (we are confident that we are measuring what we want to measure) compared to surveys, they have less external validity and generalizability (we do not know how well the results generalize to situations outside the experiment nor how well the subjects in the experiment represent the general population). The measurement of values by experiment has not been applied directly to the study of environmental values, but existing literature on cooperation in games is closely related to the problem of governing the commons, as the work of the Ostroms (83) has emphasized.

MEASURING MATERIALIST AND POSTMATERIALIST VALUES Inglehart is another prolific scholar working within the Rokeach tradition (84–87). His work is focused on contrasting a set of values that are said to reflect a materialist orientation to

national priorities with those reflecting what he calls a *postmaterialist* view. Inglehart's hypothesis is that "given individuals pursue various goals in hierarchical order—giving maximum attention to the things they sense to be the most important unsatisfied needs at a given time" (88, p. 991). As those unsatisfied needs change with the process of industrialization so do people's priorities, resulting in a fundamental shift in values. Those who are living in nonindustrial or industrializing countries are more likely to have materialist values that prioritize economic and physical security, such as "fight rising prices" and "strong defense forces." Those in postindustrial nations are more likely to have postmaterial values that reflect and increasing emphasis on needs for belonging, esteem, and self-realization. He has developed a value survey (88), which asks respondents to rank preferences among a set of possible goals for one's country (some materialist, and some postmaterialist) to test his hypothesis of changing values in postindustrial societies (84). (See Table 3.) There are several versions of the survey items, ranging from a 4-item minimal version to a version with 16 items. The longer versions produce more reliable measures of the underlying values than the shorter versions.

In his early work, Inglehart categorized respondents as purely acquisitive (choosing two materialist priorities) or purely postbourgeois (choosing two postmaterialist priorities). Later he added a category for mixed types as well. The percentages of each of these types within a country and the majority type for the country indicate the degree to which a country is materialist or postmaterialist. Inglehart has argued that environmentalism is a product of postmaterialist values (86).

Inglehart's proposed measures of materialist and postmaterialist values are perhaps the easiest to implement of all the methods of value measurement in the literature. They require as few as four questions in a survey. However, as discussed below, there is considerable debate in the literature on the ability of these simple

TABLE 3 A short version of the Inglehart Index (84)

There is a lot of talk these days about what this country's goals should be for the next 10 or 15 years. On this card are listed some of the goals that different people say should be given top priority. Would you please say which of them you yourself consider to be most important in the long run? And what would be your second choice?
Maintaining order in the nation (S)[a]
Giving people more say in important government decisions (B)
Fighting rising prices (E)
Protecting freedom of speech (A)

[a]The letter in parenthesis indicates the category of the goal: Materialist goals are (S), which represents security, and (E), which represents economic. Postmaterialist goals are (B), which represents belonging, and (A), which represents self-actualization.

measures to predict environmentalism, and at least some of that debate suggests that if there is a link between postmaterialism and environmental concern it can only be reliably detected with more elaborate scales than the four-item scale (89). In addition, because the items used by Inglehart tap instrumental rather than terminal values, they focus on values not nearly as stable and fundamental as those assessed by the Schwartz approach.

ETHNOGRAPHIC AND RELATED VALUES APPROACHES Kempton and associates (29) have used in-depth interviews to explore environmental values. They found that for those interviewed, concern for the environment was strongly linked to values, especially to religious and spiritual values. Hanada (90) replicated their work in Germany and Japan, and found similar strong links between religious and spiritual values and environmental concern, as well as a difference between the two countries in the role assigned to government: The Japanese government was expected to call for changes in individual behavior, whereas in Germany, changing government behavior was seen as part of the role of citizens. Satterfield (91) conducted experiments asking people to write about their reactions to various scenarios. The resulting narratives often offered concerns that resonate with humanistic and biospheric altruism. Despite wide respect for the work of Kempton, Boster, and Hartley, the ethnographic method for studying values has not seen much use compared to survey methods. It has the advantage of allowing inductive exploration of issues but the disadvantage of being very labor intensive, particularly if deployed with representative samples. All of these efforts reflect the anthropological and sociological traditions of allowing respondents speak for themselves and extracting patterns from what they say. Although this approach is labor intensive and can make it difficult to generalize across studies, it has the advantage of uncovering how people are articulating their values rather than asking them to react to survey items that may not adequately tap how people are thinking.

VALUES AND NORMS Before beginning his work measuring values, Schwartz (92–96) proposed what has become known as the *norm activation* model of altruism. It deals with behavior intended to help other humans beyond what self-interest would dictate—what we refer to as humanistic altruism. Norms are statements about how one ought to behave, so Schwartz's theory described the conditions under which norms lead to altruistic action. Schwartz's norm activation approach has been applied to understanding pro-environmental behavior quite frequently (13, 40, 97–100) and has been combined with values to provide an integrated values-beliefs-norms theory we describe below. We mention it here because it is common in the literature for researchers to measure norms about pro-environmental behavior (i.e., measure how people believe they should behave with regard to others and the environment) but discuss their results in terms of values. There are strong logical and empirical relationships between norms regarding altruistic behavior and altruistic values, but to examine the substantial literature focused exclusively on altruistic norms and environmentalism is beyond the scope of this review.

VALUES AND THE ENVIRONMENT

Most discussions of values suggest that values influence our thinking about and behavior toward the environment by indicating which preferences are to be given priority. Values help us decide how to think about a choice and what to do. But the effects of values may be complex. Values do not act alone but in tandem with other factors in shaping decisions. Altruism, while of great theoretical importance, is not the only value that influences evironmentalism. And because environmental issues always involve uncertainty, some work has begun to explore the relationship between values and perceptions of risk. Here we explore the theoretical elaborations and empirical tests of arguments specifying links between specific values, other influences on decisions, and environmentalism.

How Do Values Influence Environmentalism?

Values, which may act indirectly on our decisions about the environment through their influence on norms or beliefs, do not act alone and do not influence all decisions. The *values-beliefs-norms* (VBN) theory of environmental concern and behavior emphasizes the indirect links between values and decisions about the environment (8, 9, 52), see Figure 2. The theory suggests that values influence our worldview about the environment (general beliefs), which in turn influences our beliefs about the consequences of environmental change on things we value, which in turn influence our perceptions of our ability to reduce threats to things we value. This in turn influences our norms about taking action. The theory also emphasizes that action can take more than one form: political activism, nonactivist political behaviors such as voting, and private sphere actions such as consumer choices and behaviors in organizations where pro-environmental policies might be endorsed.

