

Conservation Psychology

Understanding and promoting human care for nature

Susan Clayton and Gene Myers

 **WILEY-BLACKWELL**

A John Wiley & Sons, Ltd., Publication

Conservation Psychology

Conservation Psychology

Understanding and promoting human care for nature

Susan Clayton and Gene Myers

 **WILEY-BLACKWELL**

A John Wiley & Sons, Ltd., Publication

This edition first published 2009, © 2009 by Susan Clayton and Gene Myers

Blackwell Publishing was acquired by John Wiley & Sons in February 2007. Blackwell's publishing program has been merged with Wiley's global Scientific, Technical and Medical business to form Wiley-Blackwell.

Registered office

John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

Editorial offices

9600 Garsington Road, Oxford, OX4 2DQ, UK

The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

111 River Street, Hoboken, NJ 07030-5774, USA

For details of our global editorial offices, for customer services and for information about how to apply for permission to reuse the copyright material in this book please see our website at www.wiley.com/wiley-blackwell

The right of the author to be identified as the author of this work has been asserted in accordance with the Copyright, Designs and Patents Act 1988.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, except as permitted by the UK Copyright, Designs and Patents Act 1988, without the prior permission of the publisher.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

Designations used by companies to distinguish their products are often claimed as trademarks. All brand names and product names used in this book are trade names, service marks, trademarks or registered trademarks of their respective owners. The publisher is not associated with any product or vendor mentioned in this book. This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. It is sold on the understanding that the publisher is not engaged in rendering professional services. If professional advice or other expert assistance is required, the services of a competent professional should be sought.

Library of Congress Cataloguing-in-Publication Data

Clayton, Susan.

Conservation psychology : understanding and promoting human care for nature / Susan Clayton and Gene Myers.

p. cm.

Includes bibliographical references and index.

ISBN 978-1-4051-9409-9 (hardcover : alk. paper) – ISBN 978-1-4051-7678-1 (pbk. : alk. paper)
1. Nature–Psychological aspects. 2. Environmental psychology. 3. Human behavior. I. Myers, Gene (O. Gene) II. Title.

BF353.5.N37C53 2009

155.9'1–dc22

2008042544

A catalogue record for this book is available from the British Library.

Set in 10.5/13pt Minion

by SPi Publisher Services, Pondicherry, India

Printed and bound in Malaysia

Contents

<i>Acknowledgments</i>	viii
1 Introducing the field of conservation psychology	1
Conservation	2
Psychology	2
Human care for nature	5
The roots of conservation psychology	6
The potential of conservation psychology	7
The organization of this book	10
Conclusion	11
Part I Thinking about nature	13
2 Attitudes, values, and perceptions	15
Core understandings of nature	15
Risk perception	22
Biases in information processing	24
Language and discourse	27
Who is responsible?	30
Linking perceptions to behavior	31
Conclusion	33
3 Moral psychology and the environment	34
Background in ethical concepts	35
A virtue ethics of the environment	35
The Deontic tradition and psychological research	39
Contextual differences in moral duties	43
Consequentialism, emotion, and socialization	45
Psychological dynamics of moral functioning	48
Pragmatist ethics	50
Conclusion	53

4 Environment and identity	54
The concept of identity	54
Identity development	55
Developing an affiliation with nature	58
Environmental identity	59
Measuring environmental identity	61
Place identity	62
Animals and identity	65
Environmental social identity	66
Identity and behavior	68
Putting identity to work	70
Conclusion	72
5 Theoretical foundations for the human response to nature	73
The heritage of environmental psychology	73
Ecological perception and psychology	74
Evolutionary psychology and biological thinking	78
Biophilia	81
Combining nature and nurture	84
Experiential approaches	86
Conclusion	88
Part II Interactions with nature	89
6 Domestic nature: Cohabiting with animals and plants	91
Animals in the home	91
Plants in the domestic sphere	100
Conclusion	104
7 Managed nature: Zoos, aquariums, and public parks	106
Zoos and aquariums	107
Urban parks and green spaces	116
Conclusion	120
8 Wild nature: Encounters with wilderness	121
Defining wilderness and wild nature	121
Wilderness use and wilderness values	123
Wilderness solitude	125
Natural forces and features	127
The edge of control: Wilderness remoteness and challenge	132
Activity in wild nature, connection and caring	135
Wild nature and spiritual experience	136
Conclusion	139

Part III Promoting conservation	141
9 Promoting sustainable behavior	143
Identifying target behaviors	143
Influences on behavior	145
Models for changing behavior	156
Collective behavior	157
Changing the ideology of consumerism	159
Conclusion	160
10 Community psychology and international biodiversity conservation	162
International biodiversity conservation	163
Common pool resources and models of governance	164
Psychology, culture, and local knowledge	170
Accounting for the costs and benefits of conservation	172
Conservation and all-too-human psychology	177
Conclusion	178
11 Environmental education	180
Environmental education	181
Examples of contemporary environmental education	185
Psychological foundations of environmental education	189
Lessons for effective practice	195
Conclusion	197
12 The psychology of hope	198
Human response to threatening circumstances	198
Optimism and pessimism	200
An alternative to a focus on outcomes: Creating meaning	204
<i>Glossary</i>	207
<i>References</i>	213
<i>Index</i>	246

Acknowledgments

This book was inspired and facilitated by a wide range of scholars and practitioners whose research and life work convinced us that there was a field to be defined. We would like to particularly single out Carol Saunders for her efforts and initiative; without her work conservation psychology would have been significantly delayed. Former Brookfield Zoo Director Dr. George Rabb should be acknowledged for helping envision and support this new field. We have also benefited from conversations with Almut Beringer, Amara Brook, Louise Chawla, John Fraser, Peter Kahn, and Wes Schultz, who have been fellow laborers in this vineyard. Encouragement has come from prominent psychologists including Mike Csikszentmihalyi, Ray de Young, Stuart Oskamp, and Paul Stern, and from officials of the American Psychological Association including Alan Kazdin, Steve Breckler, and Stephanie Johnson. Our work on this project was substantially enabled by a research leave from the College of Wooster for Clayton and a sabbatical leave from Huxley College of the Environment at Western Washington University for Myers. Thanks are due to the Oberlin College Department of Environmental Studies, which provided Clayton with a home and support during her leave. Myers benefited greatly from the generosity of the following institutions where he was a visiting scholar, and from discussions with many people in them including especially those mentioned: College of the Atlantic (Rich Borden, John Anderson, John Visvader, Elmer Beal); World Wildlife Fund's Conservation Science Program (Michael Mascia and many others), and North Carolina State University's School of Design (Robin Moore and Nilda Cosco of the Natural Learning Initiative). Our students have also contributed, by spurring us to bring this information together in a way that communicates it, and by responding to chapter drafts. We also want to express our appreciation to Ward Cooper and Delia Sandford at Wiley-Blackwell, whose faith in the project was unwavering. We both wish to thank our families for inspiration, patience, and support despite the sacrifices such a work entails. Finally, we would like to dedicate this book to all those who care *about* nature in the hope that we can all learn to more effectively care *for* it.

Susan Clayton
Gene Myers

I

Introducing the field of conservation psychology

- Conservation
- Psychology
- Human care for nature
- The roots of conservation psychology
- The potential of conservation psychology
- The organization of this book
- Conclusion

This book is for the reader with some interest in psychology (even just that of a normally curious and reflective human being) and concern about contemporary threats to environmental and social well-being posed by the way humans relate to ecological systems. Some brief observations are enough to show that environmental threats face humanity on every level from local to global. Human population growth and human activities are negatively affecting the ecological processes that support life as we know it. Recent quantitative assessments of the human impact on nature give a sobering picture: the Millennium Ecosystem Assessment found that about 60% of the earth's ecosystem services are being used unsustainably. Using ecological footprint methodology, Wackernagel et al. (2002) calculated that humanity's load on the biosphere had grown to 120% of earth's capacity by 1999, up from 70% in 1961. The major institutions and behavior patterns that are driving these trends have plenty of momentum, and most readers will recognize the implications. At stake are two inextricably linked sets of values pertaining to the present and future quality of human lives, and to the vitality of the biosphere and its inhabitants.

We are driven to write this book not only by these uncompromising facts and future possibilities, but also by a secondary concern: our primary discipline, psychology, is not fully involved in helping to address these realities. This is clear across areas of conservation and natural resource research. We want to urgently ask: where are the psychologists on those research teams? Are they prepared to intelligently deploy their skills in these new contexts (do they know their ecology and economics)? Are the other social or natural science specialists ready to seek those skills (have they heard of the fundamental attribution error)? There is much psychological research that is relevant to conservation, and we attempt both to acknowledge past work and to highlight and applaud

the building momentum. Collectively, however, psychology is at best midway into effectively putting its resources at the disposal of individuals and groups working for a more healthy relation to our planet. We have yet to see a sea-change in the work of psychologists toward addressing sustainability. Although this is a scholarly volume, that is the kind of wake-up response we hope it provokes, inspires and reveals.

Conservation

Conservation psychology is the response we, along with many of our colleagues and institutional partners, want to see. So, what is conservation psychology? We will start by unpacking the title. “Conservation” should not be identified with turn of the 20th century resource conservation. Although no denigration of that movement is intended, the association is a bit misleading because of the strictly utilitarian focus of that movement. Instead, we associate “conservation” with its rebirth in the 1980s, in which it was applied to a whole new set of ideas, including landscape and continent-wide ecosystem planning, and especially to conservation biology. That field was born of a sense of crisis and some within it openly avowed value-laden positions (Soule, 1985). The same goes for conservation psychology: the goal is not only to understand the interdependence between humans and nature but to promote a healthy and sustainable relationship. The goal of “promoting” raises a sometimes contentious point. The explicit value basis of conservation psychology is unfamiliar to some scientists, who would prefer to simply describe behavior rather than take a stance with a prescriptive component (cf. Crosby et al., 2004). But psychology already has a clear value basis: the goal of promoting human well-being. If choosing research questions with an eye to their relevance compromises the integrity of one’s results then all of medical research would be suspect. Weak or inappropriate methodology and non-vigilant thinking are the real threats. There is wide consensus about the value of the natural environment, but not always about the need for change or the direction of change in order to promote sustainability. Conservation psychology seeks to direct rigorous research toward the goal of sustainability, and to rely on the results of that research to make recommendations about specific techniques.

Psychology

“Psychology” also requires explication. Many people are at first surprised when we say the two words together, “conservation psychology.” But soon they get it: oh yes, environmental problems are a result of human behavioral choices, and addressing those problems will require changes in patterns of behavior. So we need to understand people.

Psychology can be defined as the scientific study of mind, brain, and behavior. It is often misunderstood by the public, who – partly on the basis of exposure to “pop psychology” theories promoted by non-professionals – confuse psychology with psychiatry and with an emphasis on therapy. Certainly, many psychologists do work to promote

individual mental health. As a discipline, however, psychology has both a broader agenda and a more scientific basis. Psychology has as a double goal, the understanding of human behavior and the promotion of human well-being. Psychological research and practice are based on the assumption that the promotion of human welfare requires an understanding of human behavior that is based on rigorous empirical study.

Understanding human behavior means, in part, understanding how individuals are affected by the setting in which they find themselves. This includes the natural environment and changes in that environment due to things like climate change, overpopulation, and the loss of wild landscapes. Environmental issues are social issues as well, and socially-constructed perceptions of environmental change have an impact on human social behavior. It is also important to understand why people spend so much time and money interacting with aspects of the natural environment; indeed, a significant proportion of human behavior occurs in a setting that, if not directly in nature, invokes nature through windows, pictures, or potted plants.

Promoting human welfare requires awareness of how intimately connected it is to the natural environment. It is well known that environmental toxins can have direct impacts on human health. Less visible are the possible effects on mental functioning. There is a large body of research documenting the detrimental effects of lead, mercury, and polychlorinated biphenyls (PCBs) on cognitive functioning and sometimes social behavior (see Moore, 2003, for a review). Less directly, environmental problems will ultimately affect the well-being of everyone on the planet: global warming and overcrowding affect social behavior and intergroup conflict; opportunities for interaction with animals and nature affect emotional well-being and stress reduction. The goal of sustainability articulated by the World Commission of Economic Development (WECD) report in 1987 explicitly linked the two goals of environmental health and human development, including attention to human as well as environmental welfare.

A brief review of some key environmental problems shows the ways in which humans are implicated (see Oskamp, 2000):

- Global climate change is generally agreed to be a result of human action. There is a wide range of probable effects on humans. Direct effects include a possible effect of increased temperature on aggression (e.g. Anderson, 2001) and the probability of increased serious weather events with concomitant damage to human dwellings and built environments. Indirect effects may include eco-migrations, with concomitant increase in intergroup conflict (e.g. Reuveny, 2008) and impacts on agriculture and the spread of tropical diseases.
- Pollution of the air, water, and soil is a clear byproduct of human manufacturing processes. Impacts include not only increased susceptibility to cancer and possible effects on reproduction but also more psychological effects such as decreased cognitive functioning (due, for example, to exposure to lead or mercury).
- Resource depletion, for example the depletion of water resources and the collapse of fish populations, results from human overuse. Any of these will require a major shift in the way humans conduct their lives, such as where they live and how they are employed.
- Loss of biodiversity is a result of the three problems described above as well as increased development of wilderness to house a rising human population. An anthropocentric

argument to preserve biodiversity is often couched in terms of potential benefits to humanity from, for example, as yet undiscovered drugs made from natural sources. But surveys show that humans value wilderness for more difficult to quantify reasons as well, and feel that human experience would be diminished by its loss.

Psychology is broad in its purview, spanning topics from the biophysical to the cultural with commensurately diverse methods that range from observation of naturally-occurring behavior to analysis of brain activity and hormone levels. We want to enlist this full gamut of psychology in the era-defining task of conservation. This includes the following core areas:

- *Clinical psychology* is the study of mental health and well-being, as well as abnormal behavior.
- *Developmental psychology* examines continuities and changes that are associated with growth across the lifespan, in perceptual, social, cognitive and other capabilities.
- *Cognitive psychologists* examine information processing – the mental models that people use, and the abilities and tendencies that affect the way people respond to information.
- *Social psychology* looks at interpersonal behavior, and the ways in which people are affected by others.
- *Physiological psychologists* are riding the crest of amazing new technologies to explore the neural, endocrinal, and bodily processes that underlie behavior.

There is no definitive list of specialties, and there are many other ways in which people define their subdiscipline.

Conservation psychology should not be considered as a subdiscipline, but as a field or area of focus (see Sommer, 2000, for a discussion of the difference). That field or focus is practical and applied, but also theoretical and fundamental. The foundational part of conservation psychology involves one of the less-emphasized aspects of environmental psychology: persistently and deeply asking what is the human place in nature, and what is nature's place in the human being? The world today offers many ways of actually testing this: what is a human being, deprived of contact with nature, or supplied with technological simulations of nature? Does he or she turn up missing anything? Is a nature DVD as good as a potted plant, an arboretum, or a million acres of wild land for discerning in our hearts what it means to be a living creature on a living planet?

We can explore this query in terms of how it could be addressed within different core areas. Clinical psychologists can (and do) explore the positive effects on mental health of exposure to nature. Developmentalists examine the significance of early exposure to nature on the formation of an enduring environmental empathy and ethic. For cognition–brain–communication specialists: our simplified protocols for perceptual and cognitive stimuli are like nursery tunes compared to the symphonic acoustics we evolved in; what can those variations tell us that we have not yet even asked about our minds? Physiological psychologists should not neglect the impact of synergies of environmental toxins on behavior (kudos to those already doing this). Social psychologists could study the role of the media in framing attitudes toward nature, and explore ways of constructing effective and persuasive communications

about the significance of nature-based experiences. Conservation psychology should attract psychologists from all the areas mentioned, as well as others not described. Organizational, health, population, and psychologists from across the spectrum can contribute to the goals of this field.

Human care for nature

The last part of our title references “care for nature.” Care is too casual a word, perhaps, but its familiarity is a strength. We all recognize that to act with intention, to inquire, to get activated, requires that one “gives a damn” – that one “cares.” In the midst of legitimate concern over the harm that people are inflicting upon the natural environment, it is easy to feel pessimistic about the extent to which people care about nature. As people waste energy, consume resources at an unsustainable rate, undermine life-support systems, and pollute the environment, it may seem as though they have to be threatened or enticed to engage in pro-environmental behavior, as if it were against their own self-interest. However, people do care about the environment. They demonstrate this in ratings of photographs, in descriptions of favorite places, and in survey responses.

Does care mean anything more than personal preference? It does have a stronger sense – that of an obligation we learn to accept and own, to take into our very identity. Care is personal because it seems discretionary *what* we give a damn about – people care about a variety of things, mostly the things that are close to them. Care develops within social contexts, usually in relationships. Children have a lesson in care around ages 8 to 11 years through friendships that are conditional: if care is not reciprocated, the friend soon is gone. There is similar conditionality in our relationship with the earth, and it is primarily in our interest that we should learn the lesson soon. We suspect, however, that we have only begun to plumb the extent of our relationship to nature: throughout the book we will be pressing the question of how and why nature matters to us. There may be a lot of benefits to ourselves in caring.

Care relates to action. We sometimes refer in the book to “care about” which denotes an emotional response, an attitude of concern. “Caring for” has a behavioral sense; we use the phrase in everyday life when we talk about caregivers and caretakers. There are many ways to express care. Human “caring for” springs from a generative grammar of action as productive as our linguistic creativity. To take one final step in unpacking “care,” care sounds like something you do privately, since we use it to talk about personal relationships. Yet there is no question that in the stronger senses of care unveiled above – as an internalized obligatory motivation, as based in a universal valuing of cherished relationships – we care collectively too. Patriotic sentiments and action, helping to maintain one’s church, involvement in community organizations all represent collective care.

Caring together can mean working together to stop actions by others, but threats to nature are sometimes best addressed by caring about human-to-human relations and institutions. We mean that by our title also. The most courageous and novel interventions for nature – by individuals in moral impasse, or by institutions in policy innovation – may be in the human–human realm.