The VBN theory assumes that in some sense self-interest (called egoistic in the most recent version of the theory), humanistic altruism (called simply altruism), and biospheric altruism (called simply biospheric values) are the most fundamental determinants of environmental concern. They are fundamental in two senses. First, they are viewed as the most stable determinants of environmentalism across the life course. This also means they are hardest to change in the short run, but in the long run, value changes may have the most impact on decisions about the environment. Second, they are fundamental in that they are hypothesized as influences on worldviews and specific beliefs. This means that they have considerable leverage, but it also means that, net of other variables in the model, values have modest direct (but considerable indirect) influence on environmental decisions (8, 18). McFarlane & Boxall (67, 101) found this general structure in studies focused on forest issues in Alberta, Canada.

Stretching back to Dewey, arguments about the role of values in decision making suggest that values are invoked when we reflect on difficult choices, especially those involving trade-offs among our preferences. Once a decision becomes routine, we may not consciously reference our values but are more likely to do so for

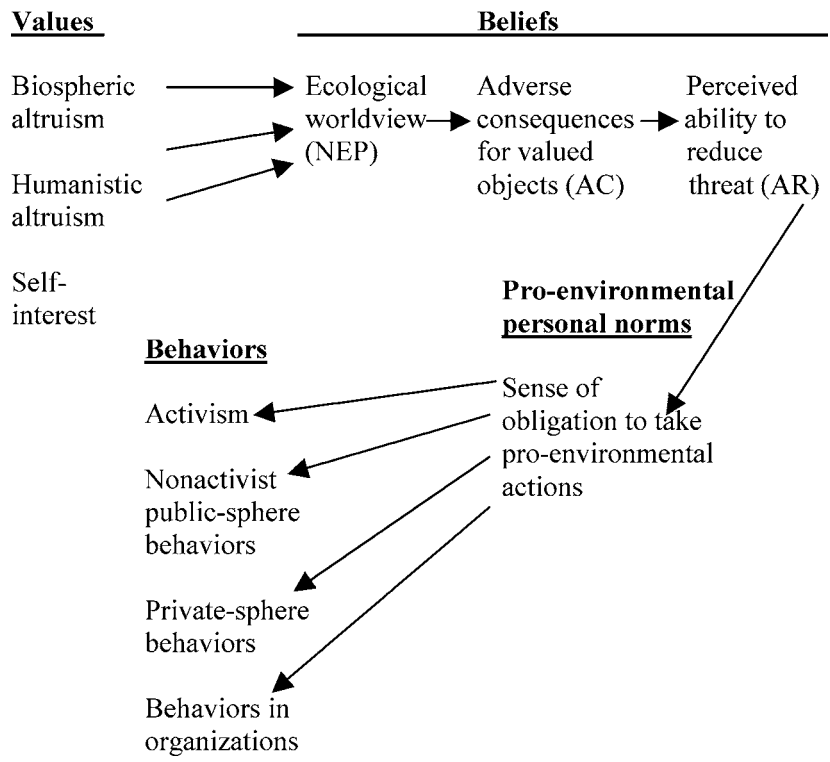

Figure 2 A schematic representation of variables in the values-beliefs-norms theory of environmentalism. Arrows represent postulated direct effects. Direct effects may also be observed on variables more than one level downstream from a causal variable. Empirically, measures of self-interest values have been negatively correlated with indicators of environmentalism. Adapted from Reference 9. The abbreviations NEP, AC, and AR refer to the new ecological paradigm, awareness of adverse consequences, and ascription of responsibility to self, respectively.

novel decisions (103). However, this also implies that the influence of values on decisions depends on a decision context that allows for reflection. If that is true, then contingent valuation surveys that ask a novel question of respondents (e.g., how much would you be willing to pay to protect an aspect of the environment?) may not provide an adequate assessment of values (91, 104–107). The context of a survey, whether via face-to-face interview, phone interview, or mailed questionnaire, does not encourage reflection. In such a circumstance, the respondent may look for quick clues about which of their personal values are relevant to the decisions and may not consider adequately their full set of personal values. Thus subtle cues in the survey may focus attention on some personal values and not others. Guagano et al. (108) provided some evidence for subtle effects of question

wording that may reflect such cuing of values, but Spash (109) has offered some cautions regarding their interpretation while agreeing with their basic suggestion about the influence of values on expressed preferences in contingent valuation surveys. Expressions of personal preference in willingness to pay surveys may be more accurate if they encourage careful reflection rather than quick response.

Given that values are only one among a set of factors that may influence individual decisions about the environment, and given that contextual factors may shape the influence of values, what do we know about the link between personal values and environmental values? There has been some empirical work on this issue over the past decade, some of it deploying the ideas of altruism and self-interest, others focusing on postmaterialism.

Altruism, Self-Interest, and Other Values

Although a logical distinction can be made between humanistic and biospheric altruism, not all studies find that people make this distinction. The survey items that are intended to tap these two concepts sometimes load on the same factor in factor analyses, indicating that survey respondents are treating them as one thing, a kind of generalized altruism, rather than as two distinct values (8, 18). That is, those who care about the environment also care about other people. However, most studies do find this distinction.

Using student samples in the United States, Karp (110) found that both biospheric and humanistic altruism influence measures of environmentalism. (Much of the literature reviewed in this section makes use of student samples. The access to such samples across a diverse set of countries has allowed the exploration of cross-cultural differences, but it must be noted that such samples may not be representative of the general populations of these countries.) Using a survey of college students in Mexico, Nicaragua, Peru, Spain, and the United States, Schultz & Zelezny (111) found that values, especially Schwartz's self-transcendence subtype (altruistic), have important effects upon self-reported environmental behaviors. More specifically, they found that a nature subtype of self-transcendence, which reflects the biospheric value orientation, is positively related to pro-environmental behavior in all of the countries they sampled with the exception of Peru. They also reported finding a negative relationship between self-enhancement (self-interest) and pro-environmental behavior. In later studies with student samples from 14 countries, Schultz & Zelezny (112) found the same general relationships between values and environmentalism, and Schultz et al. (69) have replicated these findings with student samples from an additional 6 countries. Nordlund & Garvill (113) found that altruism, as well as ecocentrism and anthropocentrism, have indirect effects on willingness to reduce car use in a Swedish sample. Additionally, several studies have found that altruists are more likely to support a vegetarian diet (114–116). In an interesting innovation that shifts focus from the individual to the organization, Nilsson et al. (116a) asked decision makers in public and private organizations in Sweden to assess the values of their organization, using the

Schwartz self-enhancement (self-interest) and self-transcendence measures. They found that in public organizations, values have substantial influence on acceptance of climate policy but had no influence in the private sector. Although these studies differ in the exact value measures used and in the measures of environmentalism considered, there is a consistent pattern of altruism emerging as a predictor of environmentalism.

Given the relationship between values and pro-environmental behavior, Schultz & Zelezny (117) argued that environmental messages might be more profitably framed around the salient values in a particular cultural context. They reviewed research that has established that people in the United States emphasize self-interest over altruistic values and then argued that environmental messages in this cultural context could be shaped to appeal to those self-enhancing values. For example, such a targeted message might highlight forms of environmental degradation and can lead to reduced property values. But they also emphasize the importance of changes in the core values of the American public as a long-term strategy. Schultz (personal communication) suggested that a key question for research on environmental values is whether or not self-interest is consistent with environmentalism. This reminds us that the altruism/self-interest distinction is central to work on values.