Fully instantiated, care includes cognitive, affective, and behavioral components. In order to care about an issue, people must be informed. Regarding environmental issues, people must recognize the ways in which their behavior can affect the environment and the ways in which those environmental changes in turn will affect the things they value. Beyond thought, however, people must feel: they will experience positive emotions associated with nature, and negative ones that are stimulated by the threat of environmental degradation. Finally, people should act in ways that will express both their knowledge and their emotions, and that may tend to minimize or alleviate the environmental threats they are facing.

Probably not everything we want conservation psychology to include falls clearly under this flag of care. Even in this volume, many other angles are taken: self-interested benefits, matters of rights and justice, strategies that simply work better with people. The richness of seeking more sustainable and harmonious relationships between people and nature and institutions cannot be reduced to any term. We use “care” here as a fundamental starting point, of giving a damn, and doing something about it. Conservation psychology cannot be about much more unless it begins with that. We will let others open the way further, in all the directions it may lead.

The roots of conservation psychology

Within environmental studies, any list of early influential articles would probably include Garrett Hardin’s (1968) piece on the “tragedy of the commons” and Lynn White’s (1967) article “The historical roots of our ecological crisis.” Both of these provocative (and flawed) essays drew attention not to unexpected consequences of technological advances, but to the ways in which people thought about the environment. At about the same time, serious research on the relationship between humans and their environment led to the development of *environmental psychology* as a subdiscipline of psychology. “Environment” was defined as the physical (rather than social) context, including both natural and built components. At first, environmental psychologists primarily focused on the ways in which environments had causal impacts on human behavior. With the rise of the environmental movement, there was more attention to the natural environment and more acknowledgment of the ways in which human behavior has an impact on the environment. Bonnes and Bonaiuto (2002) review the development of environmental psychology from a focus on the spatial–physical environment to concern with sustainable development.

From the beginning, environmental psychology has included researchers concerned with the health of the environment, and a great deal of research relevant to conservation psychology has been done by environmental psychologists. Some of the relevant psychological research has addressed the impacts of exposure to nature for individual well-being; the ways in which humans interact with nature; perceptions of nature and of environmental risks; decision-making about environmental policies; conceptions of environmental ethics; and the ways in which people’s self-concepts are intertwined with the natural environment. Important psychological constructs include knowledge, behavior, values, and attitudes at the individual level; and norms, incentives, barriers,

and behavior settings at the system level. Psychologists are employed by, or consult for, environmental management agencies, planning authorities, and government bodies (Reser, 2007).

The field of conservation psychology arose not in response to a lack of research, but in response to a lack of visibility and identification: both psychologists and non-psychologists are often unaware of the body of psychological research related to sustainability. Conservation psychology also seeks to provide a community for psychologists across all subdisciplines who want to reflect their concern for the future of the planet in their professional identity.

Although the natural environment has only recently begun to attract widespread attention from psychological researchers, there have long been psychologists who have argued for its importance, as demonstrated by a quote from Alfred Adler:

We are living on the surface of this planet, with only the resources of this planet, with the fertility of its soil, with its mineral wealth, and with its climate and atmosphere. It has always been the task of mankind to find the right answer to the problem these conditions set us, and even today we cannot think that we have found a sufficient answer.

Adler, 1956, p. 131

Relatedly, psychiatrist Harold Searles stated in 1960 that “The nonhuman environment, far from being of little or no account to human personality development, constitutes one of the most basically important ingredients of human psychological existence” (p. 5). Conservation psychology proposes to carry forward the distinctive spirits of each of these insights into today’s world of nature and the universe of psychology.

The potential of conservation psychology

Conservation psychology encompasses both basic and applied research. Applied, because a primary goal is to address and ameliorate environmental problems. But “there is nothing so practical as a good theory,” to quote Kurt Lewin (1951). Psychological research has yielded some broad conclusions that have important relevance for conservation. They include the idea that behavior is strongly affected by the consequences that follow that behavior; that people learn not only behaviors but also attitudes, values, and norms from those around them; and that people change over time, in ways that are genetically pre-programmed as well as responsive to environments. The effect of specific experiences varies according to the developmental stage at which they are encountered, and some important experiences or influences have a disproportionate impact early in development. These principles are clearly relevant to understanding the interdependence between humans and nature.

Two core conclusions are worth identifying even though they almost go without saying. One is that human behavior is a function of multiple causes, many of which are irrational and/or outside conscious awareness. This means that people do not always know what’s good for them, and even when they do they may not act on it; logical

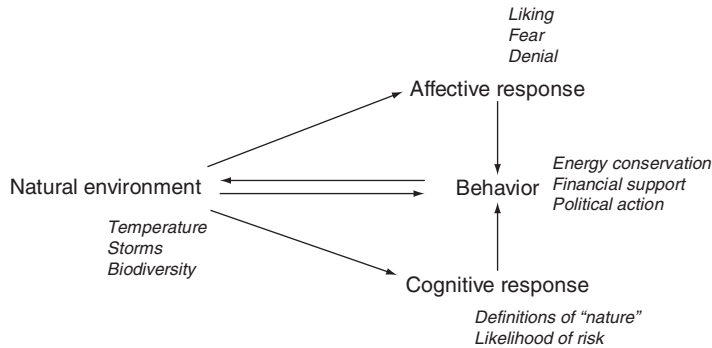


Fig. 1.1 A simplified model of the human–nature relationship.

argument about the importance of addressing environmental threats is seldom enough to affect behavior. A second is that behavior is susceptible to change. Patterns of behavior that may seem like inevitable consequences of “human nature” are nevertheless malleable, responding to both unintentional and intentional influence. Even something as fundamental as reproduction shows huge variability across both time (the birth rate declined by almost 50% between 1910 and 1994 in the USA) and culture (ranging from 11 births per 1000 people per year in Italy to 45 per 1000 per year in Tanzania) (Howard, 2000). An understanding of the core influences on behavior can allow for positive interventions to promote a healthy human–nature relationship.

Between them, Saunders (2003) and Mascia (2003) articulate a set of areas for conservation psychology research that reflect psychological knowledge and our complex definition of care. Saunders argued that conservation psychology should address (i) how humans care about nature, and (ii) how humans behave toward nature. Mascia added the cognitive component, (iii) how humans develop beliefs and knowledge about nature. He also recognized that humans function within a social context by adding two more foci: (iv) human-to-human relationships that are relevant to conservation, and (v) the relationships between humans and social institutions. Figure 1.1 shows a diagram of the general processes of concern to conservation psychologists, and some specific examples.

Conservation psychology aims to apply the concepts and the techniques of psychological research to conservation areas. This might include, for example:

- Using survey research to assess community attitudes toward particular conservation initiatives.
- Drawing on the results of attitude change research to design persuasive messages.
- Drawing on the results of behavior research to encourage sustainable behavior.
- Consulting with architects and designers to provide ways for people to interact with nature.
- Designing environmental education programs that will promote pro-environmental attitudes.
- Conducting research on the effects of exposure to nature in order to enhance the argument for protecting nature.
- Observing social interactions in order to understand the ways in which environmental values are created and transmitted.

Doug McKenzie-Mohr, a key proponent of a social marketing approach to promoting pro-environmental behavior, provides many examples of applied settings in which psychology can be useful. In a 2000 article, for example, he describes an intervention to reduce peak summer water usage. A first step identified barriers to efficient lawn watering. Targeted interventions then addressed these barriers by providing information and prompts and eliciting signed commitments to water less often. The social marketing condition decreased watering by 54%, compared to only 15% for a comparison group that only received the information.

Psychology can also promote the recognition that economic motivations are not the only forces that guide behavior. Clayton and Brook (2005) discuss the ways in which self-presentation motives and other identity concerns can supersede the desire to protect the environment. They described the success of the Toyota Prius over the comparable Honda Civic hybrid as due to the way in which the Prius satisfies self-presentation concerns by making a more visible statement about its owner's environmental values than the less distinctive Civic hybrid. This analysis was later corroborated: in a survey reported in the *New York Times*, the top reason people gave for buying a Prius was that it "makes a statement about me" (Maynard, 2007).

A lack of psychological information can be harmful. For example, Robert Cialdini, a specialist in the psychology of social influence, has documented the "understandable, but misguided, tendency to try to mobilize action against a problem by depicting it as regrettably frequent" in public service announcements and other pro-environmental messages (2003, p. 105). In controlled research, Cialdini and colleagues have demonstrated that such a message can identify a descriptive social norm by stating that many people engage in this negative behavior. Littering and polluting, for example, are common. Because people are highly guided by social comparison, they may choose to do as others are doing rather than to set themselves up as paragons. Thus the well-intentioned attempts to increase pro-environmental behavior may actually backfire.

There are caveats and cautions. Among the vast body of research on sustainable behavior, many studies have focused on behavior changes that are not particularly useful (Gardner & Stern, 2002). Psychologists sometimes target individual-level changes in cases where the important decisions and behaviors occur at the organizational or the governmental level. This does not mean that individual behavior is irrelevant, but that not all behavioral changes are equally significant. In some cases, target behaviors might be to lobby organizations, or to vote for particular policies. Recycling paper will have a lower impact than purchasing a fuel-efficient car. In addition, claims can also be made about benefits of nature that are based on anecdote but not backed up with data, or that fail to acknowledge the complexity of the human–nature relationship. Nature presents costs as well as benefits, and there are aspects of nature that people do not like (Bixler & Floyd, 1997)! Psychologists and others need to resist the temptation to be satisfied with simple answers.

It is partly out of such origins that the field of ecopsychology emerged. Ecopsychology is concerned with the ways in which people relate to nature, and the consequences for both human and environmental health. As such, it provides an important reminder that people live in nature as fish do in water, and that degradation of the environment

is likely to affect people in ways that are more subtle than increased risk of cancer. Its agenda is to link personal and social change, connecting individual therapy with environmental stewardship. The relationship between ecopsychology and psychology, however, is contested. Not all ecopsychologists are trained as psychologists, and writings on ecopsychology have been criticized for a lack of scientific objectivity, referencing concepts like spirituality and indigenous wisdom that are difficult to clearly define. Reser (1995), in a thoughtful critique, concluded that the assumptions and methods of ecopsychology are too disparate from accepted psychological standards for it to be considered an area within psychology. However, he encouraged psychologists to address the issues raised by ecopsychologists. Beringer (2003) provides a more supportive description of ecopsychology, but agrees that in some ways it lies outside, and in opposition to, mainstream psychology.

The organization of this book

This volume is designed to present a body of research related to how and why people care for nature, in order to make it accessible and useful to both psychologists and non-psychologists. We split the volume into three sections. The first, “Thinking about nature,” is the most theoretical. Here we address the ways in which the environment and environmental issues have psychological significance for people. Chapter 2 deals most directly with cognitive constructs: conceptions of nature, attitudes, values, and language regarding nature, and perceptions of environmental risk. Chapter 3 introduces the concept of morality. Many people consider the environment to have moral significance. How do beliefs about justice, ethics, and fairness affect the way we think about nature? In Chapter 4 we examine evidence that nature has intimate, personal significance for people’s sense of themselves and their personal and social identities. Chapter 5 presents the principal theories that attempt to provide a general explanatory framework for the relationship between humans and their environment. Readers that are new to psychology will find Part I to provide a sound introduction with a strong nature-focused bias. Those familiar with the discipline may see familiar concepts playing new roles.

In the second section, “Interactions with nature,” we look at specific settings in which people experience nature. We group the primary settings into “Domestic nature” (Chapter 6), “Managed nature” (Chapter 7), and “Wild nature” (Chapter 8). Each of these settings has its own unique significance and interest. Under domestic nature, for example, we examine the abundant literature on companion animals as well as the more sparse research on gardens. We take a critical look at the evidence for benefits, as well as the mechanisms that have been suggested to explain these benefits. Managed nature includes zoos and urban parks. We describe the intended purpose of these public services and review evidence about their impact, in particular the ways in which they promote caring for nature. In the chapter on wild nature, we review the literature on the benefits of outdoor experiences as well as the work on attitudes toward wildlife. This section of the book serves as a reminder that the natural environment is a source of benefits and positive experiences as well as a focus of fear about environmental degradation.

In the last section, “Promoting conservation,” we take a more practical look at interventions. Chapter 9 provides an overview of the extensive research on behavioral interventions – one of the most well-established areas of study within conservation psychology. Chapter 10 examines models for community-based conservation programs. Chapter 11 reviews the research on environmental education. The interdisciplinary connections of conservation psychology are highlighted in these chapters, and Chapters 10 and 11 (along with the chapters in Part II) attempt to build bridges to other communities of practice as well as other fields of study. There is much more such bridging and calibration to be done.

Finally, in Chapter 12 we offer a sort of epilogue. In our own experience, as well as that of others we have spoken with, studying environmental topics may lead to a sense of pessimism or even despair. We wrote this book because of our own hope in the face of environmental challenges. In Chapter 12 we encourage the reader to respond in the same way, and provide some psychological insights about sources of hope and optimism. Human behavior is a major source of environmental problems, and human behavior can be a source of solutions as well.

Conclusion

Conservation psychology is mission-driven, at least in terms of choosing some research questions based on the promise that rigorously produced results will lead to better solutions. We are about “promoting” human well-being by way of attending to nature, because the two are inseparable. Conservation psychology aims to capitalize on the extraordinary breadth of psychology, and is an “identity” open to *every psychologist* who wants to bridge the disconnect between their professional specialty and their personal sense of responsibility toward the planet. Psychology’s strength is its great scientific tradition; thus the “understanding” embedded in our title. Conservation psychology wants to tap every variety of this talent in several possible kinds of endeavors: applied interdisciplinary conservation teamwork that can immediately use tools of psychology; and using theories and findings of psychology to help re-cast the foundations of major institutions to be truer to humans in nature, and to nature in humans.

Conservation psychology is a new and rapidly developing field. We cannot hope to cover all the research, or even to capture all the topics that are being studied. Our aim is to give a sense of the focus and purpose of conservation psychology, and to summarize the research on some of the most important topics. In this way we hope to introduce the field to those for whom it is new and to package the information in a way that makes it useful to those who might wish to join the collective of conservation psychologists as well as those who are in a position to apply what has been learned. Protecting the environment must be a collaborative effort, and communication among people with different specializations is an important first step.

At the heart of conservation psychology is a recognition of the bidirectional relationship between humans and the natural environment: how nature affects people and how they in turn affect the environment. Understanding why nature is significant to people strengthens the argument for conservation. Understanding the ways in which

nature is significant to people enables the construction of initiatives that will promote conservation. In the face of the environmental challenges and changes that have already begun, evidence from psychological research has an important part to play in considerations of environmental policy.

For further information, visit these websites:

- Conservation psychology: www.conservationpsychology.org.
- Society for Population and Environmental Psychology: www.apa34.org.
- Society for Human Ecology: www.societyforhumanecology.org/.
- Society for Conservation Biology's Social Science Working Group: www.conbio.org/workinggroups/SSWG/.
- Environmental Design Research Association: www.edra.org.
- North American Association for Environmental Education: www.naaee.org.
- International Association for People–Environment Studies: www.iaps-association.org/.



Thinking about nature

Attitudes, values, and perceptions

- Core understandings of nature
 - Values
 - Attitudes
- Risk perception
- Biases in information processing
- Language and discourse
- Who is responsible?
- Linking perceptions to behavior
- Conclusion

Modern environmental scientists may feel like Cassandra: blessed with the ability to foresee the future, but cursed in that no one will believe them. What are the public perceptions of nature and of the environmental risks we face? Are those perceptions consistent with scientific understandings? The human mind is amazingly effective, but human rationality has limits: the way we think is affected by cognitive limits, leading to the use of heuristic short-cuts, and biased by emotions and values. Except in situations where people deliberately engage in sustained and critical inquiry, their understanding of a problem is probably based not on a thorough review of information, but on a selection of information that has been screened through pre-existing ideas, shaped by the media and by their social interactions, and interpreted on the basis of personal and cultural biases. This chapter will examine some core ways in which people think about the natural environment as well as how these concepts do, and do not, matter.

Core understandings of nature

Although conceptions of nature are informed by both personal experience and scientific understanding, nature and the natural environment are social constructs. Beliefs about what nature is, as well as the way in which nature is valued, are created within a historical and cultural context. For example, Carolyn Merchant (1980) has argued that the dominant view of nature is confounded with perceptions of the feminine

(cf. “Mother Nature”). The result, according to Merchant as well as other eco-feminists, is a pervasive attitude that nature is a source of perpetual nourishment that can be exploited and violated.

More concretely, most people define nature as that which is not under the control of humans. Thus, although one could argue that human constructions are just as much a part of nature as bird nests or termite mounds, the environment is felt to be natural when it is free from obvious human impact (Simmons, 1993). This simple conception has profound consequences for ecosystem management. It encourages an approach to the preservation of wilderness that removes all humans and all traces of human occupation, while conversely suggesting that there is no need to provide for or protect nature in an urban setting. It also sets up a zero-sum competition between humans and the rest of nature: if humans use a site, it is no longer natural; if it is preserved as natural, it is off-limits to humans. This approach threatens and alienates those whose occupations involve interactions with nature, such as farmers, hunters, fishers, and ranchers. In contrast to the human/nature distinction found in the developed world, pre-technological societies may have sharply different conceptions. Anthropologist Annabelle Sabloff (2001) writes, “In most if not all of the native peoples anthropologists have studied, the natural world was perceived ... to be integral to their own and could not be separated out from their cultural life” (p. 34).

Defining nature as free from human impact does not imply that people accurately assess that impact. Aesthetic judgments suggest that people prefer natural scenes with some degree of human management rather than ones in which nature has been allowed to run wild and messy. Williams and Cary (2002) asked a random sample of Australian respondents to rate photographs of different types of natural landscape, and found that although “perceived naturalness” of landscapes was valued, there was no relationship between the preference ratings and the ecological health of the landscapes as rated by professional ecologists. In a study by Bonnes et al. (2007), satisfaction with local green spaces among Rome residents was related to their availability, defined as the amount of public green space per capita in the neighborhood, but not to the biodiversity of those spaces.

It is not surprising that people’s views of nature appear fairly simplistic. Coyle (2005) reported poor performance by American adults on the National Environmental Education and Training Foundation’s (NEETF) 12-question environmental “report card,” administered in 1997 and 2000 to random national samples (NEETF & Roper Starch Worldwide, 2001). Only 28%, for example, knew that non-point sources (runoff) cause most water pollution, rather than factories. Only 41% could recognize the correct definition of biodiversity, and 53% chose the correct primary benefit of wetlands. If nine correct answers (75%) were considered “passing,” then 33% achieved this fairly low hurdle. (See further discussion of environmental knowledge in Chapter 11.) Further complicating public understanding of ecology is the changing and complex nature of the field. Coyle notes that 80% of adults are influenced by outdated or incorrect environmental beliefs. Within ecology the very idea that we can demarcate “ecosystems” is contested, although it is fundamental to the methods many ecologists use. Unless the public understands the role of these debates in scientific inquiry, the effect may be for people to feel even less inclined to rely on scientists to determine what is and is not natural.

Regardless of the way in which nature is defined, views of nature are predominantly positive. People tend to pick natural settings when asked to describe a “favorite place” or “a place they would like to be,” a result that is found across cultures. For example, when Newell (1997) asked 223 students in the United States, Ireland, and Senegal to identify a valued and favorite place, approximately 60% of respondents from each country named natural environments. Clayton (2000a) found a similar proportion when she asked students to identify an ideal environment – one that they might not actually have ever seen. Herzog and colleagues (e.g. Herzog et al., 2002; Herzog & Chernick, 2000) have found that people consider natural settings to have great restorative potential and to be more tranquil, and less dangerous, than urban settings.

Values

Values are general preferences for end states or ways of acting; they serve as goals that apply across different contexts and underlie more specific attitudes, preferences, and behaviors. (See Dietz et al., 2005, for a more extensive review of definitions and uses of the term “value” in discussions of environmental issues.) People may value, for example, beauty, peace, or wealth in varying degrees. Overall, across different countries and cultures, there is a high level of agreement that nature has value. Kahn (1999) has found such results in a number of studies, which we discuss in Chapter 3.

On what bases do people value nature? Studies on this topic by Stephen Kellert are summarized in the 1996 volume, *The value of life: Biological diversity and human society*. Based on interviews and surveys of a broad spectrum of people in several countries, Kellert identified nine to ten basic values explaining the human affiliation with the natural world. In American society, humanistic attitudes were given the highest ratings. Humanistic values are embodied in the emotional attachments people form toward natural entities, most often companion animals. Moralistic values, assigning ethical standing to nature and natural entities, are also strong. Box 2.1 shows the rough order of prevalence of eight value types in the general US population.

Box 2.1 Kellert value types in order of prevalence in American society

- 1** Humanistic (primary interest/affection for individual animals, pets).
- 2** Moralistic (right and wrong of treatment of animal and nature, strong opposition to cruelty/exploitation).
- 3** Negativistic (active avoidance due to indifference, dislike, fear).
- 4** Utilitarian (concern for the practical and material value of animals and or habitat).
- 5** Ecologistic (concern for environment as a system, for interrelations between wildlife and natural habitats).
- 6** Naturalistic (interest/affection for wildlife and outdoors).
- 7** Dominionistic (interest in mastery and control).
- 8** Scientific (interest in the physical attributes and biological functioning).

Based on data in Kellert (1996).

The third most highly rated set of values in Kellert's research was described as "negativistic," comprising feelings of fear, disgust, and dislike for elements of nature. It is important to recognize the prevalence of these negative emotions toward nature. Even negative emotions, however, reflect a type of engagement rather than disinterest, and as such may represent an opportunity to attract people's interest. Negatively-viewed species such as bats and snakes attract a great deal of attention in zoos, for example, and this fascination may engage people's attention long enough for them to learn about the animals and their needs.

Kempton et al. (1995) also studied American values toward nature, through in-depth interviews of 46 people representing different interest groups, supplemented by follow-up surveys of a representative sample of 142 others. Like Kellert, they found a strong moralistic component, concluding that "... American perspectives on global environmental change are based on fundamental moral and religious views" (Kempton et al., 1995, pp. 2–3). Surprisingly, they also found that the people in their general public sample held values similar to those espoused by people belonging to the environmental group the Sierra Club, although the public's views were not quite as internally consistent.

Whereas Kellert focuses on the type of benefit humans receive from nature, Carolyn Merchant (1992) noted that different beneficiaries can be identified. Values may be distinguished according to whose interests are privileged. Merchant described three ways in which nature can be valued: for its own sake (eco- or biocentric values), for the sake of other humans (anthropocentric or altruistic), or for an individual's own benefit (egocentric). Research has confirmed the existence as well as the distinctiveness of these value orientations. People who value nature for its own sake are likely to have different standards for the ways in which humans should treat nature, as compared to people who value nature for the benefits it provides to humans.

Much of the research into the values that underpin environmental attitudes and behavior is based on the work of Shalom Schwartz and his colleagues (e.g. Schwartz, 1992). Schwartz proposes that there are universal value types and that people can be characterized by the different ways in which they prioritize those values. Starting with 56 possible values, Schwartz's research has revealed ten distinct groupings of value types, which in turn can be arranged according to their positions on two dimensions. This fundamental value structure has been found in multiple countries around the world. The first dimension reflects self-enhancement versus self-transcendence, describing the extent to which a value prioritizes one's own interests versus the interests of others. The second dimension is traditionalism versus openness to change. The self-transcendence values include ones associated with environmentalism, including "a world of beauty," "protecting the environment," and "unity with nature," as well as others more purely altruistic, such as "a world at peace" and "equality". Stern et al. (1995) have modified the scale to more clearly distinguish the altruistic from the biocentric values.

Considering human value for nature begs the question of how that value can be measured. When products from nature are traded in a market, the prices they command reflect economic value in the given transaction. Much of environmental economics has been concerned with quantifying the "external" values not included in market prices (see Box 2.2 for one example).

Box 2.2 The value of trees

A computer program has been developed to assess the economic value of trees, figuring in the costs associated with planting and upkeep and the benefits they provide by increasing property values, removing CO₂ from the air, and reducing energy consumption by providing cooling shade. A recent examination by the New York City Parks Department concluded that New York City's street trees provide about \$122 million in benefits annually, or a return of \$5.60 for every dollar that is spent (Randall, 2007).

Often nature provides public goods (such as ecosystem services) for which markets do not exist; the challenge then is to estimate their monetary values by other means. Ecological economists' calculations of the value of ecosystem services now play key roles in conservation planning. To assess the value of natural objects that are not bought and sold, studies often ask how much people are willing to pay for nature, through what are called *contingent valuation methods*. Willingness to pay (WTP) involves asking people to identify the amount they would pay for continued access to a natural resource, or the knowledge that it would continue to exist. The WTP measure is not a perfect representation of nature's economic value. It is influenced by some variables (e.g. the framing of the question as a possible gain or loss) that should not affect it, and unaffected by some variables (e.g. the amount of nature being protected) that should (Kahneman, 1986), suggesting that it taps a more psychological assessment of value. WTP research, however, provides evidence that nature does have concrete value for people, as well as illuminating some of the variables that affect this value.

Although they are difficult to assess, values are important drivers of public policy, affecting environmental management practices and monetary expenditures. The regulations created to implement the US Oil Pollution Act of 1990 explicitly affirm that "passive use values" such as those determined by contingent valuation may be considered in determining natural resource damages.

Attitudes

Attitudes are evaluative reactions to objects or behaviors based on beliefs about those objects or behaviors. In social psychological theory, attitudes arise out of general values and primitive beliefs and are more immediate predictors of behavior. Attitudes serve to summarize and integrate our values and beliefs as they apply to a particular issue. In the United States, national surveys consistently show positive attitudes toward nature. Support for environmental protection is widespread and has persisted across decades.

What explains environmental attitudes? Overall, demographic variables are only weakly related. Younger and more highly educated respondents tend to be more pro-environmental (Bodur & Sarigöllü, 2005; Xiao & Dunlap, 2007). Women show more concern for the environment, on average (Zelezny et al., 2000; Milfont & Duckitt, 2004), but the effect is small and is not always found. A number of writers have suggested that

ethnic groups differ in their attitudes toward the environment. In general, behaviors have been found to show small differences (e.g. Parker & McDonough, 1999), but attitudinal differences are less clear. Members of environmental groups are more likely to be white and of a higher socioeconomic status than the general population, but that may reflect differences in the tendency to join advocacy/issue-oriented organizations rather than in the underlying attitude toward the environment (Morrison & Dunlap, 1986).

In an analysis of national survey data, Johnson et al. (2004) found gender and ethnic differences both in environmental behaviors (such as reading, recreation, membership in environmental groups) and attitudes (e.g. endorsement of the New Environmental Paradigm, described below). Ethnic differences in behavior remained even after attitudinal differences were controlled. Johnson et al. conclude that the context for environmental behaviors varies among ethnic groups: both the ease of performing a behavior and the meaning symbolized by that behavior are different for the different groups. In other words, the behavioral expression of an attitude will vary according to the social context and the amount of behavioral control, a point we return to below.

The search for a general predisposition toward the natural environment has generated many different ways of measuring environmental attitudes. Milfont and Duckitt (2004), using a wide range of items, obtained evidence that environmental attitudes cluster into two independent but related themes: (i) preservation, based on a biocentric valuing of nature; and (ii) utilization, reflecting an anthropocentric value. It is perhaps most useful to consider specific environmental attitudes as resulting from a more generalized worldview. A worldview is an integrated set of beliefs about what is real, what is knowable, what is valuable, and what it means to be human.

Social scientists began using the idea of worldview to understand environmental issues with the publication, in 1978, of Riley Dunlap and Kenneth Van Liere's psychological scale called the *New Environmental Paradigm* (NEP) (later revised by Dunlap et al., 2000) (Box 2.3). Dunlap and his colleagues described a worldview concerning the human relationship with nature, and proposed that the Western world had experienced a paradigm shift from the "dominant social paradigm," which stressed continued economic growth, human domination over nature, and confidence in technology, to a "new environmental paradigm," emphasizing the fragility of nature and the need for limits on the growth of human society, and denying a human right to rule the rest of nature. The revised NEP has been widely used, gets a high level of endorsement in Western society, and is associated with pro-environmental behavior. Thus, the worldview it describes seems both to be widely accepted and to help explain people's support for the environment.

Box 2.3 Some items from the New Environmental Paradigm scale

- We are approaching the limit of the number of people the earth can support.
- Humans were meant to rule over the rest of nature. (Reverse scored)
- Humans are severely abusing the environment.
- Human ingenuity will insure that we do *not* make the earth unlivable. (Reverse scored)

Based on Dunlap et al. (2000).

A worldview is usually considered to arise in part from one's cultural heritage. Environmental worldviews show consistent relations to other social belief systems. A recent multinational study of students in England, Denmark, and the USA found that support for the dominant social paradigm was negatively associated with environmental attitudes (Kilbourne et al., 2001). Heath and Gifford (2006), in a Canadian sample, found that support for free-market ideology was negatively associated with environmentalism. In a sample of Australian students, social conservatism and the belief that "money is good" were negatively associated with environmentalism (Hodgkinson & Innes, 2000). Finally, egalitarianism (as contrasted with individualism) has also been linked with environmentalism (Steg & Sievers, 2000).

Two other models of the ways in which culture affects environmental worldview have received mixed support. Inglehart (e.g., 1995) proposed that societies need to reach a level of affluence that allows them to endorse postmaterialist values before they will give priority to environmental objectives. According to Inglehart, people who live in non-industrial or industrializing countries will focus on satisfying immediate needs, such as security and economic well-being. Only after societies have achieved a certain level of stability will they have the luxury to emphasize more abstract goals such as freedom and environmental protection.

This hypothesis has been investigated at both the societal and the individual level. Inglehart found that support for environmental protection was greatest in countries that held postmaterialist values, and other studies have shown a similar effect. Gökşen and colleagues (2002), for example, surveyed over 1000 Istanbul residents and found the anticipated relationship between individuals' postmaterialist values and their environmental concern. Other research, however, has found no connection (e.g. Stern et al., 1999) or a more complex relationship. Dunlap and Mertig (1996), using a dataset with 22,000 respondents from 24 countries stratified by per capita income level, found that large majorities in all countries see environmental problems as at least somewhat serious. All problems were rated as more serious by residents of poor countries, who were most likely to rate local and national conditions as serious. Thus it would be incorrect to conclude that environmental concern is restricted to wealthy countries.

A cultural dimension that has been frequently studied in psychological research is the distinction between individualist and collectivist cultures (e.g. Markus & Kitayama, 1991). Individualistic cultures emphasize the self as independent, distinguish between personal and communal goals, and focus on personal utility. Collectivist cultures think of the self as interdependent with others, believe that personal and communal goals are aligned, and emphasize interpersonal norms and obligations. It has been argued that collectivist values are more compatible than individualist ones with environmentalism, and some studies have found greater endorsement of the NEP in collectivist countries (Schultz et al., 2000a; Vikan et al., 2007). However, countries that are classified as having primarily collectivist worldviews, such as China and Japan, are not typically found to endorse environmental initiatives more strongly than individualistic countries like the USA (Deng et al., 2006; Eisler et al., 2003). On average, the Japanese show a lower moralistic value for nature compared to Americans (Kellert, 1996), and despite its supposed nature-friendly Taoist tradition, China has in fact heavily degraded its resources over many centuries.

Anthropologist Florence Kluckhohn and social psychologist Fred Strodtbeck (1961) suggested that all cultural belief systems embody one of three basic descriptions of the human–nature relationship. Some cultures incorporate the basic belief that humans are elevated over nature and superior to it, and thus can and should dominate it. Others hold that humans and nature exist in harmony, and still others frame humanity as subordinate to the more powerful natural world of beings and forces. Such basic root metaphors are abstractions from complex systems of belief that systematically differ from one religious tradition to another (although they also vary across individuals and situations). Kluckhohn and Strodtbeck’s work stands as a reminder that sensitivity to religious worldviews is necessary when studying the experience of nature in other cultural settings.

The fact that many ascribe spiritual or moral value to nature leads to the question whether religiosity is associated with support for nature. In an influential 1967 essay, historian Lynn White suggested that traditional Christian religiosity would undermine environmentalism because the Judeo-Christian worldview emphasized human domination over nature. Studies that find a relationship do tend to show that measures of religiosity such as regular churchgoing are negatively associated with environmentalism in America (e.g. Schultz et al., 2000b; Gardner & Stern, 2002).

Gardner and Stern, however, conclude that the relationship is due to the social conservatism associated with churchgoing. Their analyses show that religious beliefs have only a weak negative relationship to environmental behavior when controlling for age, gender, education, income, and political liberalism (see also Sherkat & Ellison, 2007). White (1967) also argued that the more respectful attitude toward nature found among Eastern religions would encourage greater protection for the environment, a relationship that has not been found. Overall, religious beliefs may have some connection with environmentalism but this connection is overshadowed by other social factors surrounding religious practice.

In some of the best research to date on culture and environmental cognition and behavior, Atran et al. (2005) showed that beliefs in the sacredness of local nature were important in the rate of deforestation practiced by three different ethnic groups in the Guatemalan state of Petan. We discuss this example in more detail in Chapter 10.

Risk perception

A great deal of research has examined perceptions of environmental threats. In general, people have been shown to be inaccurate at assessing risks, inflating the probabilities of some events and underestimating others (cf. Slovic et al., 1980). Most environmental degradation is not available to human senses. Although an accident at a nuclear power plant or an oil spill may be highly visible, the slow increase in average global temperature or incremental loss of species is not. Thus the human perception of threats is highly subject to biases and dependent on framing. Leiserowitz (2005) describes public risk perceptions as based on imagery, trust, values, worldview, personal experience, and emotion, in addition to scientific information.

Information can be obtained from the mass media, but the media also serve to define an issue as important or not through the amount of coverage they give. Over the past

decades, the media have paid increasing attention to environmental issues, so it is not surprising that most people are familiar with environmental problems. For example, a 2006 poll of over 30,000 people from 30 countries in all major regions of the world found that a large majority of people in all countries polled believe that climate change or global warming is a serious problem. In no country did more than one in five say it is not a serious problem (WorldPublicOpinion.org, 2006). Similarly, media coverage of such dramatic environmental disasters as the nuclear meltdown in Chernobyl, the *Exxon Valdez* oil spill, the Union Carbide toxic gas release in Bhopal, and Hurricane Katrina has sensitized people across the planet to the possibility of environmental threat. Overall, however, the public in general tends to feel that environmental threats will have a greater impact on the global environment than on their own local environment (e.g. Chuk-Ling Lai & Tao, 2003; Leiserowitz, 2005; Broder & Connelly, 2007). Note that the media can also frame the issue. Dispensa and Brulle (2003) demonstrated that the US media suggest more uncertainty about anthropogenic climate change than did the media of other advanced nations.

Recognizing a threat does not always mean understanding that threat. Past research, for example, found that many Americans confuse global climate change with ozone depletion (Kempton et al., 1995; Bord et al., 2000). Interestingly, Bord et al. found that an accurate understanding of the causes of global warming was not related to a belief that global warming exists – misinformation about causes was just as predictive of a belief in global warming. However, accurate information was the best predictor of an intention to do something about it.

Studies repeatedly show that “lay people” rate environmental risks differently than do scientific or risk professionals. In part, this reflects differential access to information. For this reason, professionals may believe they simply need to impart their knowledge to the public. However, discussions of risk are about more than information; they include a subtext about power, social control, and values (Cvetkovich & Earle, 1992). Where professionals may see an environmental threat as a purely scientific/economic issue, the lay public may also be concerned about ethics, responsibility, and inclusion (Vaughan & Siefert, 1992). Members of the public may also consider outcomes that are not factored into the professionals’ assessment. Thus, it is important not to dismiss the fears of the public as simply irrational, or wrong. The existence of different issue publics, or interpretive communities, indicates the way in which underlying beliefs about science, government, and social relationships affect responses to environmental risks. For example, in a mail survey of 673 Americans, Leiserowitz (2005) found that a white, male, conservative, religious, anti-egalitarian group represented a distinctive set of “naysayers” concerning the risk of climate change.