Risk and Technological Choice

Few studies have examined the influence of values on risk perceptions and technological choice. Of these, Whitfield (118) found that support for nuclear power was higher among those with traditional values and lower among those with altruistic values, with other factors controlled. Values had no effect on perceptions of risk from nuclear power, but they did influence perceptions of risk from global environmental change, i.e., those with altruistic values saw more risk and those with traditional values saw less risk. Altruists have more trust in environmental groups. Slimak (119, 120) found that values, especially humanistic and biospheric altruism, influenced the perceptions of a broad suite of environmental risks among the general public, the public attentive to climate change, risk assessors, and risk decision makers, although the effects were much weaker among the risk professionals than among the general public. Using several measures of values, including items from the new ecological paradigm (NEP), Inglehart, and Schwartz's scales, to predict assessments of personal risk, Sjöberg (121) found that measures of general values in this context did not have much explanatory power and that using measures of attitudes was more useful. It is rather surprising that value concepts have been deployed so seldom in the study of technological choice, and this is clearly an area where further research is warranted.

Traditional Values and Openness to Change

Although the theoretical foundations of research on values and environmentalism has emphasized altruism and self-interest, when traditional values (what

Schwartz calls conservation) are included in studies, they usually have an effect on environmentalism. Such studies have generally found that those with strong traditional/conservative values tend to be less pro-environmental than others (111, 122, 123) and, more specifically, that traditionalism is negatively related to vegetarianism (114). Such results may indicate that environmentalism is perceived as contradicting conservative values by suggesting a move away from traditional patterns of behavior, and it may also be that conservative value items tap a general value frame that favors the market over government intervention and thus is resistant to government regulation that usually accompanies environmental policy. However, most of these studies have been conducted in the United States, so it remains to be seen if they generalize. Additionally, the effects of traditionalism on environmentalism are not always significant in these studies, and the opposite relationship between the two has also been found (125). Studies that have also included openness to change have found that it has little influence on environmentalism, although Lindeman & Sirelius (116) found that it was positively related to vegetarianism.

Postmaterialist Theory

In 1975, Dunlap et al. (126) posited that concern for environmental quality may be a luxury, a need that is high on Maslow's hierarchy, and thus is satisfied once more basic material needs are fulfilled. This approach was the first use of survey measures of values as a predictor of environmentalism and relates individual values to individual environmental behavior. Inglehart (127) has made a parallel argument about the influence of postmaterialist values at the societal level. He found that mass support for environmental protection tends to be the greatest in (*a*) countries that have relatively severe objective problems (air and water pollution) and (*b*) countries with publics that hold postmaterialist values.

In 1994, Brechin & Kempton (128) asked whether global environmentalism might be an exception to the postmaterialist thesis. They cited the increasing numbers of grassroots environmental organizations in developing countries and survey data on citizen concern for the environment. Their analysis of international survey data found no statistically significant differences between low- to middle-income countries and advanced industrial countries in perceived seriousness of national and world environmental problems, indicating that citizens in wealthy nations are not the only ones who value the environment and that concern for the environment has become a global phenomena. Dunlap & Mertig (129, p. 24) came to a similar conclusion, finding that national wealth is "more likely to be negatively than positively related to citizens' environmental awareness and concern."

The Brechin & Kempton article initiated a lively debate regarding whether environmentalism was driven by postmaterialist values. Kidd & Lee (130) argued that gross national product is not a good indicator of materialist versus postmaterialist values because postmaterialism depends on socialization as well as affluence. Inglehart's original thesis was based on characterizing nations by the percentage of

people who hold materialist versus postmaterialist values, not on their affluence. Thus there can be a logical distinction between a country's gross national product and the degree to which it is postmaterialist versus materialist. However, Brechin & Kempton (131) pointed out that researchers, including Inglehart, have tended to blur the unit of analysis, often referring to a wealthy country as a postmaterialist country. Diekman & Franzen (132) and Franzen (133) found that, although there is growing concern about the environment in developing countries, the tendency to give priority to environmental goals is higher in developed countries than lesser-developed countries. Recchia (134), in a statistical analysis of 19 democracies, all of which save India are relatively affluent, found that higher levels of post-materialism lead to ratification of more international environmental treaties. The preponderance of evidence refutes the argument that nations with high levels of postmaterialist values have higher environmental concern than other nations. But more research on the subject is certainly warranted. Of particular value would be work that engages the full spectrum of ideas about values offered by Rokeach, including both the values Inglehart has invoked in his materialist/postmaterialist distinction and the consideration of altruism and self-interest that dominates the broader literature.

Independent of the debate about materialism and postmaterialism, two other theories have posited a relationship between development and environmental concern. The *environmental Kuznets curve* theory suggests that as countries become more affluent, they pass through a stage of increasing environmental impact, and then become more concerned about and better able to afford environmental protection. Thus the relationship between environmental impact and affluence should be an inverted U-shaped curve (135). Ecological modernization theorists have also suggested that societies move from industrialization to a stage of *ecological modernization* in which environmental impacts are minimized (136). Although these theories all make a similar argument that increasing affluence, through various mechanisms, leads to increased environmental protection, they have developed in isolation from one another. And independent of all these efforts, there is a growing awareness of the importance of ecosystem services in providing human well-being among the least affluent around the globe (35). Reaching consensus about the relationship between affluence, values, and environmentalism requires better integration of these theories, clearer specification about the implications of each, and comparative tests of these implications.

A few studies have examined whether or not individuals who consider postmaterialist values important are more likely to be concerned about the environment than those holding materialist values. Davis (137) argued that Inglehart's theory is primarily a theory of individual values rather than national values but found no relationship between environmentalism and postmaterialism. Stern et al. (8) estimated the effects of postmaterialist beliefs on four forms of self-reported pro-environmental behavior for a national U.S. sample and found no significant effect net of altruism, openness to change, self-interest, and traditionalism (the Schwartz value clusters). However, Gökşen et al. (138), in an Istanbul sample, found that

postmaterialist values are negatively related to perception of local environmental problems, not related to perception of global environmental problems, and positively related to willingness to pay for improvement in both local and global environmental problems. Grendstad & Selle (30) found no link between postmaterialism to environmental attitudes in a Norwegian sample. As with the cross-national literature discussed above, the evidence for a link between postmaterialism and environmental concern is not strong, but here too, further research is warranted, especially research that compares value theories. Because both individual and national effects are posited in the literature, hierarchical statistical methods that allow simultaneous estimation of both individual and aggregate effects would be the most appropriate way to address this issue. Using such methods, Kemmelmeier and colleagues (139) found that affluence for both individuals and societies predicted environmentalism, but that postmaterialist values did not.