Slimak and Dietz (2006) surveyed risk professionals and the general public to find their ratings of 24 environmental threats. In general, the public responded more to things that were of low probability but high consequence (hazardous waste and sewage) whereas risk professionals responded to things that were probable but had incremental impact (global warming, invasive species, loss of wetlands, decreased biodiversity). People tend to show more fear of technological hazards compared to other environmental risks (e.g. Walsh-Daneshmandi & MacLachlan, 2000), perhaps because the former are more clearly a product of human influence. In a study by Brown et al. (2005),

American undergraduates rated an environmental loss as more serious if it was caused by humans than if there was a natural cause. Among human-caused events, those due to growth were considered less serious than those due to carelessness or illegal behavior. In general, people are more willing to accept risks perceived as necessary consequences of countervailing benefits.

Not surprisingly, a greater threat is perceived when people are aware of a risk and perceive the associated consequences as severe (Slovic et al., 1980). Controllability of the risk is also important (Chuk-Ling Lai & Tao, 2003; Adeola, 2007). Hazards that are unfamiliar, unobservable, uncontrollable, and with potentially fatal consequences are more feared than those that do not have these attributes.

People are more likely to be aware of threats that are immediate and/or personally relevant. Personal experience, observation, or knowledge, spatial proximity, and length of residence are all associated with recognition of a possible local hazard (Edelstein, 2002). In Texas, driving distance from a creek predicted awareness of environmental problems: those who lived closer were more likely to express concern about the water's safety. Income, length of residence, and gender (male) predicted awareness, as did general concern about the environment (Brody et al., 2004). Other studies, however, have found women to be more worried about environmental risks than men (Edelstein, 2002). Minority groups have also been found to perceive greater environmental risk (Flynn et al., 1994). Minority groups do, on average, experience greater exposure to environmental hazard (Bullard, 2000); in addition, they tend to have lower trust in government and authorities to protect them from these risks (Adeola, 2000).

Unsurprisingly, cultural differences have been found in risk perception. Europeans, for example, are more concerned about genetically modified food than are Americans. Some of this may reflect the fact that national media tend to highlight different issues. Recent studies that show differences between native-born and foreign-born residents of the USA (e.g. Adeola, 2007), however, suggest that differences in risk perception reflect more than the salience of particular threats. Like nature, risk is a socially constructed concept. Differences between cultures reflect differences not only in access to information, but also in levels and types of potential harm or exposure, as well as in social trust and faith in technology.

Is there such a thing as overall concern about the environment, or do people respond to each issue differently? Xiao and Dunlap (2007), evaluating survey data from the USA and Canada, found that there was a single underlying construct that explained responses to eight different aspects of environmental concern, which would suggest a tendency to a general environmental concern. The one exception was that concern for issues affecting the local community showed a distinct pattern, probably indicating the impact of personal experience.

Biases in information processing

Today's media and internet-savvy society provides too much information for anyone to attend to, let alone integrate and apply. Psychologists Herb Simon and Daniel Kahneman have each won a Nobel Prize for identifying the limits on human rationality and

Table 2.1 Some biases in information processing.

Decision-making biases	Probability biases	Social biases
Confirmation bias	Anchoring	Actor–observer bias
Contrast effect	Attentional bias	Egocentric bias
Temporal discounting	Availability	False consensus
Illusion of control	Gambler’s fallacy	Fundamental attribution error
Impact bias	Hindsight bias	Halo effect
Information bias	Illusory correlation	Ingroup bias
Loss aversion (sunk costs)	Neglect of base rates	Just-world beliefs
Neglect of probability	Optimism bias	Outgroup homogeneity
Mere exposure	Recency effect	Self-serving bias

describing some of the shortcuts, or heuristics, people use to cope with the information overload. Unfortunately, these shortcuts can lead us astray. A sample of information processing biases is listed in Table 2.1.

Some of these biases are particularly applicable to environmental issues. For example, people give more weight to a possible loss than a possible gain, a finding that is described in *prospect theory* (Kahneman & Tversky, 1979). This is quite clearly illustrated in programs for energy efficiency. Homeowners are less swayed by being informed about the savings they could realize through more effective insulation, than by being told about the money they are losing. One program encourages energy companies to describe the loss as “like a basketball-sized hole in your wall” – a phrase that vividly illustrates the loss of heat due to inadequate insulation. Because people tend to adapt to an existing state, a level of pollution that may have been inconceivable to a previous generation may be accepted as the status quo by the current generation. The effect is that a move toward sustainability may be seen as an environmental gain, the benefits of which are outweighed by the associated cost or perceived decrease in living standard.

People have a tendency to discount risks whose negative effects will be felt in the distant future (Frederick et al., 2002). This tendency to short-term thinking may have a basis in our evolutionary heritage: our ancestors were more likely to survive if they focused on immediate threats, and often did not live long enough to benefit from any consideration of long-term outcomes (e.g. Ornstein & Erlich, 1989). Milfont and Gouveia (2006) measured individuals’ tendency to consider future consequences in a Brazilian sample, and found that people with a future orientation were more likely to engage in environmentally protective behaviors.

Interestingly, several studies have shown that environmental risks may be less subject than other types of risks to this temporal discounting. Gattig and Hendrickx (2007) propose that this is because an ethical evaluation is entailed for environmental risks. They present data to show that ethical evaluations are not affected by a time delay in consequences, because the ethical evaluation pertains to the act rather than to the consequences. In a study of Dutch students, Hendrickx and Nicolaij (2004) found that there were considered to be more ethical implications associated with environmental risks than with medical or financial risks.

A bias whose pervasive influence has been extensively documented is the *availability* heuristic. Estimates of probability are affected by how cognitively available an event is – that is, how easy it is to think of an event. It is easier to think of events that happen more often; to this extent, availability is a useful heuristic. However, it is also easier to think of events that we have personally experienced, events that have been highlighted in the media (even in fictional media, like the movies), and events that have been vividly depicted. Loss of biodiversity is difficult to envision. Global warming, however – thanks in part to Al Gore’s award-winning movie (2006), *An Inconvenient Truth* – is not. One of the successes of this movie was in linking vivid images to the consequences of global climate change.

The salience of risks is influenced by the sensory vividness with which they are perceived. Hardin (1968) advocated the use of vivid imagery of environmental damage to make risks more apparent. Keller et al. (2006) found that providing affect-laden photos of damage from a flood increased the perceived risk of flooding. Similarly, when Meijinders et al. (2001) showed Dutch adults videos with frightening images about the effects of global warming, the participants showed more fear of climate change compared to participants who did not see the videos. In addition, those who saw the frightening images were more affected by the informational content of the video than were those who did not. Meijinders et al. concluded that only the fear induced by the video motivated participants to attend to the information provided.

Caution in the use of threatening or disturbing imagery is warranted because adaptive responses are encouraged by medium levels of arousal, but inhibited by overarousal (Berlyne, 1960). Emotion may encourage attention, but emotional biases may interfere with people’s ability to evaluate environmental issues adaptively. These biases can be summarized as the desire to believe that what we want to be true is true, and conversely, the desire not to think about things that we do not want to be true. Deborah Winter (2000; Winter & Koger, 2004) describes how psychological defenses interfere with the rational perception of environmental realities. Defensive thinking results when our basic wants, such as the desire for comfort and pleasure, are incompatible with our rational or moral judgment. Faced with a conflict between a desire for self-gratification through unsustainable behavior and the knowledge that the environment is threatened by such behavior, we repress our awareness of the conflict, deny the threats that face us, displace them onto other communities, and rationalize our continued unsustainable behavior as having no alternative. Denial and other defensive thinking are particularly likely when people believe they can do nothing to lessen the danger (see further discussion in the next chapter). Thus, telling people what they can do to reduce a threat is likely to be more effective than emphasizing the magnitude of the threat in getting people to respond to it.

We can understand the role of emotion in risk response through *protection-motivation theory*, which integrates emotion, stress, and coping (Lazarus, 1966). According to this theory, when a threat is perceived the first step is “threat appraisal”: Are valued goals threatened by a high severity and high probability event? Depending on the answer, the threat is appraised as high or low. Next, the person appraises their own ability to respond (“perceived response efficacy”) and the costs and benefits of doing so. This “coping appraisal” results in either a high or low sense that one can cope with the threat.

The combined result of these two appraisal steps is a choice of coping strategy. If the threat is low, a coping response is unlikely regardless of high or low resources for coping. If the person perceives both high threat and high coping, they will approach the situation in a problem-solving fashion, assessing and deploying resources to deal with the threat, making changes, and acting as needed. If, however, the person perceives high threat and believes they have low coping ability, they will use emotion-focused coping. In emotion-focused coping, the person tries to lessen or tolerate fear, anxiety, and helplessness by emotional means such as avoidance, denial, wishful thinking, religious faith, fatalism, and normalization/desensitization – believing the situation is normal and becoming numb.

Ironically, an experience of environmental contamination, for example through exposure to toxins in one's neighborhood, may increase awareness of and sensitivity to environmental hazards but also result in a perceived loss of control (Edelstein, 2002). Although active attempts to deal with the problem can increase perceived control, the emotional experience may be so strong that denial, which helps to cope with the emotion, may be more likely than problem-focused responses. Because these strategies are self-protective and self-focused, emotional coping strategies generally work against individual or collective problem-solving. Based on extensive studies of communities that have experienced environmental contamination, Michael Edelstein (2002) suggests that the formation of local networks may simultaneously help cope with both the unpleasant emotions and the underlying problem, noting substantial evidence that the formation of local groups has psychological benefits for the participants.

Language and discourse

To a significant degree, our thinking about nature is affected by our language and the wider social conversations we have about the environment. As explained by Dryzek (1997), environmental discourses arise because of the social nature of environmental problems: that is, the different interests, positions, and “shared ways of apprehending the world” (p. 8) that develop as various social actors encounter each other. Discourses persist over time but are also dynamic, interactive, and vary in their dominance. Their dominance comes partly from institutions (legal systems, etc.) that are built around their premises and then persist as social patterns, often by garnering resources. Understanding discourses helps make sense of the complex landscape of environmental issues.

Table 2.2 presents some of the main discourses discussed by Dryzek, compared according to four key ideas: (i) what are considered the important entities in reality; (ii) what is natural (inevitable or intrinsic) in the relations between these entities; (iii) who or what are the principal actors and their motivations; and (iv) what linguistic devices are most typical of the discourse. As can be seen from Table 2.2, the discourses vary dramatically along these dimensions. “Survivalist” discourses stress scarcity and consequent conflict for control over dwindling resources – conflicts typically dominated by those with power. “Promethean” discourses are confident in the prerogative and promise of economic and technological progress to shape nature or make it obsolete.

Table 2.2 Some environmental discourses. (From *The politics of the earth* by John S. Dryzek, 1997, pp. 37, 53, 76, 97, 115, 132, 146, 167, 187; by permission of Oxford University Press.)

Discourse	Basic entities recognized or constructed	Assumptions about natural relationships	Agents and their motives	Key metaphors and rhetorical devices
Survivalism	Finite resources Carrying capacity Population Elites	Hierarchy and control	Elites Motivation "up for grabs"	Overshoot Collapse Commons Spaceship earth Cancer
Promethean	Nature as only brute matter Markets, prices Energy Technology Innovation	Hierarchy of humans over all else Competition	Everyone Material self-interest	Doom and redemption Mechanistic Trends
Administrative rationalism	Liberal capitalism Administrative state Experts Managers	Nature subordinate to human problem-solving People subordinate to state Experts and managers control state	Experts and managers Motivated by public interest, defined in unitary terms	Mixture of concern and reassurance The administrative mind
Democratic pragmatism	Liberal capitalism Liberal democracy Citizens	Equality among citizens Political relationships Cooperation Competition	Many different agents Material self-interest Multiple conceptions of public interest	Public policy as a result of forces Policy-like scientific experimentation Feedback

Economic rationalism	“Homo economicus” Markets Prices Property Governments (not citizens)	Competition Hierarchy based on expertise Subordination of nature	Self-interest Government officials motivated by public interest	Mechanistic Stigmatizing of regulation Freedom Horror stories
Sustainable development	Nested social and ecological systems Capitalist economy Differing positions on existence of limits	Subordination of nature Economic growth, environmental protection, distributive justice go together	Many agents at different levels, notably transnational and local rather than the state Public good	Organic growth Progress Reassurance
Ecological modernization	Complex systems Ecological services Capitalist economy The state	Partnership across sectors Subordination of nature Environmental protection and economic prosperity together	Partners Motivated by public good	Tidy household Progress Reassurance
Green romanticism	Global limits Inner nature Nature Unnatural practices Ideas	Natural relationships between humans and nature which have been violated Equality across people and nature	Human subjects, some more ecologically conscious than others Agency exists in nature too	Many biological and organic metaphors Passion Intuition
Green rationalism	Global limits Nature as complex ecosystems Rational humans Social, economic, and political structures	Equality among people Complex interconnections	Many individual and collective actors Multidimensional motivation Agency in nature downplayed	Organic metaphors Appeals to reason Potential rationality of social structures Progress

Other discourses stress the power of different human institutions to produce adaptive responses, although the dynamics and aims differ. The more “ecological” discourses may agree on the complexity of nature and the need for responsive institutions, but they diverge on the fundamental metaphors.

Metaphors are one example of cognitive framing devices. By highlighting some similarities between two things, they also obscure others. Metaphors also have high emotional power because the comparison may evoke fear, disempowerment, supreme confidence, and so on. The importance of cognitive framing in political discourse has been highlighted by linguist George Lakoff (2004), and his work has been applied to environmental campaigns (see the Frameworks Institute, <http://www.frameworksinstitute.org/>). Based on a study of the reactions of people to the “language of conservation,” for example, the Nature Conservancy and the Trust for Public Land found that some framings encouraged conservation while others turned people off (Weigel et al., 2004). Referring to “conservation easements” was less favorable than “land preservation agreements,” the latter connoting a mutual act rather than a legalistic context. This study, as others, found that referring to oneself as an “environmentalist” engendered skepticism and more people identified with the term “conservationist.” Typical of social discourses, such connotations and consequently the best framings will vary over time and situation.

Who is responsible?

Regardless of how people perceive environmental threats, the impact of this perception will be mediated by their perception of who is responsible for addressing them, as indicated by the fourth column of Table 2.2. Among a sample of German adults, Böhm (2003) found that people feel neither personally responsible nor personally threatened by environmental risks, overall. Surveys suggest that although people are willing to take some action to address environmental problems, they perceive the primary responsibility as lying with the government (e.g. Broder & Connelly, 2007). For example, among a representative sample of 1400 Americans in 1997 and 1998, a large majority (77%) believed in the existence of global warming. Fifty-nine percent said that the US government should do something to address the problem (similar proportions said US business and foreign governments should do something to address it). Only 44% said the average person should do something to deal with global warming (Krosnick et al., 2000). Bord et al. (2000), surveying Americans, found that, while people were willing to make some behavioral choices that were affected by environmental problems – about 60–70% said they might buy more a more fuel-efficient car or more energy-efficient appliances – only a small percentage would actually compromise their comfort, e.g. by reducing their use of air-conditioning (42%) or driving less (31%). Similarly, a recent *New York Times*/CBS News poll found that 92% of Americans favor requiring car manufacturers to produce more energy-efficient cars, but only 38% support an increase in the gasoline tax (Broder & Connelly, 2007).

Environmental problems are sometimes described using the metaphor of the “commons dilemma.” First discussed by Garrett Hardin (1968), the commons dilemma

refers to a situation in which members of a group benefit from a common resource. Because individuals do not pay for this resource, rational self-interest would lead each person to maximize his or her use of the resource. Such behavior has direct benefits for the individual while the cost of any individual's behavior, dispersed across the whole group, is insignificant. If many individuals take this behavioral approach, however, the outcome is overuse and depletion of the resource to the detriment of all. This pattern can be seen when individuals maximize their consumption of limited environmental resources like fossil fuels, clean water, and wild-caught fish. People recognize the finite nature of the resource but do not feel personally responsible for maintaining it, and in the absence of similar curtailment by all, attempts to limit use represent a short-term sacrifice for the individual without any long-term benefit for the group. (See Chapter 10 for a discussion of recent literature on the commons dilemma.)

Attempts to encourage sustainable behavior, however, are not futile. Research has shown that individuals are capable of acting in a coordinated fashion to maintain a group resource. Milinski et al. (2008) recently described an experiment in which people were more willing to cooperate to prevent simulated dangerous climate change when the risks of not cooperating were highest, and suggested the importance of effectively informing people about the dangers that are faced. However, there was still a high rate of non-cooperation. Regulations limiting individual use are one way of coping with the tendency toward unsustainable use. Another is to foster a sense of collective identity, which enhances the salience and value of collective well-being and may promote a sense of shared responsibility for that well-being (Kramer & Brewer, 1984). Individuals who feel highly identified with their group are more likely to voluntarily limit their own use of a collective resource in order to protect that resource for the group. This may be particularly relevant for environmental issues, which tend to promote or elicit a group-level identity (Clayton, 1998, 2000b).

Linking perceptions to behavior

Both theorists and practitioners are often disappointed by the low correlation between knowledge and action and by the limited ability of attitudes to predict behavior. General tendencies toward environmental concern may show only low correlations with pro-environmental actions. Icek Ajzen (1991) formulated the Theory of Planned Behavior (TPB) in order to provide a more complete explanatory model. According to TPB, behavior is a function in part of salient attitudes, but it is also shaped by many other forces. Many causes of behavior are unintended: sometimes we have no control over our behavior, or we behave automatically in response to situational cues or habit. Behavioral intentions, however, are more internally governed. The three antecedents of behavioral intention are attitude, subjective norms, and perceived control. Attitudes, as described above, are a function of beliefs about attributes associated with the attitude object and evaluation of those attributes. Subjective norms, or normative beliefs, are concerned with the likelihood that important referent individuals or groups approve or disapprove of performing a given behavior. Perceived behavioral control refers to people's beliefs about the ease or difficulty in performing the behavior. It has been

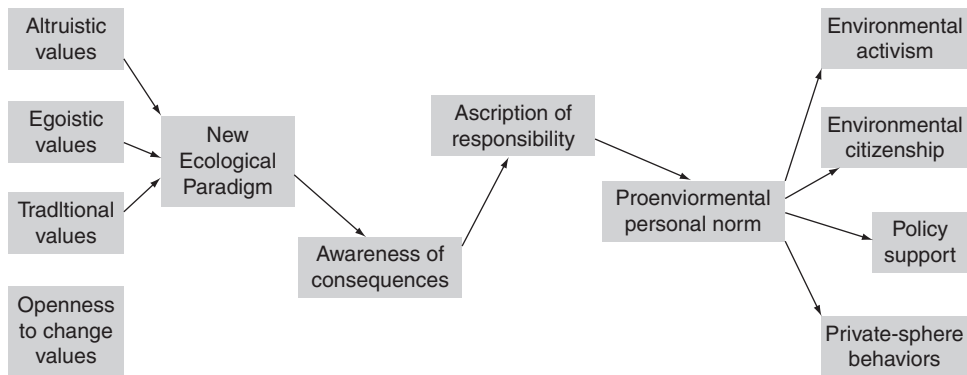


Fig. 2.1 A Value–Belief–Norm theory of support for social movements: the case of environmentalism. (From Stern et al., 1999, with permission.)

found that intentions predict behavior with a large amount of accuracy when there are not serious problems of control.

Attitudes are more likely to affect behavior when they are strong, based on personal experience, and salient. Even a strongly-held attitude will be ineffective when its relevance is unclear or when other forces are stronger. Thus, many environmentalists engage in unsustainable behaviors when the environmental impact of those behaviors is not apparent, when social norms are too strong, or when the actor does not perceive him- or herself as having control over the behavior. The complex relationship between attitudes and behavior was illustrated in an analysis of an international dataset with 22,000 respondents by Brechin and Kempton (1994), who found a positive but non-significant correlation between willingness to pay for environmental protection and affluence, but a negative and highly significant relation between willingness to volunteer time and affluence. In other words, people in poor countries have no control over economic solutions because they do not have the money to pay for them. However, they nonetheless perceive environmental problems as severe, and are willing to invest the resource they do have – time – in their solution.

The Value–Belief–Norm (VBN) model (Stern et al., 1999; Stern, 2000) was developed to describe how values are linked to pro-environmental behaviors. According to the VBN model, environmental values influence general beliefs or worldview about the environment, which influence beliefs about the consequences of environmental change for valued objects as well as one’s perceived ability and responsibility to take action, which in turn influence personal norms about taking action. Thus, the link between values and behavior is primarily indirect. Values may have only a small impact on any given behavioral decision, but their potential range of effect is quite large. The one important factor across different types of behavior was “personal environmental norms” or “the belief that the individual and other social actors have an obligation to alleviate environmental problems” (Stern et al., 1999, p. 91) (Fig. 2.1).

Manfredo and Teel (2008) used a version of the VBN model to test values and attitudes toward wildlife. Consistent with the model, they found that values affected attitudes, which in turn predicted behavior (see Chapter 8).

Conclusion

As we have seen, most people worldwide value nature and support environmental protection, although their understanding of what nature is may be flawed and the bases for valuing it vary. Many also consider it to have moral significance. And the large majority recognizes the existence of threats to the environment, although many are misinformed about the specific nature of these threats or actions that can be taken to ameliorate them. Because of the ways in which specific groups filter their perceptions of threat through existing worldviews, cognitive heuristics, and emotional biases, it will take more than scientific information to redress this problem. As Freudenberg and Pastor (1992) point out, research suggests that there is often little or no difference in information between supporters and opponents of a technology. In order to understand the basis for the ways in which people think and care about nature, we need to take into account the social contexts and discourses within which information is received, interpreted, and constructed.

The link between attitudes or other cognitive constructs and behavior is typically weak or indirect. The way people think about the natural environment is important in understanding general tendencies, but it is not necessarily the key influence on any specific behavior affecting the environment. In Chapter 9 we will discuss some of the other factors that affect environmentally-relevant behavior and that may be amenable to influence.

Moral psychology and the environment

- Background in ethical concepts
- A virtue ethics of the environment
- The Deontic tradition and psychological research
- Contextual differences in moral duties
- Consequentialism, emotion, and socialization
- Psychological dynamics of moral functioning
- Pragmatist ethics
- Conclusion

One of the real mistakes in the conservation movement in the last few years is the tendency to see nature simply as natural resources: use it or lose it. Yet conservation without moral values cannot sustain itself. Unless we reach people through beauty, ethics, spiritual or religious values or whatever, we're not going to keep our wilderness areas.

George Schaller, field biologist (2007)

Morality is a pervasive aspect of human life and a significant element of both attitudes and behavior toward the natural environment. The importance of the moral and ethical dimensions of our relationship to nature may be illuminated by examining another social issue, that of civil rights. The continuing and haltingly successful struggle for civil rights in the USA is a collective story: of wrongs recognized and righted, of moral leaders' courage and sacrifice, and of dreams carried across races, classes, and generations. This struggle has developed social identities and aspirations that are nationally significant. It is bolstered against detractors and failures by ideals that are often upheld and repeated, and by the sense of being part of a shared social project that outlasts the current participants. There are many lessons in this story for environmental action.

Many actors in the civil rights movement were and are ordinary local citizens who are directly affected; today, some of those efforts include the struggle for environmental justice. Others were insulated by their white ethnicity from direct impacts, but still recognized the powerful injury racial discrimination presents to our national well-being. In the case of the environment, every human alive has some stake in its condition, but those with the greatest stake are future human generations and other species.

Thus action requires people who may not feel a direct effect of environmental change to nonetheless become morally aroused and activated. Such people feel a personal responsibility that reaches beyond self-interest to the expression of deep moral values. Interest is keen today to define the environment as a moral issue. In *An Inconvenient Truth* (2006), for example, former Senator, Vice President and Presidential contender Al Gore Jr. explicitly calls climate change a moral issue and leverages this to summon citizens everywhere to join together in response. As we saw in Chapter 2, many people feel that environmental issues have a moral component. This chapter will consider the meaning and psychological implications of such a perspective.

Background in ethical concepts

Ethics and morality are terms with complex and overlapping use. “Ethics” often refers to a more philosophical approach, whereas morality has more “real life” flavor, whether behavioral, psychological, or religious in emphasis. Both terms are concerned with ideas of right and wrong; with good and bad actions, outcomes, and/or intentions. What makes something a matter of morals or ethics is that it is evaluated by proscriptive or prescriptive norms. Something proscribed is forbidden or not permitted, whereas something proscribed is a matter of duty or obligation. In addition some actions are considered supererogatory, or discretionary: these are good actions that are considered “beyond the call of duty.” Thus, out of the wide set of possible behaviors, many of which are morally “neutral,” morality endows some with special significance. Another criterion of ethics is that these judgments – proscriptive, obligatory, or discretionary – are justified by appeal to human welfare, justice, or other moral values. Many ethical theories further hold that for something to be moral, it must be generalizable, applicable in principle across human groups, and not rooted in power, convention, or mere personal preference.

The different traditions of ethical thought include virtue ethics; deontological or duty-centered conceptions; utilitarian or consequentialist approaches; and pragmatism. Each offers unique perspectives and potentials regarding environmental ethics and each entails somewhat different psychological considerations. Because some philosophical position necessarily undergirds the psychological study of morality, much of the following will be organized according to these traditions. However, from a psychological point of view, the different approaches may not be so separate.

A virtue ethics of the environment

Virtue ethics is perhaps the oldest school of Western ethical reflection, with clear roots in Aristotle’s thinking. As the name implies, what is right is defined by character traits that are considered virtuous. For example, honesty is a virtue: an honest person possesses honesty as a trait, and acts honestly regardless of consequences, or conflicting principles. Certain individuals might be identified as environmental heroes (Aldo Leopold) and villains (James Watt, President Reagan’s first Secretary of the Interior)

because of behaviors that reveal underlying moral traits. Cafaro (2001) shows that virtue ethics answers the questions, what is the *best* life for a person and a society, and how can we achieve it?

Virtue, inferred from behaviors, requires a shared understanding or justification of its intrinsic value. Classically, no justification would be necessary because virtues were deeply and consensually validated by the community. Virtue ethics appears to depend strongly on inculcation of such traits during childhood, as recognized by the popular movement in the USA for a “character education” approach to moral development (Likona, 1991). One weakness of virtue ethics, therefore, is that it may be undermined when a person grows up in a pluralistic “community” that does not agree on many virtues (MacIntyre, 1984). Lacking widespread consensus, virtues appear discretionary. Former US Vice President Dick Cheney exploited this weakness when he once said that energy conservation is virtuous and thus not required.

The environmental ethicist Frasz (1993) considered another weakness of virtue ethics in prescribing behavior. Its focus on the behavior rather than on the consequences seems inflexible: it cannot give specific guidance in making decisions, nor guarantee that a person possessing a particular virtue will avoid bad choices. But there is a corresponding strength: rather than approaching environmental problems and behavioral choices in isolation, and by reference to cumbersome rule systems that miss large-scale patterns, virtue ethics is aimed at long-term patterns of action and the traits that produce them. This approach to ethics is strong because virtues are internalized and pervasively affect action not only because of socialization but also because of a person’s own deliberate self-cultivation. A successfully developed virtue becomes habitual. Virtue ethics thus does not place an unrealistic premium on conscious choices, but would also value the small or large lifestyle changes that environmentally virtuous people routinize.

Environmental ethicists differ on how to specify virtues. Sandler (2005) suggests four different approaches, each with implications for environmental action. One approach extends traditional interpersonal virtues such as compassion and gratitude to apply to our interactions with nature. Here we might ask what would motivate people to make such extensions, such as their views of nature or relationships with non-human creatures, or their perception of their own identity as a part of nature (cf. Chapter 4). A second approach relates virtues to the benefits to those possessing them. Cafaro, for example, says that virtue ethicists have always “provided strong self-interested reasons for treating others with respect – reasons based on a person’s concern for his own virtue and flourishing” (Cafaro, 2001, p. 5). This suggests that the drive for virtue could be considered a core human motive, like the desire for control or connectedness; it would logically contribute to a person’s self-esteem. Other philosophers ground virtues in concepts of human excellence and flourishing. For example, just as a person who undermines social relationships would fail to be a virtuous human being, so too would one who habitually threatened ecological relationships. Research into how our social and ecological embeddedness binds us to nature could inform this type of virtue. Fourthly, virtues can be specified inductively by study of the traits of outstanding individuals. Cafaro (2001) uses the exemplars of Henry David Thoreau, Aldo Leopold, and Rachel Carson to illustrate the positive psychology of living respectfully and

Table 3.1 Possible environmental virtues.

Name of virtue	Description or examples
Prudence	Avoidance of irreversible harm; precautionary principle
Frugality	Materialist values tempered by ecological world view and environmental impacts
Non-violence	Avoiding and opposing harm to humans and other living things
Gratitude, respect, love toward nature	Recognition of our dependence and equal status among living things
Fidelity to nature	Being “true to” nature in activities such as design, management, restoration, “saving all the parts” as the first rule of “intelligent tinkering” (Leopold, 1949)
Humility	Avoidance of arrogance and misanthropy (the devaluing of human interest; Frasz, 1993)

appreciatively with nature. Carfaro argues that Thoreau’s vision of the good life cultivated the virtues of “health, freedom, pleasure, friendship, a rich experience, knowledge (of self, nature, God), self-culture and personal achievement” (2001, p. 6) partly through contact with nature. Similarly, much of Aldo Leopold’s (1949) *A Sand County almanac* illustrates the possibilities for self-development through one’s relationship to nature (Shaw, 1997). In short, virtue ethics may offer a way to see our relations to nature as a route to human flourishing, a theme that runs through the field of conservation psychology and throughout this book. Some specific environmental virtues have been proposed, and Table 3.1 lists several examples.

We will consider one virtue in depth: Hill (1983) chose *humility* as the one key environmental virtue. Pointing out the moral discomfort felt when witnessing the destruction of nature, regardless of the justification, Hill suggested that this discomfort is a response to seeing the lack of certain moral qualities in others. These include aesthetic sensibility, the inclination to “cherish what has enriched one’s life” (Hill, 1983, p. 216), limits on self-importance, and self-acceptance as a finite, mortal, dependent part of nature. Knowledge and a long-term valuing attitude toward nature are important ingredients of the virtue of humility. Throop and Purdom (2002) apply this virtue in their argument that humility, self-restraint, and altruism should inform our thinking about wilderness and restoration. Specifically, humility may guide us towards elevating wildness (not merely naturalness) as a key criterion, and toward pursuing ecocentric rather than only anthropocentric values as the goal of land management.

Whether these or any other environmental virtues are effective hinges on the empirical question of whether they enjoy community consensus. Such consensus could be found either in a broad public, or in more restricted communities that share a set of basic beliefs; we will consider the evidence for each.

As we saw in Chapter 2, Americans express fairly strong environmental values. Do they actually possess the requisite virtues? American society probably discourages

humility by its emphasis on control, individualism, competition, efficiency, change, and materialism (Kohls, 1984; see Schultz & Zelezny 2003, for a consideration of how environmental messages might work *within* such values). But despite a history of viewing nature instrumentally, Americans do view it with some respect, if judged by their valuing of nature (Kempton et al., 1995), and their resolve to employ the precautionary principle (an expression of prudence) when the risks are made clear. The widespread acceptance of recycling as a good thing would suggest that a belief in limits is part of respect for nature. Although more research is clearly needed, it seems plausible that despite great cultural diversity, Americans show some potential for humility and associated virtues regarding nature. In qualitative accounts of wilderness experience, people often make reference to the idea that they feel “small,” suggesting that nature may have the ability to foster humility (see Chapter 8).

This is clearer if the concept of humility is examined more closely. Psychologist Wong (2003) distinguishes it from self-abasement, and grounds it in a sense of meaning or significance, which are distinct from selfish ambition or pride. Humility is linked to fulfillment because it leads us to realistic self-assessment and away from striving for a false sense of esteem. Humility is also held as a cardinal virtue in Christianity, Buddhism and Taoism (Wong, 2003). Thus organized religious communities with shared spiritual world views might be one type of more restricted community context where humility and other environmental virtues might take stronger root.

Conceptions of stewardship ethics that are grounded in the Bible may be one example where environmental virtues are taking hold in the USA. Although the term stewardship is used in many different ways, it has a traditional meaning in Christian traditions where stewardship is a virtue applicable to one’s relation to the church. Extending this existing virtue to creation is becoming more widespread. The Biodiversity Project found that 56% of their representative sample of 1500 US adults said that “Nature is God’s creation and humans should respect God’s work” and that this was an “extremely important” reason for them “personally to care about protecting the environment,” second only to responsibility to future generations (58%) (Biodiversity Project et al., 2002a). The subjects were also asked to choose the one most important reason, and the results are summarized in Fig. 3.1.

Other evidence of the importance of religious virtue as a force in Americans’ environmental ethics is found in the declarations of the National Religious Partnership for the Environment, such as the Evangelical Environmental Network’s Declaration for the Care of Creation (signed by over 500 church leaders) and other initiatives. Although morality is not co-extensive with religion, if people’s spiritual views become more ecological, environmental moral virtues and duties fall into place almost automatically (Beringer, 2003). From a different angle, working with strongly held, enduring values systems, as the stewardship ethic does, is an important strategy. Virtue ethics builds on existing internalized moral feelings and world views, has the potential to generalize to many of an individual’s behaviors, and contributes to both personal and community senses of responsibility. On the other hand it pays less attention to the outcome than to the character of the actor, and is weak if community norms are absent. Nonetheless, all societies exhibit and extend existing virtues and generate new ones over time.

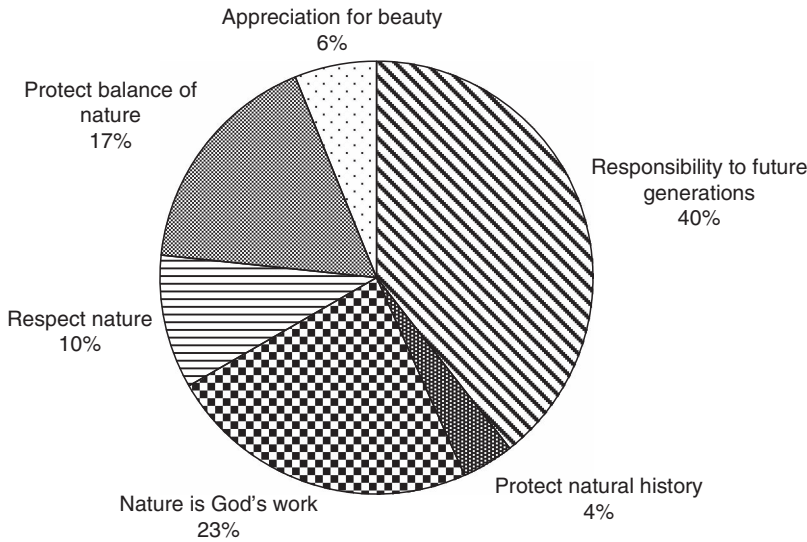


Fig. 3.1 American adults' responses to the question "Which is the most important reason for you personally to care about protecting the environment?" (Based on data from Biodiversity Project et al., 2002b, p. 17.)

Natural systems bind humans in increasing interdependence with each other, a situation that may be favorable to fostering virtues of the environment.

The Deontic tradition and psychological research

In the modern period ethicists have tried to ground morality on universal principles that appeal to reason. One such school of ethics, generally known as "deontological" (referring to duties), emphasizes the role of dispassionate reason following ethical principle. Philosophers in this tradition have sought to develop unitary coherent systems that can resolve confusion, often by reference to a single absolute basic principle. At a risk of over-generalizing, such thinkers would defend a notion of "objectively true" morality. This objectivism is not about factual accuracy, but about rational defensibility or reasonableness.