NEW DIRECTIONS

Empirical and theoretical work continues on the the roles of altruism, postmaterialism, and other values on environmentalism. But even as the value theory of environmentalism becomes more integrated and the empirical evidence underpinning it becomes more robust, a number of interesting issues remain relatively unexplored. These questions point to interesting areas for further work that will lead to a more integrated and realistic understanding of environmentalism. We review a few of the key issues open to exploration here.

Values, Identity, and Emotions

Dewey, Mead, and especially Rokeach saw values as closely related to identity. Recent work has begun to explore the relationship between values, self, identity, and emotions. Schultz (140, 141) elaborated on the role of values by arguing "that objects (e.g., plants, animals, other people) are valued because of the degree to which they are included within an individual's cognitive representation of the self" (125, p. 336). Thus values are related to an individual's exhibited feelings of interconnection between the self and nature, a link between values and identity. Schultz and associates (142) have shown that a biospheric perspective is positively related and an egoistic perspective is negatively related to feeling connected with nature. Stets & Biga (143) found that environmental identity has a very strong effect on environment-related behaviors. Bowles & Gintis (144) link emotions to performance in a game setting involving altruism, making a connection between emotions and values as measured in an experimental setting. Kempton et al. (29) also found that there is close linkage between environmental values and personal identity, especially a spiritual dimension of identity. Because environmental issues often invoke strong feelings (145), exploring the links between values, identity, and emotions will aid in understanding the feelings aroused by many environmental conflicts and the dynamics of the environmental and anti-environmental movements, where personal identity is likely to play an important role (146).

Value Choice

The rational actor model suggests that preferences and, by implication, values that give weights to competing preferences are relatively fixed and that when faced with a decision, people simply apply the weights to anticipated outcomes, weighted by the probabilities that the outcome will actually occur. However, many decisions do not allow much time for the kinds of calculations this model of decision making implies. For example, when people are asked to assign monetary values to a change in an aspect of the environment in a contingent valuation survey, they usually respond in a few seconds. Yet most people have never given much thought to this kind of problem let alone to the specific environmental change to be assessed. Dietz & Stern (103) have suggested that in such circumstances, people search for clues regarding the kind of decision they are making. Put differently, the weight given to various elements of our values may depend on the role we are in when making a decision. The negotiation over the price of a used car is different if we are planning to sell the car to a close relative than if we are planning to sell it to a stranger who owns a used car lot. In the former case, humanistic altruism is likely to be given more weight than in the latter. As noted above, a number of studies have argued that contextual clues may influence expressed willingness to pay to protect the environment.

Dietz (83) has suggested that values should not be thought of as having a single value or weight for each individual, but rather that each individual has some variability in the importance they assign to a value. Someone may be very altruistic toward other humans or not at all altruistic, depending on the context. Surveys that measure values are tapping some point within the range of values for an individual, depending on how the person interprets their role when they answer the question. In this framework, individual values exist, but because the importance assigned to them is not fixed, the weight given a value in making a decision depends on the context as defined by the individual. Cues about the context and thus the role to be taken can shift individuals from one value weight to another. Some people have little range in the weights they assign to their values, whereas others change weights much more with context.

Values and Discourse

Dewey (27) and more recently Habermas (147) have emphasized the importance of discourse in changing values. Certainly conversation shapes our choice of the role we are playing in a particular situation. Indeed, few major life decisions are made without conversation. But Dewey and Habermas are making an even stronger point—that over one's life, communication with other individuals shapes and reshapes the emphasis we place on values. Our sense of identity and the values to which we give greatest weight are developed by interaction with others whose views we respect. And in this way, a community develops commonality in its values, although never perfect agreement. Dewey and Habermas hold that real rationality is deliberative rationality, not the isolated expression of individual preferences, and suggest that deliberation can lead to reflection and value change.

However, Mendelberg (148) cautioned that value conflicts may make most methods of deliberation intractable.

Despite a growing literature on deliberation in environmental decision making, these ideas have not been much explored in empirical research on values. However, several lines of research suggest themselves. First, the idea that individuals vary not just in the weights they assign to values but in the volatility of those weights across contexts could be tested directly by examining the values deployed across multiple roles held by individuals. Second, the way in which conversation influences role choice and thus values could be examined. As noted above, most of the empirical work on values has been conducted using survey methods, and although these remain an important part of the methodological repertoire for values research, such questions call for use of experimental and ethnographic approaches.

The contingent valuation literature is increasingly engaged with the issue of how to insure adequate reflection before individuals answer valuation questions, and some of these studies emphasize the role of deliberation. This allows a bridge between policy analysis based on the utilitarian ethics and that based on deliberative ethics (32). Niemeyer & Spash (149) provide a critical review of efforts to integrate benefit-cost analysis and deliberative approaches to policy analysis. There have also been some impressive efforts to integrate risk analysis with deliberation (150–152).

Deploying Better Methods in the Study of Values

We have emphasized the lack of data on actual behavior in nearly all the research cited above. Most studies do not have the resources to measure environmentally significant behavior directly. However, the literature on environmentalism, including the literature on values, has not paid sufficient attention to recent advances in using surveys for behavioral measurement (153), which would allow survey measurements that are better correlated with actual behavior.

Nearly all the studies above assume that values are causally prior to beliefs, norms, and other social psychological variables included in models. There is a theoretical consensus about the plausibility of this assumption, but the estimation methods used only verify a strong association between values and the other concepts measured—they cannot establish causal order. Panel data (multiple observations on the same individuals over time) and experimental data could test the validity of the causal ordering assumed at present. But there is a theoretical paradox that must be confronted. Values are assumed to be causally prior to other social psychological measures because they are assumed to be relatively stable over time. This means that they do not vary much over waves of a panel, nor are they easy to manipulate in an experiment. Furthermore, if the arguments above about the influence of context and role on the weights given to values are correct, we have to disentangle these contextual influences from value change. Dealing effectively with these issues requires more elaborate research designs than those currently deployed.

Value Heterogeneity

Values can differ across groups in two ways. The more complex possibility is a difference in meaning of values. In empirical terms, this would mean that the pattern of responses to specific value items in a Rokeach/Schwartz style survey would be different for each group. As a result, the statistical analysis of response patterns might reveal one "value structure" (such as that presented in Figure 1) for one group and a different structure in another group. A simpler possibility is that groups have the same value structure, but they assign different scores (ratings or rankings of values) to the value types or value clusters. For example, studies in Israel (154) and the United States (155) found that men and women have nearly identical value structures but that women give higher priority to altruism.

Stern and his colleagues (156) found gendered differences in environmentalism in their study, with women taking more pro-environmental positions than men. However, they further found that when awareness of consequence beliefs were controlled, the effect of gender on political action and willingness to pay fell below the level of significance [this result was later replicated using another sample of college students (157)]. Thus, their results indicate that women tend to have a stronger belief in the consequences of environmental degradation and are therefore more likely to act on behalf of the environment.