Deontological thinkers reject subjectivism, according to which one person's "right" can validly be another's "wrong," and hypocrisy or intolerance could be a "moral" position. This reduces morality to an individual preference, when in fact it is fundamentally about coordinating social existence. The ethically objective alternative to subjectivism is not absolutist. It holds, rather, that there are one or more moral principles that should generally guide action, but may be overridden by other moral principles in cases of conflict. Thus, the position provides for a moral life that is socially negotiated. But ethics is not reducible to society or culture. Although cultural groups do vary in their ethics, if ethics in fact depended only on culture, there would be no independent basis

for criticizing the morality of any culture but one's own, including intolerant or unjust cultures. Any extant morality would be as good as any other, and ideal moralities would be less valid than any morality being practiced, even though ideals have long provided essential moral guidance. When one belonged to two or more groups with differing ethics, it would not be possible to resolve conflicting prescriptions for action. Ethical objectivism rejects this relativism as untenable.

The psychological study of morality, including development, has been strongly influenced by the deontic tradition in philosophy. Lawrence Kohlberg, for instance, carefully studied Western ethical philosophy as a preliminary to his developmental psychology research. He concluded that justice is the key ethical virtue, because: (i) it is prescriptive (focusing on "oughts"); (ii) it favors universality because it provides a minimal agreeable value (since the "good" is presumed to be different for different individuals, a concern for objective means of interpersonal adjudication of conflicting goods is seen as a universal good); and (iii) its emphasis on reciprocity and equality make it "the most structural feature of moral judgment" and thus parallel to basic cognitive logical operations that develop during adolescence (Kohlberg et al., 1984a, pp. 305–6). Building on the structural developmental work of Piaget (1929/1975), Kohlberg studied the conceptual structures, networks of ideas, and "mental operations" or kinds of logic children use by asking children to reason aloud about hypothetical dilemmas. In general, psychological research on morality agrees with modernist deontological ethicists that *reasoning* is the key psychological feature of morality (Turiel, 2006) because it can correct the influences of self-interest and emotion to achieve fair judgments.

Structural developmental work on environmental ethical judgment has advanced beyond Kohlberg's theories. Kohlberg had in effect defined a high standard for true morality that very few people attained. But Turiel (1983) showed that the concept of morality can be defined more simply by a person: (i) understanding and employing prescriptivity (an action can be right or wrong); (ii) using justifications based on welfare, rights, and justice; and (iii) generalizing, where the person maintains the action would still be right (or wrong) in another cultural setting, and despite contrary social consensus or authoritative decree. Operationalizing moral concepts accordingly with appropriate hypothetical scenarios and semi-structured follow-up questions, Turiel found that most young children possess the concepts. Turiel argued that Kohlberg's stages were not stages of morality but in fact confounded three social knowledge *domains* that all people distinguish: (i) matters of *morality*, which are governed by considerations listed above (plus a discretionary "beyond the call of duty" kind of morality); (ii) *conventional* matters, governed by what facilitates social life in a group and followed if supported by rules or authorities; and (iii) actions that are appropriately governed only by *personal* preference. The specific contents of what is moral versus convention may vary across social groups and cultures and time, although there appear to be some universal moral contents.

Turiel's social domain framework has shed light on the nature of moral thought in general. For example, research has shown that members of various religious groups distinguish between religious doctrine that is non-moral and alterable by church authorities (and not expected of members of other faiths) and religious doctrines that are moral (like injunctions against killing or stealing). Tellingly, when asked if God's



Fig. 3.2 Ethical prescriptions regarding the environment. (Photo courtesy of Susan Clayton.)

decree could make killing or stealing okay, children, adolescents, and young adults in these studies denied that this would make the acts morally acceptable (Turiel, 2002). This finding epitomizes the basic stance of the moral reasoning literature: that morality is not simply transmitted by doctrine and socialization, but is actively constructed by individuals in their own minds.

As shown in Fig. 3.2, nature does elicit some deontological prescriptions. Continuing the structural developmental tradition, Peter Kahn and colleagues have conducted a series of studies on the development of environmental moral reasoning. These studies, summarized in *The human relationship with nature* (Kahn, 1999), give us the best available look at how anthropocentric and biocentric reasoning develop across different cultures. Kahn found that children from 6 years to young adults almost universally judged polluting a water body to be wrong, provided moral justifications, and generalized their judgments. That is, they placed polluting in the moral domain. In response to this and other questions such as relations to domestic animals, conceptions of what is natural, and ideas about harmony with nature, interviews revealed that about 95% of children's reasoning was anthropocentric (centered on human well-being) and 5% was biocentric (concerned with the intrinsic value of nature). The same general pattern was found for children in a village on the Amazon River, in Manaus (a city on the Amazon), in a predominantly poor and African-American neighborhood in Houston, and among middle class American children.

The structural developmental perspective assumes that children's conceptual structures develop through interaction with their environment, so the low biocentric reasoning of children in the remote village is surprising; children in contact with unspoiled nature might be expected to understand and appreciate the inherent values

of its inhabitants. Kahn and colleagues did find greater biocentric reasoning among adolescent and college-age subjects in a study in Portugal, in response to questions tapping the welfare and importance of wild animals. Kahn has speculated that early in life children experience concerns about harm to both humans and non-humans but these are undifferentiated and unelaborated; children are generally sensitive to harm. Out of this, anthropocentric and biocentric structures branch, the latter focused on the intrinsic value of living beings. Later, a more mature biocentric structure may coalesce that coordinates both the earlier branches. Kahn spells out several ways that children in his study achieved this coordination, for example by finding parallels between the bodies or needs of humans and animals, and later by balancing similarities with differences, although such reasoning was demonstrated by only a modest percentage of subjects. Overall, Kahn concludes, “one of the central findings from my collaborative research [is that] children across diverse cultures engage in remarkably similar environmental moral reasoning” (Kahn, 2003, p. 131).

Other researchers have also focused on biocentric moral development, finding for example that plants may not fare as well as animals when it comes to moral consideration, perhaps because children are less able to generalize from their own experience based on perceived similarities to natural entities. Gebhard et al. (2003) found that German children between the ages of 6 and about 11 years see trees as morally worthy objects by virtue of their being alive. Aliveness and “anthropomorphic” qualities like feeling appear to go together, funding this concern (similar to the reasoning Kahn labeled biocentric), but from ages 12 to 16 what Gebhard and colleagues considered “anthropomorphic” concerns for plants had lost sway. Plants are then more likely to be valued instrumentally. Dunlap (1989) found that moral-developmental theory can be extended to interpret the moral reasoning of 12–18-year-old boys about dilemmas involving animals. Nevers et al. (1997) cite evidence that 6–11-year-old children view animals as capable of suffering, feel solidarity with them, and will defend the “interests” of organisms. Myers (1998/2007) found that young children aged 4–5 years express moral emotional concern about harms to animals they know directly.

Confirming the early potential for biophilic morality, in a recent study one of Kahn’s PhD students, Rachel Severson, asked children what if an earth hypothetically uninhabited by humans were invaded by life-harming aliens? Would it be okay for the aliens to harm plants and animals? She found that 85% of second graders and 90% of fifth graders used biocentric reasoning (Severson & Kahn, 2005). These data affirm others’ findings of biocentrism at earlier ages and suggest the importance of cognitive development in children’s ability to recognize and balance competing moral claims in a way that maintains concern for non-humans.

When there is conflict between humans and nature (particularly wild animals), people may show less concern for nature’s welfare. Kellert (1996) found that non-urban Americans have very low moralistic attitudes toward wolves, suggesting the negative influence of perceived threats from wildlife on morality. When levels of threat to people increase, people express less opposition to stringent solutions such as killing wild animals (e.g. Kaltenborn et al., 2006) (see further discussion in Chapter 8). In two experiments, Kortenkamp and Moore (2001) found that scenarios involving ecological

damage to a “wild” setting drew more non-anthropomorphic reasoning but when the dilemma involved a social conflict, subjects drew on values from social ethics, such as truthfulness. Similarly, Opatow (1994) found that people were less supportive of protective measures for a beetle species if they perceived its land needs as conflicting with those of humans. This suggests that biocentric reasoning may be left out unless it is coordinated with social ethics generally. Indeed, situations where our welfare is pitted against that of another species put biocentric morality to the test, and remind us why the concept of justice is so central to moral reasoning. In general, the integration of positive and negative, and human and non-human in moral thought, or what Kahn (1999) called “integrated biophilia,” illustrates the balancing of different principles and the check on self-interest envisioned by objectivist environmental ethical theory. We need a better understanding of its emergence, especially in diverse cultural settings.

Contextual differences in moral duties

One important divergence from early moral developmental work has been the recognition that people apply distinct moral principles in different social contexts (Shweder et al., 1997). Justice morality (Shweder’s “ethics of autonomy”) is especially suited to the problems of social regulation encountered in relatively impersonal and role-divided Western political, economic, and social institutions. But in both political thought and moral psychology we find a tension between the needs to control social chaos and apply laws equally, and the needs to recognize individual and contextual differences, protect interdependent relationships, and leave room for compassion.

Within a community of shared values and common interests, or in close relationships, people apply a different set of moral considerations. Among psychologists, Gilligan (1982) called this a moral orientation of care; Shweder et al. (1997) identified a similar cross-cultural “ethics of community”; Snarey and Keljo (1991) use the German sociologist Tönnies’ term “Gemeinschaft” (as opposed to “Gesellschaft” or “society”); and Eckensberger and colleagues use “personal” as opposed to “transpersonal” (Breit et al., 2003) to designate this more particularistic ethic. These psychologists describe a form of principled morality with central values including concord or understanding; happiness integrally linked to well-being of the community; valuing of tradition; family and community obligations, roles, and relationships as basic to being; and the unity of all life. The “we” of the community might well encompass dependent humans and non-human others who, although they do not participate directly in the processes of interpersonal coordination that give rise to higher moral judgments, might be represented in discourse as important subjects of moral care. Beringer (1994) found that the “care” dimension is not merely “supererogatory” as suggested by Kohlberg, but is a route by which non-human entities are included in adolescents’ developing moral judgment. In later formulations of the ideal endpoint of moral development, Kohlberg did suggest that justice and care need to be integrated (Kohlberg et al., 1984b, p. 340), and careful studies of reasoning about real-life

dilemmas have confirmed that integration of care and justice leads to superior resolutions (Walker, 1991).

Environmental decision-making may represent a distinctive context for moral reasoning. For example, a traditional way to describe a just or fair distribution of limited resources is to focus on the relationship between inputs and outcomes: those who contribute more – in effort, money, or other merit – receive more. Americans are comfortable distributing material resources, like houses or cars, in this manner. But there is resistance to applying it to environmental costs and benefits. Should the use of national parks be restricted to those who can afford to pay? Should environmental hazards such as pollution be disproportionately inflicted on the poor? Natural resources seem to be viewed as things to which everyone is equally entitled. Research in controlled settings has indicated that appeals to equality make a more compelling argument in distributing environmental resources as compared to some other domains; in particular, equality is a less successful basis for anti-environmental arguments, which tend to focus on individual entitlement (Clayton, 1994, 1996, 2000b).

As suggested earlier, one way of defining the context and thus the relevant ethical standards is by identifying the relevant community. Another justice principle that is highly relevant to environmental issues concerns inclusion: the right to participate in a decision, and the right to be considered as a possible recipient of resources. Americans have gradually expanded the “scope of justice” ever since a declaration that “all men are created equal” was paired with a constitution that denied political voice and freedom to a large proportion of the population (Nash, 1989). Opatow’s (1994) work has shown that inclusion is fundamental to environmental issues. The public might agree that everyone is entitled to share access, but disagree about whether “everyone” includes foreigners, future generations, or non-human animals. Those with a high degree of concern for the environment or a strong environmental identity (see Chapter 4) are more likely to consider the welfare of other species to be relevant in resolving environmental conflicts (Clayton, 1996, 2003, 2008). The way in which moral inclusion and exclusion operate in environmental conflicts is further discussed below.

Standards of justice matter, in general and in discussion of environmental issues. Kals (1996) found that individual perceptions of the justice of proposed environmental policies were the strongest predictors of support, more than the extent to which one would be personally affected by those policies. However, there is more than one way of defining justice and of delimiting the moral sphere. Social consensus about duties regarding welfare, rights, justice, and care will guide the way in which individuals frame conceptions of justice, and this consensus may gradually change in response to a recognition of our interdependence with nature.

The psychological investigation of moral reasoning suggests that moral action is not possible if people cannot recognize when their desires or self-interest, or the selfish actions of others, conflict with duties to or regarding other entities, including nature. Some moral principles may be universally recognized, even if expressed differently across cultures; others must be socially negotiated. Although humans may be just beginning to articulate our duties regarding nature, this approach provides tools, such as a dialogical approach, to help others think carefully and relatively objectively through value conflicts involving nature.

Consequentialism, emotion, and socialization

A very different approach to ethics, consequentialism, is familiar as utilitarianism. Consequentialists generally hold that the rightness of an act is determined not by character or by adherence to an abstract principle, but by its consequences, particularly by the “good” or pleasure it generates overall. Utilitarianism is the foundation for modern economic theory, and thus most environmental economics is concerned with how economic systems can better account for environmental costs and benefits, which have typically gone unrecognized as “externalities.” Some philosophers have extended utilitarian theory to include consequences experienced by nature, most notably animals (e.g. Singer, 1975). Both the theoretical and practical adequacy of these adjustments to theory are hotly debated in economics. Also, psychological research has undercut the plausibility of the “rational actor” model of the person assumed in economic theory who chooses actions based on a reasoned comparison of consequences (Ariely, 2008), suggesting that affect and mental shortcuts play a large role in decisions.

Our main interest here is in the psychological bases of consequentialist ethics, specifically emotions and socialization. Rather than reason philosophically about what is right, the founders of utilitarianism, such as David Hume, Adam Smith, and Jeremy Bentham, began empirically, attempting to describe how people actually make judgments. Their observation that people respond strongly to pleasure and pain formed the basis for their calculus of the greater good: satisfaction, or “utility.” Hume argued that when we experience something that feels good, we judge it to be right, and when we perceive something that feels bad, we judge it to be wrong.

Critical in this process are not just the self-interested emotions, but also the other-oriented ones, particularly what Hume called “sympathy” and we now call empathy. Our ability to share another’s feelings means that when we perceive another who is benefited or harmed, we may experience that person’s emotional response. This is more technically termed “state matching.” If the moral spectator (as well as the recipient of the action) approves of an act, he or she attributes a positive moral virtue to the agent; a negative one if the empathic feeling was unpleasant. Sympathy thus provides the non-selfish part of our moral motivations. This is notably different from the deontological story, because reasons or principles play no role. Indeed, we typically seem to make moral judgments rapidly without conscious calculation, although subsequent thought may either validate or change our moral emotional response. Hume went further, holding that “reason is and ought only to be the slave of the passions, and can never pretend to any other office than to serve and obey them” (Hume, 1739/1978, p. 474). Emotion drives moral behavior; reason comes in afterwards in what we would call “rationalization.”

The emphasis on emotion makes this a very psychological approach to morality. It is also a socialization-based approach. Hume speculated that some moral traits were innate but that others were learned, and that the vices and virtues of a society may change over time as new kinds of events prompting approval or revulsion arise. In our time, several psychologists have developed theories that link empathy (or sympathy, which moves beyond matching the other’s emotional state to wanting to help the other)

to altruistic behavior via the internalization of moral norms (e.g. Mussen & Eisenberg-Berg, 1977; Staub, 1979; Batson, 1991; Hoffman, 2000). Hoffman (2000) has researched the developmental emergence of this process, in particular by studying transgression situations, where parents use a practice called “induction” to point out the victim’s distress and produce empathic guilt. Because the parents do not accuse but simply describe and explain, letting empathy do the rest of the work, the guilt produced is experienced by the child as having an internal origin, and is focused on the deed and its consequences rather than on the self. In contrast, shame focuses on the self rather than the behavior (Tangney et al., 2007), and has thus not been thought to lead to internalization. Careful research by Fung (2006) in Taiwan, however, shows that this is a cultural matter: shame is used productively in Chinese moral socialization practices and also produces internalization (see also Haidt, 2001, for a contemporary Humean perspective that considers culture also).

The underlying capacity for empathy develops in stages from early automatic imitative responses at birth to cognitive empathy based on taking the perspective of the other, imagination, and introspection. Fascinating social-cognitive neurological studies have identified the “mirror neuron” system as a specialized process whereby we automatically represent others’ actions in the same brain areas that we represent our own (for overviews, see Preston & de Waal, 2002; Hastings et al., 2006; Sommerville & Decety, 2006). Whether this system is recruited when observing non-human things (animal, vegetable, or mineral) has not been investigated with magnetic resonance imaging (MRI) and other modern tools, but other lines of evidence suggests that it is. Myers (1998/2007) found that young children experience empathic distress and moral emotional responses upon witnessing or learning about harm to animals.

Concepts derived from this research were applied by Bexell (2005), who tested a conservation education program in Chendu, China, a country with very low levels of humane attitudes, and less than 1/3000th the number of humane organizations per capita as in the USA (Irwin, 2003). Remarkably, when both children and adults were given the chance to observe animals carefully, discuss their cognitive abilities, and learn about caring for them, Bexell found dramatic changes toward moral inclusion of animals (Fig. 3.3). (We discuss Bexell’s program further in Chapter 11.) These results suggest that the basic equipment of empathy is not overridden by cultural norms, but may be available for recruitment to non-culturally-valued entities, particularly animals, given favorable conditions. The potentials of empathy with wild animals are explored in Myers et al. (2009; see also Chapter 8).

The likelihood of an empathic response to another varies with the perceived familiarity and similarity of the other to us, as well as with the salience of the cues about the other’s state, the range of our own past emotional experiences, and the extent to which our knowledge helps us take the perspective of another. Notably, Bexell’s (2005) intervention used all of these variables. Studies have shown higher concern for animals with anthropomorphic traits (Eddy et al., 1993; Knight et al., 2004). Conflicts, resource dependency, or aversive emotional reactions may decrease empathy. Considering how much these characteristics vary across the vast range of natural others and our experiences with them, it is not surprising that many people’s emotional sympathies do not extend very far or very strongly away from the human and the domestic realm.



Fig. 3.3 Empathy grounds moral responsiveness: wildlife conservation education camp, Chendu, China. (Photo courtesy of Sarah Bexell.)

But much more could be done to study how natural objects can be presented to people to increase the chances of empathy, and thus inclusion in the sphere of morality.

The strength of the Humean approach is that emotion does seem to be what drives actual moral behavior. Without emotional drive, one might reach a clear rational conclusion about what to do, for example upon observing someone's plight, but simply not be moved to act. At the same time, caregivers and role models define what situations and objects are worthy of concern by their own actions and by whether they induce guilt or shame in the young person. Clearly, most moral socialization in modern societies concerns actions toward other humans. But the potential for the environmental ethical side is considerable. For example, in the USA and some European countries, humane attitudes have been part of middle class socialization since the 18th century (Grier, 1999). Another important point is that we must pay attention to what moral responses already *are* operating – largely ones that define human–human morality – because these may dominate in situations of conflicts regarding the environment (cf. Kortenkamp & Moore, 2001). At the same time, emotional bonds with nature arise when people are offered the opportunity to develop them, and may be morally powerful also.

Surely emotion and reason work together. On a simple level, shame- or guilt-based parental inductions typically ask the child to reflect on reasons for behavior. Meanwhile, cognition, albeit rapid and sometimes unconscious, is integral to the “primary appraisals” that generate emotions (Lazarus, 1991), and enables conscious perspective-taking. More fundamentally, Hauser (2006) suggested that the classically dichotomized emotion and reason work with a more primary innate moral faculty that automatically analyzes actions according to an unconscious generative grammar of morality analogous to Chomskian universal linguistic grammar. After a judgment is made, both reasoning and emotion might result. This model could explain how the presence of strong

emotions related to hurt (guilt, shame, anger) or disgust can change a person's judgment of an action from the conventional to the moral sphere, whereas acts that are unintentionally harmful or disgusting but done in the course of accomplishing some greater good are perceived as permissible. That people can distinguish such cases and make rapid and precise moral judgments suggests a fine integration of emotion and cognition. When we deliberate morally, cognition about principles may correct morally misguided emotional inclinations.

Psychological dynamics of moral functioning

Dwelling on moral theory and the human capacity for moral behavior has an optimistic feel. It is encouraging to think that we are moral creatures, at least some of the time. Indeed the emotional lift we get from observing virtuous action, termed "moral elevation," is part of moral life (Haidt, 2003). Often, however, behavior falls short of the ideal. Real moral controversies activate not only moral emotions and reasons, but also other psychological responses that may undermine optimal functioning. The complexity of environmental ethical situations may compound this: there are frequently many different values and points of view, multiple perpetrators of small actions with cumulative impact, multiple victims whose moral standing may be in question, a variety of timescales at which the outcomes differ in certainty, severity, and so on.

In the heat of a moral confrontation over the environment, moral judgments entail questions such as whether anthropocentric or biocentric values are at stake, whether the agent is blameworthy, whether the consequences meet some threshold, etc. Additional factors involve identity, emotions, communication, and social disequilibrium or disharmony. The situation is dynamic, transactional, socially and culturally structured, and the outcomes will have consequences for both the situation and the actor. How do we behave in such situations?

As thinkers back to Plato have observed, the motivation to be moral, or to at least present the self *as* moral is extremely high (Haan et al., 1985). To be immoral, and perceived to be so, is to be placed outside the human moral community. This means a loss of dignity, standing, "face," and reciprocity with others. Because our self-perception is so deeply influenced by the messages we get about ourselves from others, it is a high risk to be perceived as having acted immorally. When a moral wrong is committed, this is the social disequilibrium that occurs, and it is a more challenging aspect of morality than the cognitive demands alone (Haan et al., 1985).

The highly arousing situation of moral confrontation may swamp our ability to rationally think through the problem. So our ability to right the moral balance, regardless of our position in the controversy, will depend on what might be called "psychodynamic moral skill" as well as on our judgment (Fig. 3.4). Such skills involve emotional self-regulation, or the ability to modulate our emotional reactions, or to stand back from them by taking 20 minutes or so to let our autonomic system's arousal to settle down. But it also involves more habitual coping versus defensive strategies or skills. Positive coping strategies identified by Norma Haan (1977) include trying to be objective, focusing on ideas and interests rather than persons, logical analysis, tolerance of



Fig. 3.4 Social and cognitive disequilibrium in moral conflict. The late Joan Norman protesting logging of old-growth reserves and inventoried roadless areas in the Siskiyou National Forest, Oregon, 2005. An interview with Norman is available at <http://www.zcommunications.org/zmag/viewArticle/13963>. (Photo © Rolf Skar.)

ambiguity, empathy and perspective-taking, reviewing what happened, concentration, and integration of feelings and ideas. To these Alon and Omer (2006) add consolation and acceptance, alternatives to blaming and demonization. In Haan's research, subjects who used these skills found better resolutions of experimentally induced moral conflicts with friends than did those who used what Haan termed "defensive strategies": self-righteousness, withdrawal and isolation, intellectualization, projection, self-effacement, giving up, denial, and displacement of feeling. All of these allow the person to attempt to keep intact their self-image as a moral person without admitting the possibility they did wrong. When there is a sense of mutual wrongs, but a refusal to reciprocate another's recognition that they have had a role in the problem, the imbalance is exacerbated.

Unfortunately, such negative dynamics are not only a part of acute moments of confrontation, but can become reified in social identities and interactions. Moral disengagement (Bandura, 1990, 1999) and moral exclusion (Opatow, 1990; Opatow & Weiss, 2000) are psychological terms for what philosophers would call a denial of another's

Table 3.2 Attitudes and beliefs associated with moral exclusion.

Derogation	Normalizing violence
Dehumanization	Concealment of harm
Reducing moral standards	Desecration
Blaming the victim	Euphemisms
Self-righteousness	Condescension
Displacing responsibility	Moral engulfment
Transcendent ideologies	De-individuation
Dominionistic values	Glorifying violence

moral standing. As described by various authors (Opatow, 1990; Plous, 1993; Vollum et al., 2004), some of these behaviors and social patterns are listed in Table 3.2. All of these patterns may be concealed through rationalizations, or conceptual structures that legitimate or excuse the moral exclusion of others. Given a history in which nature has been regarded primarily as merely a means to human ends, it is not surprising that nature is often morally excluded. That some countries continue to pass and uphold laws such as the US Endangered Species Act reflects a change in such cultural norms.

Chronic disputes of all kinds typically result in the moral exclusion of each group by the other. This includes environmental disputes such as the example of rangeland conflict described by (Opatow and Brook, 2003; Brook et al., 2003). These psychologists point out that such negative spirals can be reversed by establishing overarching identities focused on common values regarding the resource at stake, while also preserving the original identities. The original identities need to be protected, as they are fundamental to the different parties, and they form the nucleus for reaching out to others in the respective communities. Conflicts are inevitable in complex, specialized, and fragmented societies with divergent interests and identities. Progress toward better conflict resolution may be enhanced by fostering communicative, coping, and analysis skills, and conducting conflicts in ways that reduce or work through defensiveness. These are also important in the next and final perspective on environmental ethics (see also the discussion of conflict in Chapter 10).

Pragmatist ethics

A growing ethical tradition focuses uniquely on approaching the human dynamics and value questions not from a particular moral theoretical point of view, but from a practice- and inquiry-oriented stance. This approach is the American-born school of thought called pragmatism, first formulated by turn of the 20th-century thinkers like Charles Sanders Peirce, William James, Oliver Wendell Holmes Jr., and John Dewey. The early pragmatists proposed an entirely different epistemology for both scientific and ethical questions, one inspired by Darwinism and suited to American democracy. They sought to understand truth as an evolving relationship between the language used in a community and the experience of its members. Language and experience

were seen as active things, and truth was tested in a contest among different ideas put into action and tried and re-tried by a community of people attempting to solve immediate problems.

In environmental affairs one major example of pragmatism is adaptive management, where policies and other actions are taken as experiments and data tracking the results are used to reformulate the policy (Lee, 1993). It entails community engagement with questions of fact as well as of value. The innovative and empirical spirit of this approach can be seen in the writings of philosopher Bryan Norton (1991, 2005). He has strongly criticized standard polarities in environmental ethics such as the historical preservationism of John Muir versus the conservationism of Gifford Pinchot. The contemporary version of this polarity is that between deontological intrinsic value (IV) biocentrists and utilitarian anthropocentric economists (a polarity also seen in the structure of environmental attitudes described in Chapter 2). Norton (1991) suggests that politically desirable solutions will be found where ecologically and economically acceptable options overlap. Both the IV theorists and economists, Norton argues, agree on certain problematic “pre-experiential ontological commitments” (Norton, 2005, p. 190) about value:

- Both assume a dichotomy between “intrinsic” and “instrumental” values, and that intrinsic value is the basis for determining moral standing.
- Both focus on objects rather than on processes.
- Both are both monistic, reducing all values to a first principle or expressing them in a single metric, for example of monetary values in the case of economics.
- Both values are treated as placeless – as Norton puts it, “neither dollars nor ‘intrinsic values’ are contextualized or sensitized to the particularities and idiosyncrasies of local places” (Norton, 2005, p. 183).

When applied as rules for decisions, theories with these deep assumptions exert a leveling or homogenizing influence on behaviors, as Norton shows in examples of national policy and activism.

The alternative formulated by Norton (2005), Fuller (1992), and others (Light & Katz, 1996) is an empirical approach such as that of the pragmatists, which opens value questions, including scientific descriptive questions, to fresh experience, and tries them “by fire” in a community problem-solving context. Such a context will reveal multiple kinds of value, some local and some larger scale, including ones grounded in a sense of place.

Norton has added the terms “transformative values” and “constitutive values” to our vocabulary. The former values are important because of their ability to spark reflection on one’s overall value system (Norton, 1987). Experiences that afford such values are worth psychological study (see Chapter 8 on transformative experiences of wild nature). Constitutive values occur in relation to experiences or places whose characteristics have shaped a person fundamentally. When such values are lost, historical rootedness, community identity, home, and self are diminished.

Psychology can help in discovering values whose existence or prevalence is not addressed by philosophy. This is a kind of detection problem calling for qualitative

research, and an elaboration problem calling for language and theory to support and extend what may have begun as inarticulate feelings. For example, in piloting a study of emotional experiences of zoo visitors observing animals, Myers, Saunders, and Birjulin (2004) discovered many visitors felt a hard to articulate emotion the researchers came to denote as a sense of “special privilege.” Psychological research to identify indicators for different types of values could be of use in decision-making. More generally, Sayre’s (1991) pragmatist approach is to determine: (i) how norms come to be held in a given society; (ii) the practical environmental effects of such norms; and (iii) the relative desirability of alternative norms.

Psychology can also examine this kind of learning-through-discussion with the aim of understanding and improving it. Pragmatic ethicist Anthony Weston (2007) draws from psychology in describing such techniques as reframing and lateral thinking as ways to create “room to move” in even the most vexing ethical problems. Alternatively, the emphasis in *social learning* is precisely on the level of collective process, product, and identity (Wals, 2007). Such inquiry has increased greatly in recent years, partly in response to the idea of “deliberative democracy” (e.g. Fishkin, 1991; Dryzek, 2000). Public participation in collaborative decision-making has been studied in terms of the nature of processes such as successful dialog, conflict reduction, and the importance of participants having substantive knowledge (Tuler & Webler, 2006). The connection to environmental morality lies in a deepening commitment to democratic values through exercising them. Such values are essential in increasing society’s ability to work through sometimes polarized value and world view differences to solve common problems. Samuelson, Peterson, and Putnam (2003) report a case study of collaborative learning in which members of different interest groups came together to discuss the restoration of a local watershed. Although they began with very different perspectives on the “right” course of action – differences rooted in their identities as farmers, residents, or resource managers – through discussion they were able to recognize shared values and develop a shared identity. They did not reach total consensus, but their sense of themselves as a collective enabled them to listen to each other and compromise rather than rigidly adhering to their initial positions.

The ability to hear, reflect upon, choose among, and act coherently upon others’ and one’s own values constitutes “value rationality” or “practical wisdom.” It is central to success in solving complex real-world problems, and involves a high degree of context specificity. Accordingly, pragmatic ethics is a form of situational ethics. Psychology is important here in grounding our understanding of problem-solving (Brewer & Stern, 2005). Despite the emphasis on explicit models and procedures in problem-solving instruction and theory, proficient and expert problem-solvers in complex fields of practice do not rely on models and rules; even advanced learners find that rules must be interpreted in order to fit a given context. Further, phenomenological analysis of the experience of experts shows that masterful performers respond to immediate context without reference to any theory or procedure, as elaborated in the work of Dreyfus and Dreyfus (1988). Recent experimental studies on the “deliberation without attention” hypothesis show that even ordinary consumers make complex purchase decisions (but not simple ones) better when they do not attentively deliberate on them (Dijksterhuis et al., 2006).

Problem-solving requires reading the context and defining the problem in ways that offer solutions. What does this mean when applied to the values at stake in complex, contested issues? How can people's value rationality be increased? We need to understand more about how people deal with values in context. As Norton (2005, p. 397) argues,

the identification, articulation, and measurement of . . . values must be undertaken . . . within a broad-based, participatory, iterative process, a process that must be begun, and pursued continually, within a larger adaptive management process in each particular place where community members resolve to live sustainably, according to a definition they have actively chosen.

Narrative psychology generates context-sensitive “thick” descriptions that may encourage understanding of others' viewpoints and help correct oversimplifications in the “normative” models often used by formal decision-makers. Flyvbjerg (2001) argues that case study methods that address the dynamics of power, knowledge, context, identity, and collective action show the most promise to advance practical wisdom.

Like the Humean approach, pragmatism is viewed with suspicion by modernist ethicists who fear that it may legitimize relativism. Pragmatists respond that the majority in a society may be wrong, but the attempt to coerce people to comply with some ecologically determined dictate is neither proper nor effective. Instead, the best recourse is to generate and convincingly communicate data about reality and the consequences of choices, effectively widening the experiences of everyone (Norton, 2005). Pragmatism relies on psychology to measure and describe the values, change, and learning that occur.

Conclusion

We began by invoking one of the defining moral achievements and challenges of the American experience: society's confrontations over slavery and civil rights. It is often suggested that to meet current conservation and sustainability challenges, an equivalent moral purpose must drive not only America but all societies. From our vantage point now, we can see there is not one vision of what this might mean, but several. One is based on the ideas of character and virtue grounded in community world view, perhaps of a spiritual sort. Another centers on the idea that concepts related to ethical principles and knowledge underlying sound judgments are the core of morality, tempering self-interest and other personal biases. A third approach looks most closely at the psychology of emotions such as empathy, guilt, and shame; it focuses on socialization as what truly underlies moral identity and action, and thus must be understood and recruited. From these considerations, it is clear that to a great extent satisfying our environmental moral concerns depends on our ability simply to work together despite a huge variety of values, world views, and circumstances. In this light our attention shifts from individual morality to our collective ability to recognize, reflect upon, and reasonably address the value questions we face. From this perspective, what is most needed is an understanding of the social processes that enable us to work together on such deeply rooted questions.

Environment and identity

- The concept of identity
- Identity development
- Developing an affiliation with nature
- Environmental identity
- Measuring environmental identity
- Place identity
- Animals and identity
- Environmental social identity
- Identity and behavior
- Putting identity to work
- Conclusion

The love people have for nature is strong. As we described in Chapter 2, national surveys consistently reflect a high value for nature and its protection that is not based on instrumental concerns. For example, according to Gallup polls, 69% of Americans in 2007 worried about the extinction of plant and animal species; 57% opposed opening the Arctic National Wildlife Refuge for oil and gas exploration; and over the past 10–15 years a majority of the public has agreed that protection of the environment should take precedence over economic growth (Gallup, 2007; see also Kempton et al., 1995). Although it is true that this value does not always translate into environmentally-protective behavior, it is nonetheless worth considering this love, and its implications. Why do people care about nature? What gives it its emotional and moral resonance? Part of the answer lies in the deep personal significance that people find in the natural environment. (We consider other answers in Chapter 5.) Interactions with the natural environment shape the ways in which people define themselves, as individuals, as members of society, and as humans. Researchers interested in human development and identity have begun to examine the importance of nature in developing and experiencing a fully actualized sense of self.

The concept of identity

There is a substantial literature within psychology on identity: what it is, where it comes from, and what difference it makes. Identities are frameworks for organizing information

about a person. They can be personal attributes; they can involve social roles and relationships; or they can place people into social categories. We have multiple identities, whose salience may vary across time and across situations. One of psychology's earliest and most influential writers, William James, described a tripartite categorization between the material, social, and personal aspects of the "objective" self, or "the sum total of all a person can call his" (James, 1892/1961, p. 44). His definition of the material self included what was tangible: home, body, possessions. Although James did not specifically talk about nature as part of the material self, he clearly recognized that a sense of self comes from things outside the person as well as those inside.

Identities are experienced both internally and externally: we have a self-concept or sense of ourselves, but we are also defined by others. The identities that come from within may not be the same as those imposed from without, but both of them are important and both have the potential to affect behavior. The environment in which we exist helps to shape the way we perceive ourselves as well as the ways we are perceived.

An identity can be considered both as effect and as cause. As compilations of beliefs about the self, identities are outcomes of our experiences and of the kind of aspects James described, constantly evolving over time in response to new experiences. Identities also affect the way we respond to the world, both cognitively and emotionally. Identity can serve as a focusing mechanism: if something is self-relevant, it gets greater attention, as demonstrated in shorter response times and better recall (Markus et al., 1982; Kihlstrom et al., 1988). In addition, connections to identity are a strong motivator: if something is part of my self-definition, I will be invested in protecting it, as well as in presenting it in the best possible light. The desire to have a coherent and positive identity leads people to value opportunities for connectedness, efficacy, and autonomy (Ryan & Deci, 2000).

This chapter reviews research on the ways in which the environment, and particularly experiences with nature, affect identity development among both children and adults. We will also examine different ways of thinking about, and measuring, an environmental identity. Finally, we discuss environmental identities in practice: how they affect behavior and how they are nurtured within a social context. The impact of identity on behavior is worth considering as we ponder how to encourage care for nature. But the impact of environment on identity development also merits our attention as a reminder of *why* it is important to protect our natural environment.