Stern et al. (44) suggested that gender differences in altruism might arise from an "ethic of caring" that is stronger in women because of their relative disadvantage in many contexts, and they go on to suggest that if this is so, the same emphasis on altruism might be found among disadvantaged minorities of both gender. Kalof and colleagues (158) in comparing black, white, and Hispanic men and women in the United States found that white men assign lower priority to altruism than any other group. However, sociocultural variation in values have not been much explored in the literature on values and the environment, although it has been addressed in the broader values literature (3).

CONCLUSIONS

What can be said of the common assertion that changing values lead to changes in environmentalism and especially in environmentally consequential behavior? First, there is consensus across a broad literature that values are a reasonable way of conceptualizing how we make decisions about the environment. Second, there is a diverse body of literature that shows moderately strong relationships at the individual level between various measures of values and measures of environmentalism, including reports of actual or intended behavior. Third, the literature on national or cultural values and environmentalism is equivocal. Fourth, there are intriguing arguments about values and identity, value change, the influence of contextual clues on the values given weight in a decision, and the influence of communication on values and on methods of valuation that involve deliberation. We can conclude that values are an important influence on environmental concern,

but further research is needed before we can draw strong conclusions about how to change values, how those value changes influence behavior, and about improving methods to deploy our values in collective decision making.

ACKNOWLEDGMENTS

We thank Amy Dan, Riley Dunlap, Linda Kalof, Wesley Schultz, and Paul Stern for their very helpful comments on a draft, Lori Baralt for her assistance compiling the literature, and Diana Liverman for her help in conceptualizing the project.

LITERATURE CITED

1. US Natl. Res. Counc. 1999. *Our Common Journey: A Transition Toward Sustainability*. Washington, DC: Natl. Acad.
2. Dietz T, Dolšak N, Ostrom E, Stern PC. 2002. The drama of the commons. In *The Drama of the Commons*, ed. E Ostrom, T Dietz, N Dolšak, PC Stern, S Stonich, E Weber, pp. 3–35. Washington, DC: Natl. Acad.
3. Hitlin S, Piliavin JA. 2004. Values: reviving a dormant concept. *Annu. Rev. Sociol.* 30:359–93
4. Kalof L, Satterfield T, eds. 2005. *The Earthscan Reader in Environmental Values*. London: Earthscan
5. Satterfield T, Kalof L. 2005. Environmental values: an introduction. See Ref. 4, pp. xxi–xxxiii
6. Corral-Verdugo V. 1997. Dual 'realities' of conservation behavior: self-reports vs observations of re-use and recycling behavior. *J. Environ. Psychol.* 17:135–45
7. Bardi A, Schwartz SH. 2003. Values and behavior: strength and structure of relations. *Personal. Soc. Psychol. Bull.* 29:1207–20
8. Stern PC, Dietz T, Abel T, Guagnano GA, Kalof L. 1999. A social psychological theory of support for social movements: the case of environmentalism. *Hum. Ecol. Rev.* 6:81–97
9. Stern PC. 2000. Toward a coherent theory of environmentally significant behavior. *J. Soc. Issues* 56:407–24
10. Gardner GT, Stern PC. 1995. *Environmental Problems and Human Behavior*. Needham Heights, MA: Allyn & Bacon
11. Stern PC. 1999. Information, incentives and pro-environmental consumer behavior. *J. Consum. Policy* 22:461–68
12. Tanner C. 1999. Constraints on environmental behaviour. *J. Environ. Psychol.* 19:145–57
13. Stern PC, Black JS, Elsworth JT. 1983. Adaptations to changing energy conditions among Massachusetts households. *Energy* 12:339–53
14. Guagnano GA, Stern PC, Dietz T. 1995. Influences on attitude-behavior relationships: A natural experiment with curbside recycling. *Environ. Behav.* 27:699–718
15. Durlauf S, Young H. 2001. *Social Dynamics*. Cambridge, MA: MIT
16. Klöckner C, Matthies E. 2004. How habits interfere with norm-directed behaviour: a normative decision-making model for travel mode choice. *J. Environ. Psychol.* 24:319–27

17. Thøgersen J, Ölander F. 2003. Spillover of environment-friendly consumer behavior. *J. Environ. Psychol.* 23:225–36
18. Stern PC, Dietz T, Kalof L, Guagnano G. 1995. Values, beliefs and proenvironmental action: attitude formation toward emergent attitude objects. *J. Appl. Soc. Psychol.* 25:1611–36
19. Brown L, ed. 1993. *The New Shorter Oxford English Dictionary on Historical Principles*. Oxford: Clarendon
20. Zimmerman MJ. 2004. Intrinsic vs. extrinsic value. In *The Stanford Encyclopedia of Philosophy*, ed. EN Zalta, (Fall 2004 ed.) http://plato.stanford.edu/archives/fall2004/entries/value-intrinsic-extrinsic/
21. Routley R. 1973. Is there a need for a new, an environmental ethic? In *Proc. 15th World Congr. Philos.*, pp. 205–10. Manchester, NH: Sophia
22. Brennan A, Lo Y-S. 2002. Environmental ethics. In *The Stanford Encyclopedia of Philosophy*, ed. EN Zalta, (Summer 2002 ed.) http://plato.stanford.edu/archives/sum2002/entries/ethics-environmental/
23. Joas H. 2000. *The Genesis of Values*. Chicago, Ill: Univ. Chicago
24. Ostrom V. 1984. The meaning of value terms. *Am. Behav. Sci.* 28:249–62
25. Jaeger C, Renn O, Rosa EA, Webler T. 2001. *Risk, Uncertainly and Rational Action*. London: Earthscan
26. Hechter M. 1994. The role of values in rational-choice theory. *Ration. Soc.* 6:318–33
27. Dewey J. 1939/1988. Theory of valuation. In *Later Works*, pp. 189–251. Carbondale: South. Ill. Univ.
28. Mead GH. 1934. *Mind, Self and Society*. Chicago, Ill: Univ. Chicago Press
29. Kempton W, Boster JS, Hartley JA. 1995. *Environmental Values in American Culture*. Cambridge, MA: MIT
30. Grendstad G, Selle P. 1997. Cultural theory, postmaterialism and environmental attitudes. In *Culture Matters: Essays in Honor of Aaron Wildavsky*, ed. RJ Ellis, M Thompson, pp. 151–68. Boulder, CO: Westview
31. Stigler GJ, Becker GS. 1977. De gustibus non est disputandum. *Am. Econ. Rev.* 67:76–90
32. Dietz T. 1994. 'What should we do?' Human ecology and collective decision making. *Hum. Ecol. Rev.* 1:301–9
33. Arrow K. 1951. *Social Choice and Individual Values*. New York: Wiley
34. Johansson PO. 1991. *An Introduction to Modern Welfare Economics*. Cambridge, UK: Cambridge Univ. Press
35. Alcalmo J, Ash NJ, Butler CD, Callicot JB, Capistrano D, et al. 2003. *Ecosystems and Human Well-Being: A Framework for Analysis*. Washington, DC: Island
36. Carson RT. 2000. Contingent valuation: a user's guide. *Environ. Sci. Technol.* 34:1413–18
37. Champ PA, Boyle KJ, Brown TC, eds. 2003. *A Primer on Nonmarket Valuation*. Dordrecht, Neth.: Kluwer Acad.
38. Leopold A. 1987 (1949). *A Sand County Almanac and Sketches Here and There*. New York: Oxford Univ. Press
39. Meine C. 1988. *Aldo Leopold: His Life and Work*. Madison: Univ. Wis. Press
40. Heberlein TA. 1977. Norm activation and environmental action. *J. Soc. Issues* 33:79–87
41. Dunlap RE, Van Liere KD. 1977. Land ethic or golden rule. *J. Soc. Issues* 33:200–7
42. Light A, Katz E. 1996. *Environmental Pragmatism*. London: Routledge
43. Norton B. 1991. *Toward Unity Among Environmentalists*. New York: Oxford Univ. Press
44. Stern PC, Dietz T, Kalof L. 1993. Value orientations, gender and environmental concern. *Environ. Behav.* 25:322–48
45. Stern PC, Dietz T. 1994. The value basis of environmental concern. *J. Soc. Issues* 50:65–84
46. Merchant C. 1992. *Radical Ecology: The*

Search for a Liveable World. New York: Routledge
47. Hamilton WD. 1964. The genetical evolution of social behavior I, II. *J. Theor. Biol.* 7:1–52
48. Trivers R. 1971. The evolution of reciprocal altruism. *Q. Rev. Biol.* 46:35–57
49. Sober E, Wilson DS. 1998. *Unto Others: The Evolution and Psychology of Unselfish Behavior*. Cambridge, MA: Harvard Univ. Press
50. Richerson PJ, Boyd R. 2005. *Not by Genes Alone: How Culture Transformed Human Evolution*. Chicago, Ill: Univ. Chicago Press
51. Schwartz SH, Bilsky W. 1987. Toward a universal psychological structure of human values. *J. Personal. Soc. Psychol.* 53:550–62
52. Fransson N, Gärling T. 1999. Environmental concern: conceptual definitions, measurement methods and research findings. *J. Environ. Psychol.* 19:369–82
53. Marini MM. 2000. Social values and norms. In *Encyclopedia of Sociology*, ed. EF Borgatta, RJV Montgomery, pp. 2828–40. New York: Macmillan
54. Rokeach M. 1973. *The Nature of Human Values*. New York: Free
55. Rokeach M. 1968. *Beliefs, Attitudes and Values: A Theory of Organization and Change*. San Francisco: Jossey-Bass. 207 pp.
56. Schwartz SH, Bilsky W. 1990. Toward a theory of the universal content and structure of values: extensions and cross-cultural replications. *J. Personal. Soc. Psychol.* 58:878–91
57. Braithwaite V, Law HG. 1985. Structure of human values: testing the adequacy of the Rokeach Value Survey. *J. Personal. Soc. Psychol.* 49:250–63

57a. Struch N, Schwartz SH, van der Kloot WA. 2002. Meanings of basic values for women and men: a cross-cultural analysis. *Personal. Soc. Psychol. Bull.* 28(1):16–28

58. Schwartz SH. 1992. Universals in the content and structure of values: theoretical advances and empirical tests in 20 countries. In *Advances in Experimental Social Psychology*, Vol. 25, ed. MP Zanna, pp. 1–65. New York: Academic
59. Schwartz SH, Bardi A. 2001. Value hierarchies across cultures: taking a similarities approach. *J. Cross-Cult. Psychol.* 32:268–90
60. Schwartz SH, Sagiv L, Boehnke K. 2000. Worries and values. *J. Personal.* 68:309–46
61. Bok S. 1995. *Common Values*. Columbia: Univ. Missouri Press
62. Schwartz SH. 2004. Mapping and interpreting cultural differences around the world. In *Comparing Cultures: Dimensions of Culture in a Comparative Perspective*, ed. H Vinken, J Soeters, P Ester, pp. 43–73. Leiden: Brill
63. Schwartz SH, Bardi A, Bianchi G. 2000. Value adaptation to the imposition and collapse of communist regimes in East-Central Europe. In *Political Psychology: Cultural and Crosscultural Foundations*, ed. SA Renshon, J Duckitt, pp. 217–37. New York: NY Univ. Press
64. Stern PC, Dietz T, Guagnano GA. 1998. A brief inventory of values. *Educ. Psychol. Meas.* 58:884–1001
65. Thompson SCG, Barton MA. 1994. Ecocentric and anthropocentric attitudes towards the environment. *J. Environ. Psychol.* 14:149–57
66. Vaske JJ, Donnelly M. 1999. A value-attitude-behavior model predicting wildland preservation voting intentions. *Soc. Nat. Resouc.* 12:523–37
67. McFarlane BL, Boxall PC. 2000. Factors influencing forest values and attitudes of two stakeholder groups: the case of the Foothills Model Forest, Alberta Canada. *Soc. Nat. Resour.* 13:649–61
68. Schultz PW. 2001. The structure of environmental concern: concern for self, other people, and the biosphere. *J. Environ. Psychol.* 21:327–39
69. Schultz PW, Gouveia VV, Cameron L,

Tankha G, Schmuck P, Franek M. 2005. Values and their relationship to environmental concern and conservation behavior. *J. Cross-Cult. Psychol.* 36:1–19
70. Kellert SR. 1979. *Public Attitudes Toward Critical Wildlife and Natural Habitat Issues*. Washington, DC: US Fish Wildl. Serv.
71. Kellert SR, Berry JK. 1980. *Knowledge, Affection and Basic Attitudes Toward Animals in American Society*. Washington, DC: US Fish Wildl. Serv.
72. Kellert SR, Westervelt MO. 1981. *Trends in Animal Use and Perception in 20th Century America*. Washington, DC: US Fish Wildl. Serv.
73. Kellert SR. 1996. *The Value of Life: Biological Diversity and Human Society*. Washington, DC: Island
74. Bjerke T, Odegardstuen T, Kaltenborn B. 1998. Attitudes toward animals among Norwegian adolescents. *Anthrozoos* 11:79–86
75. Drews C. 2002. Attitudes, knowledge and wild animals as pets in Costa Rica. *Anthrozoos* 15:119–38
76. Rauwald K, Moore C. 2002. Environmental attitudes as predictors of policy support across three countries. *Environ. Behav.* 34:709–39
77. Kellert SR, Wilson EO, eds. 1993. *The Biophilia Hypothesis*. Washington, DC: Island
78. Axelrod LJ. 1994. Balancing personal needs with environmental preservation: identifying the values that guide decisions in ecological dilemmas. *J. Soc. Issues* 50:85–104
79. Gärling T, Fujii S, Gärling A, Jakobsson C. 2003. Moderating effects of social value orientation on determinants of proenvironmental behavior intention. *J. Environ. Psychol.* 23:1–9
80. Camerer C, Fehr E. 2005. Measuring social norms and preferences using experimental games: a guide for social scientists. In *Foundations of Human Sociality: Economic Experiments and Ethnographic Evidence from Fifteen Small-Scale Societies*, ed. J Henrich, R Boyd, S Bowles, C Camerer, E Fehr, H Gintis, pp. 55–95. Oxford: Oxford Univ. Press
81. McClintock CG. 1978. Social values: their definition, measurement and development. *J. Res. Dev. Educ.* 12:121–37
82. Schwartz S. 1996. Value priorities and behavior: applying a theory of integrated value systems. In *The Psychology of Values*, ed. C Seligman, JM Olson, MP Zanna, pp. 1–24. Mahwah, NJ: Erlbaum Assoc.
83. Dietz T. 2003. The Darwinian trope in the drama of the commons: variations on some themes by the Ostroms. *J. Econ. Behav. Organ.* 57:205–25
84. Inglehart R. 1977. *The Silent Revolution: Changing Values and Political Styles Among Western Publics*. Princeton, NJ: Princeton Univ.
85. Inglehart R. 1990. *Culture Shift in Advanced Industrial Society*. Princeton, NJ: Princeton Univ. Press
86. Inglehart R. 1995. Public support for environmental protection: objective problems and subjective values in 43 societies. *PS: Polit. Sci. Polit.* 15:57–71
87. Inglehart R. 1997. *Modernization and Postmodernization: Cultural, Economic and Political Change in 43 Societies*. Princeton, NJ: Princeton Univ. Press
88. Inglehart R. 1971. The silent revolution in Europe: intergenerational change in post-industrial societies. *Am. Polit. Sci. Rev.* 65:991–1017
89. Davis D. 2000. Individual level examination of postmaterialism in the US: political tolerance, racial attitudes, environmentalism and participatory norms. *Polit. Res. Q.* 53:455–75
90. Hanada A. 2003. *Culture and Environmental Values: A Comparison of Japan and Germany*. Fairfax, VA: George Mason Univ.
91. Satterfield T. 2001. In search of value literacy: suggestions for the elicitation

of environmental values. *Environ. Values* 10:351–59
92. Schwartz SH. 1968. Awareness of consequences and the influence of moral norms on interpersonal behavior. *Sociometry* 31:355–69
93. Schwartz SH. 1968. Words, deeds and the perception of consequences and responsibility in action situations. *J. Personal. Soc. Psychol.* 10:232–42
94. Schwartz SH. 1970. Moral decision making and behavior. In *Altruism and Helping Behavior*, ed. J Macauley, L Berkowitz, pp. 127–41. New York: Academic
95. Schwartz SH. 1973. Normative explanations of helping behavior: a critique, proposal and empirical test. *J. Exp. Soc. Psychol.* 9:349–64
96. Schwartz SH. 1977. Normative influences on altruism. In *Advances in Experimental Social Psychology*, Vol. 10, ed. L Berkowitz, pp. 221–79. Orlando, FL: Academic
97. Black JS, Stern PC, Elsworth JT. 1985. Personal and contextual influences on household energy adaptations. *J. Appl. Psychol.* 70:3–21
98. Stern PC, Dietz T, Black JS. 1986. Support for environmental protection: the role of moral norms. *Popul. Environ.* 8:204–22
99. Clark C, Kotchen MJ, Moore MR. 2003. Internal and external influences on pro-environmental behavior: participation in a green electricity program. *J. Environ. Psychol.* 23:237–46
100. Van Liere KD, Dunlap RE. 1978. Moral norms and environmental behavior: an application of Schwartz's norm-activation model to yard burning. *J. Appl. Soc. Psychol.* 8:174–88
101. McFarlane BL, Boxall PC. 2003. The role of social psychological and social structural variables in environmental activism: an example of the forest sector. *J. Environ. Psychol.* 23:79–87
102. Deleted in proof
103. Dietz T, Stern PC. 1995. Toward realistic models of individual choice. *J. Socio-Econ.* 24:261–79
104. Fischhoff B, Slovic P, Lichtenstein S. 1980. Knowing what you want: measuring labile values. In *Cognitive Processes in Choice and Decision Behavior*, ed. T Wallsten, pp. 117–41. Hillsdale, NJ: Erlbaum
105. Fischhoff B, Furby L. 1988. Measuring values: a conceptual framework for interpreting transactions with special reference to contingent valuation of visibility. *J. Risk Uncertain.* 1:147–84
106. Fischhoff B. 1991. Value elicitation: Is there anything in there? *Am. Psychol.* 46:835–47
107. Fischhoff B. 2000. Informed consent for eliciting environmental values. *Environ. Sci. Technol.* 34:1439–44
108. Guagnano GA, Dietz T, Stern PC. 1994. Willingness to pay: a test of the contribution model. *Psychol. Sci.* 5:411–15
109. Spash CL. 2000. Ethical motives and charitable contributions in contingent valuation: empirical evidence from social psychology and economics. *Environ. Values* 9:453–79
110. Karp DG. 1996. Values and their effects on pro-environmental behavior. *Environ. Behav.* 28:111–33
111. Schultz PW, Zelezny LC. 1998. Values and proenvironmental behavior: a five-country survey. *J. Cross-Cult. Psychol.* 29:540–58
112. Schultz PW, Zelezny LC. 1999. Values as predictors of environmental attitudes: evidence for consistency across 14 countries. *J. Environ. Psychol.* 19:255–65
113. Nordlund AM, Garvill J. 2003. Effects of values, problem awareness, and personal norm on willingness to reduce personal car use. *J. Environ. Psychol.* 23:339–47
114. Dietz T, Frisch AS, Kalof L, Guagnano GA. 1995. Values and vegetarianism: an exploratory analysis. *Rural Sociol.* 60:533–42
115. Kalof L, Dietz T, Stern PC, Guagnano

GA. 1999. Social psychological and structural influences on vegetarian beliefs. *Rural Sociol.* 64:500–11
116. Lindeman M, Sirelius M. 2001. Food choice ideologies: the modern manifestations of normative and humanist views of the world. *Appetite* 37:175–84
116a. Nilsson A, von Borgstede C, Biel A. 2004. Willingness to accept climate change strategies: the effect of values and norms. *J. Environ. Psychol.* 24: 267–77
117. Schultz PW, Zelezny LC. 2003. Reframing environmental messages to be congruent with American values. *Hum. Ecol. Rev.* 10:126–36
118. Whitfield S, Dietz T, Rosa EA. 1999. *Environmental Values, Risk Perception and Support for Nuclear Technology*. Fairfax, VA: Hum. Ecol. Res. Group, George Mason Univ.
119. Slimak MW. 2003. *Values and Ecological Risk Perception: A Comparison of Experts and the Public*. Fairfax, VA: George Mason Univ.
120. Slimak MW, Dietz T. 2003. *Personal values, beliefs and ecological risk perception*. Presented at Soc. Risk Anal. Annu. Meet., Baltimore, MD
121. Sjöberg L. 2000. Factors in risk perception. *Risk Anal.* 20:1–11
122. Karp DG. 1996. Values and their effect on pro-environmental behavior. *Environ. Behav.* 28:111–33
123. Stern PC, Dietz T, Kalof L, Guagnano G. 1995. Values, beliefs, and proenvironmental action: attitude formation toward emergent attitude objects. *J. Appl. Soc. Psychol.* 25:1611–36
124. Deleted in proof
125. Schultz PW. 2001. The structure of environmental concern: concern for self, other people, and the biosphere. *J. Environ. Psychol.* 21:327–39
126. Dunlap RE, Grieneeks JK, Rokeach M. 1975. *Human values and 'pro-environmental' behavior*. Presented at Annu. Meet. Pac. Sociol. Assoc., Victoria, BC
127. Inglehart R. 1995. Public support for environmental protection: objective problems and subjective values in 43 societies. *PS: Polit. Sci. Polit.* 28:57–72
128. Brechin SR, Kempton W. 1994. Global environmentalism: a challenge to the post material thesis? *Soc. Sci. Q.* 75:245–69
129. Dunlap R, Mertig A. 1997. Global environmental concern: an anomaly for postmaterialism. *Soc. Sci. Q.* 78:24–29
130. Kidd Q, Lee A-R. 1997. More on postmaterialist values and the environment. *Soc. Sci. Q.* 78:36–43
131. Brechin SR, Kempton W. 1997. Beyond postmaterialist values: national versus individual explanations of global environmentalism. *Soc. Sci. Q.* 78:16–20
132. Diekmann A, Franzen A. 1999. The wealth of nations and environmental concern. *Environ. Behav.* 31:540–49
133. Franzen A. 2003. Environmental attitudes in international comparison: an analysis of the ISPP surveys 1993 and 2000. *Soc. Sci. Q.* 84:297–308
134. Recchia SP. 2002. International environmental treaty engagement in 19 democracies. *Policy Stud. J.* 30:470–94
135. Cavlovic TA, Baker KH, Berrens RP, Gawande K. 2000. A meta-analysis of Kuznets Curve studies. *Agric. Resour. Econ. Rev.* 29:32–42
136. Mol AP, Sonnenfeld DA, eds. 2000. *Ecological Modernisation Around the World*. London: Cass
137. Davis D. 2000. Individual level examination of postmaterialism in the U.S.: political tolerance, racial attitudes, environmentalism and participatory norms. *Polit. Res. Q.* 53:455–75
138. Gökşen F, Adaman F, Zengínobuz EÜ. 2002. On environmental concern, willingness to pay and postmaterialist values: evidence from Istanbul. *Envion. Behav.* 34:616–33
139. Kemmelmeier M, Król G, Kim YH. 2002. Values, economics and

proenvironmental attitudes in 22 societies. *Cross-Cult. Res.* 36:256–85
140. Schultz PW. 2000. Empathizing with nature: the effects of perspective taking on concern for environmental issues. *J. Soc. Issues* 56:391–406
141. Schultz PW. 2002. Inclusion with nature: the psychology of human-nature relations. In *The Psychology of Sustainable Development*, ed. P Schmuck, PW Schultz, pp. 61–78. New York: Kluwer
142. Schultz PW, Shriver C, Tabanico JJ, Khazian AM. 2004. Impicit connections with nature. *J. Environ. Psychol.* 24:31–42
143. Stets JE, Biga CF. 2003. Bringing identity theory into environmental sociology. *Sociol. Theory* 21:398–423
144. Bowles S, Gintis H. 2002. *Prosocial emotions*. Presented at Econ. Complex Evol. System III, Santa Fe, NM
145. Dietz T. 2001. Thinking about environmental conflict. In *Celebrating Scholarship*, ed. L Kadous, pp. 31–54. Fairfax, VA: George Mason Univ.
146. Johnston H, Larana E, Gusfield JR. 1994. Identities, grievances and new social movements. In *New Social Movements: From Ideology to Identity*, ed. E Larana, H Johnston, JR Gusfield, pp. 3–35. Philadelphia, PA: Temple Univ. Press
147. Habermas J. 1991. *Moral Consciousness and Communicative Action*. Boston: Beacon
148. Mendelberg T. 2002. The deliberative citizen: theory and evidence. In *Research in Micropolitics: Political Decision Making, Deliberation and Participation*, ed. MX Delli Carpini, L Huddy, RY Shapiro, pp. 151–93. New York: Elsevier
149. Niemeyer S, Spash CL. 2001. Environmental valuation analysis, public deliberation, and their pragamatic synthesis: a critical appraisal. *Environ. Plan. C* 19: 567–85
150. Stern PC, Fineberg H, eds. 1996. *Understanding Risk: Informing Decisions in a Democratic Society*. Washington, DC: Natl. Acad.
151. Morgan KM, DeKay ML, Fischbeck PS, Morgan MG, Fischoff B, Florig HK. 2001. A deliberative method for ranking risks (II): evaluation of validity and agreement among risk managers. *Risk Anal.* 21:923–37
152. Florig HK, Morgan MG, Jenni KE, Fischoff B, Fischbeck PS, DeKay ML. 2001. A deliberative method for ranking risks (I): overview and test-bed development. *Risk Anal.* 21:913–21
153. Bradburn N, Sudman S, Wasink B. 2004. *Asking Questions: The Definitive Guide to Survey Design*. San Francisco: Jossey-Bass
154. Prince-Gibson E, Schwartz SH. 1998. Value priorities and gender. *Soc. Psychol. Q.* 61:49–67
155. Dietz T, Stern PC, Kalof L, Guagnano GA. 1998. *Value Priorities and Gender in the United States*. Fairfax, VA: Hum. Ecol. Res. Group, George Mason Univ.
156. Stern PC, Dietz T, Kalof L. 1993. Value orientations, gender, and environmental concern. *Environ. Behav.* 25:322–48
157. Joireman JA, Lasane TP, Bennett J, Richards D, Solaimani S. 2001. Integrating social value orientation and the consideration of future consequences within the extended norm activation model of proenvironmental behaviour. *Br. J. Soc. Psychol*. 40:133–55
158. Kalof L, Dietz T, Guagnano GA, Stern PC. 2002. Race, gender and environmentalism: the atypical values and beliefs of white men. *Race, Gender Class* 9:1–19