Identity development

The physical environment is influential as a child develops a sense of self. Because places convey expectations for behavior and vary in their compatibility with a person's behavioral goals, familiarity with an environment will enhance the child's sense of control. Childhood memories of places evince strong emotions, in particular feelings of privacy, control, and security (Korpela, 2002). Psychoanalytically-oriented theorists consider the environment as one possible object for affection and attachment. Just as a good parent can provide a secure base that gives a child the freedom to explore, so too a stable and comforting location – such as a bedroom or a treehouse – can provide a

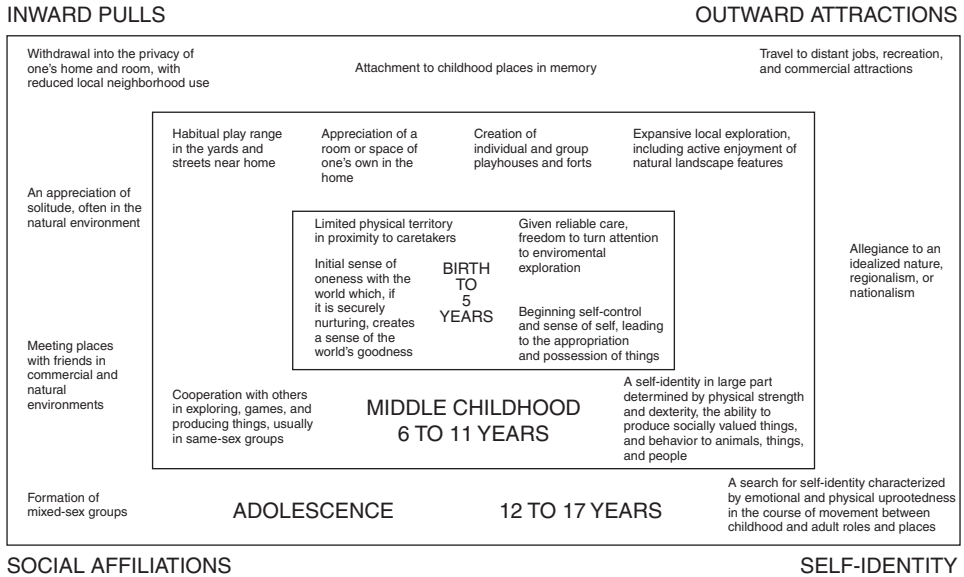


Fig. 4.1 Sources of developing place attachments in early and middle childhood and adolescence. (From Chawla, 1992, by permission of Springer Science and Business Media.)

home base that allows a child to roam his or her surroundings with confidence (cf. Chawla, 1992). Conversely, instability in the environment, either through frequent moves or through some environmental disruption, may have a lasting impact on a child's identity.

Research suggests that children's identities are rooted in and enriched by relationships to natural places and to other living things. Some of the evidence for the importance of the natural environment to childhood identity development comes from research looking at children's favorite places. The geographies of childhood – the physical boundaries in which a child is allowed to venture alone or with friends – were studied earliest by Roger Hart (1979) in the USA and Robin Moore (1986a) in the UK. These researchers mapped children's behavior and went with them to favorite and other places to learn their significance. In Fig. 4.1, Louise Chawla summarizes such findings as an expanding pattern of positive place attachments in normal development.

A variety of motivations across development encourages a balance between familiar places and the draw of the unknown. Both novel and familiar environments support identity development, providing conventional settings where social roles may be enacted, and unprogrammed spaces that offer autonomy. Contributions to identity formation vary at any moment and as the child matures.

Pre-schoolers depend on parents or caregivers to take them into natural settings. In middle childhood, nature can provide a particularly good site for unsupervised experimentation as children learn to manipulate objects in their environment. Damming creeks, building forts out of branches, and making mud pies are activities unconstrained

by rules and instruction manuals that allow children to explore not only the physical properties of objects but also their own abilities and creativity. Friendships spur exploration, and exploration intensifies friendships (Moore, 1986a). Through middle childhood there is an outward trend, but adolescents seem to value nature less than other age groups, probably because the formation of extrafamilial social ties becomes more important and the social environment is paramount (Kaplan & Kaplan, 2002). As mixed-sex groups form, adolescent youth seek privacy in their homes, and by venturing to more distant locations.

Adult autobiographies provide further evidence of the importance of nature for children. Memories of childhood show disproportionate attention to outdoor environments, given the amount of time children actually spend outdoors. Louise Chawla (1986) evaluated 38 randomly-selected contemporary autobiographies for memories about childhood places and identified four types of place attachment. (Methodological issues about using memories as data are discussed in Chawla, 1986, 1992, 1994, 1998b.) The most common was simple affection for a place. Two more types include idealization of the environment and ambivalence toward the environment – the latter based on identification with a place accompanied by recognition of its flaws or socially stigmatized status. An adolescent may find personal resonance in the social connotations of a place: nature as wild, untamed, and dangerous; sublime and awe-inspiring; or, alternatively, contaminated and repulsive. Chawla also described transcendent memories where a place was remembered as a “living presence in itself, exciting all five senses and inspiring exuberance, calm or awe” (Chawla, 1992, p. 74). These patterns suggest that nature can contribute to identity through what it represents and the emotions it evokes.

Environmental identity may also develop from a sense of connection to other species. Myers (1998/2007; Myers & Russell, 2003) has examined the ways in which interactions with non-human animals affect the development of identity for both children and adults. His research began with the recognition that the identity does not develop on its own, but through interaction with and feedback from others. Myers’s (1998/2007) observations of pre-school children with animals, as well as their reported experiences, talk about, and pretend play as animals revealed that children can flexibly employ their developing social abilities in interaction with a range of species. Myers argues that this process is not primarily projective, anthropomorphic, nor determined by culture, but arises as facilities of mind such as mirroring, empathy, and perspective-taking encounter variations on the theme of animacy. Considering the self which James termed the “subjective” sense of self (the ongoing actor we call “I”), the child thus directly forms a sense of self-in-relation to the available mixed-species community. Children expressed concern and distress when harm occurred to an animal they knew, suggesting such an extended sense of identity.

Taking this idea further, Myers and Russell (2003) showed that adults with intimate knowledge of wild animals (in this case, wild black bears) may flexibly employ a similar suite of social skills in understanding them and shaping their identities in relationship to them. Zoo visitors, too, appear to use encounters with zoo animals to reflect upon their own identities as humans (Clayton et al., 2008). Even plants can help children to think about what it means to be human. Qualitative research by Gebhard and colleagues

(2003) illuminated the extensive anthropomorphism evident in children's reasoning about trees, and the ways in which this anthropomorphism informs their beliefs about appropriate human behavior toward nature.

Developing an affiliation with nature

Research shows that people who strongly identify with the natural environment as adults typically had special relationships with nature as children (Chawla, 1998a; Degenhardt, 2002; Zavestoski, 2003; Wells & Lekies, 2006). These relationships could encompass a special outdoors place, or a personal experience of environmental loss or degradation. Based on interviews with environmentalists about the source of their motivation to protect the environment, Chawla reported that "most people described childhood as the foundation of their relationship with the environment" (1999, p. 17). The two most common themes were positive experiences with nature in childhood and family members who were role models for respecting the natural environment. Negative experiences of environmental loss were also mentioned by 39% of the sample. Experience of environmental destruction as an adult can also make an environmental identity stronger or more salient (e.g. Kempton & Holland, 2003), as shown by the way local leaders arise in response to environmental justice issues (e.g. Schwab, 1994).

Perhaps as important as personal experience with nature is the association of particular environments with particular social bonds. Writers often make too strict a distinction between the social and the non-social environment; in fact, connections to nature are usually encouraged or even initiated through connections to other people. In her analysis of environmental memories in autobiographies, Chawla (1986) found that the most common form of place attachment in children was affection due to an association with loved family members or other important social figures. Kals et al. (1999) report that emotional affinity toward nature is associated with having spent time in nature with significant others as a child. Other writers have also observed that environmentalists tend to describe parents who encouraged a love of nature. Such parents may help children to overcome common negative reactions to nature or the discomforts being outdoors may bring (Bixler & Floyd, 1997). Bixler and colleagues (2002) have argued persuasively that socialization, including learning basic skills, is an essential component in children having positive relations to nature.

A sense of connection to nature can also be nurtured among adults, though research on this topic is relatively new. Deep ecologists argue that it develops from personal experiences or involvement with natural entities (e.g. Diehm, 2007). Seed et al. (1988) developed a workshop called the "Council of All Beings" in which participants are encouraged to role play the part of some non-human component of the natural world. Bragg (1996) examined the impact of a "Council of All Beings" workshop on self-concept immediately after the workshop and 6 months later. Using the Twenty Statements Test, a standard measure of self-concept, she found that a sense of ecological self was greater after the workshop. However, unless it was supported by a social network, the ecological self tended to drop back to baseline levels as time passed. It seems likely that a person needs to have a wider range of experiences – extending over

time and/or throughout different aspects of one's life – in order to maintain a strong environmental identity. We need to consider the broader societal structures (such as jobs, activities, and affiliations) and discourses that support or inhibit such identity (Zavestoski, 2003).

Environmental identity

The personal relevance of nature can be closely examined among adults, who are more likely than children to reflect on, and articulate, the way nature can affect their sense of self. The following comments, taken from a Sierra Club survey that asked people why they care about the environment (available at <http://www.sierraclub.org/sierra/200107/inspire.asp>), show how the experience of an environmental identity can blur the boundary between self and nature:

- My motivations for protecting the wild earth are fairly selfish.
- [There is a] sense of myself that I feel when I'm outdoors and nowhere else.
- . . . Something deep within all of us connects us to the natural world. . . . I feel so connected to that circle [when I am out in the wilderness] . . . [nature] is connected to the inner core of our being.

These quotes resonate with the ideas of *deep ecology*, which has proposed the concept of an ecological self: a sense of identity that transcends the individual and encompasses one's position as part of a living ecosystem (Naess, 1989; Mathews, 1991; Bragg, 1996). The philosopher Naess (1989) stressed "identification" not in the sense of indistinguishability with life processes, but in terms of our capacity to see something of the other in ourselves, to experience a sense of similarity or shared community. Other writers have used terms such as "ecological identity" (Thomashow, 1995), "environmental identity" (Weigert, 1997; Clayton & Opatow, 2003), and "environmental self" or "sense of self-in-place" (Cantrill, 1998; Cantrill & Senecah, 2001). Although these terms have slightly different connotations, they all stem from the idea that the natural environment and our relationship to it can be an important part of our self-concept. Experiences with nature may be not just enjoyable, but self-relevant and potentially transformative, affecting the way we define ourselves to ourselves as well as to others.

Borden (1986) took a similarly broad tack, suggesting that for people with a high degree of ecological concern, ecology had acted as a metaphor for the sometimes sudden emergence of a new identity. In a series of studies (summarized in Borden, 1985, 1986), Borden and colleagues found many correlates of high versus low environmental concern that related to self-definition or personal goals, such as a shift from "quality of life" to "quality of experience" and responsibility, suggesting pervasive changes in organizations of mind and behavior. Borden speculated that the environmental crisis is experienced as a crisis within the self, in which many people's sense of both the self and world are pervasively toned by cultural themes such as competition, materialism, and domination. Qualitative life-history research may show how ecological insight, often sparked by some experience in nature, can precipitate a profound and rapid dialectical

reorganization of meanings about the self, making self and world part of one whole, with simultaneous deep re-evaluations of responsibility and action (Borden, 1985).

Why would nature affect our sense of self? Natural, as opposed to built, environments have certain characteristics. They appear to provide an optimal level of sensory stimulation: not so low as to be boring, not so heavy as to be overwhelming. This provides the space for self-reflection. People talk about natural environments as ones in which they are able to think about their own goals and priorities (Herzog et al., 1997; cf. the discussion of Norton's "transformative values" in Chapter 3). Long et al. (2003) found that people described nature as an important location for solitude experiences that promoted inner peace and self-discovery, and that it was rarely associated with such negative aspects of solitude as loneliness and anonymity. Korpela and colleagues, similarly, have found that natural settings are favored in part because they are used to reflect on personal matters and to regulate one's emotional state and self-concept (Korpela, 1989, 1992; Korpela et al., 2001).

The natural environment also may fulfill basic identity needs (Ryan & Deci, 2000). Most people feel a desire for *autonomy*, the sense that they are acting in response to their own wishes rather than merely as a tool for others. A natural environment can enhance autonomy because social regulations, oversight, and consequences are fewer. In interviews with New York City residents, Manzo (2005) found that natural environments were preferred locations when people were seeking privacy. Clayton asked students on an overnight field trip to a nature center if they felt differently about themselves out in nature and found themes related to self-direction:

- Nature . . . makes me feel like myself.
- I feel much more independent out here.
- Here in the forest I feel more like a person. I can be myself, no one here will judge me.

Another fundamental motivation related to identity is the desire for *connection* or *belongingness*. Transcendent experiences – experiences in which a person feels a sense of transcending the limits of the self, being part of a larger collective, or participating in a deeper meaning – seem to be fostered by natural environments (Williams & Harvey, 2001; see Chapter 8). Nature provides the opportunity to think about one's role as part of a larger whole, an interdependent ecosystem. As Naess stated, "One experiences oneself to be a genuine part of all life" (1989, p. 174). Similarly, Stephan Kellert refers to "the confidence which flows from the conviction that a basic kinship binds all living creatures and the natural world together" (1996, p. 24). Chawla (1986) found that transcendence, defined as a profound sense of connection to nature, was a common theme in environmental memories. In research with 17–18-year-old Finnish adolescents, Korpela (1989, 1992) found that children associated a sense of belongingness with their favorite places. Clayton's students also reflected a sense of connection:

- I feel like I belong.
- I no longer think of myself so much as an "I" or an individual [but as] part of everything else.

- I feel like I get to see . . . life, a community all interrelated and tied together. I am part of that.

A third motive is the *desire to feel competent*. A perception of self-efficacy may result from the opportunity for self-sufficiency and the use of physical skills. Natural environments remind us how it feels to move around under our own steam and be responsible for satisfying our own needs (for shade, for a good view, perhaps for food and/or water (see Scherl, 1989; Fredrickson & Anderson, 1999).

As experiences with the natural environment and environmental problems transform identity, a strong environmental identity should affect the way people respond to environmental information and problems. Bragg (1996) delineates the possible consequences of an ecological self: greater sensitivity to information about the environment, feelings of connectedness or sympathy to environmental entities, and activities that promote the connection. The experience of an ecological self implies a perception of similarity, relatedness, or analogy between oneself and other elements of the ecosystem, to the extent that a person might react to threats to nature as if they were threats to themselves.

Measuring environmental identity

The burgeoning recognition of the importance of environment to identity has led to the development of a number of ways to assess the connection. Clayton (2003) developed the 24-item Environmental Identity (EID) Scale to measure the extent to which people consider nature to form an important part of their self-concept. Items on the scale reflect the extent to which a person tends to interact with elements of the natural world, whether a person rates nature as important, whether the person thinks of him- or herself as part of nature, and whether the natural environment evokes positive emotions (Table 4.1). The scale has high internal reliability and relates in expected ways to environmental behaviors, attitudes, and group membership.

Aron et al. (1992) developed a non-verbal measure to assess the degree to which people consider themselves to be separate from, or interdependent with, a significant other. This measure is simply a series of pictures of two circles, one of which represents the self and one of which represents the other, which start side by side, then overlap to an increasing extent until they are entirely the same. Wesley Schultz (2001) adapted this measure by having one of the circles defined as “nature” so that the measure assessed the extent to which nature was included in the self-concept. Although very different in

Table 4.1 Items from the Environmental Identity Scale.

-
- I feel that I have a lot in common with other species
 - I like to garden
 - Being a part of the ecosystem is an important part of who I am
 - I feel that I have roots to a particular geographical location that had a significant impact on my development
-

format, Schultz's "Inclusion of Nature in the Self" (INS) scale is highly correlated with Clayton's EID scale, suggesting that both tap into a valid, underlying construct.

Schultz et al. (2004) were particularly interested in the possibility that connections to nature might be implicit, operating outside conscious awareness. They developed a modification of the Implicit Association Test, which measures the extent to which concepts are closely connected in a person's network of cognitive associations. This test requires people to rapidly and accurately decide if two paired terms belong together or not. For example does an item like "flower" belong with "me or nature" or "other or built"? After rounds of this sort, the game requires choices of whether "flower" (and other terms) belong with "me or built" or "other or nature." A person with a mental network connecting the self to nature will answer the former items more rapidly because there is a cognitive connection between "me or nature," whereas it will take more deliberation to discern that "flower" belongs with "other or nature" because "other" and "nature" are not cognitively associated. The time delay to answer questions correctly provides an estimate of the degree of how closely the person implicitly identifies with nature or with the built environment that is relatively unbiased by self-presentational concerns. (The game can be found at <http://www.conservationpsychology.org/game/>.) Schultz et al.'s research shows acceptable reliability of the measure, and a relationship to environmental attitudes. This measure could be particularly useful when socially desirable responses are a problem.

Several other measures have been developed to assess the connections people perceive between themselves and the natural world. Elisabeth Kals and colleagues (1999) developed a scale measuring emotional affinity with nature, which includes questions about "feelings of oneness with nature" as well as about love for nature and feelings of freedom and security associated with nature. Steve Mayer and Cynthia Frantz (2004) focused on emotional responses to nature with their "Connectedness to Nature" scale and found correlations with environmentalist identity and worldviews among college and community samples. All of these measures have demonstrated some reliability and validity for research purposes. Together, they suggest that the construct of environmental identity or sense of connectedness with nature is psychologically meaningful. Choice of a measure should depend on the specific research question being addressed as well as characteristics of the sample.

Place identity

The construct of environmental identity considers the personal significance of natural environments in general. A more specific way in which the environment affects identity is captured in the concept of *place identity*. This term was first used by Proshansky, in 1978, where it signified "those dimensions of self that define the individual's personal identity in relation to the physical environment by means of a complex pattern of conscious and unconscious ideas, beliefs, preferences, feelings, values, goals, and behavioral tendencies and skills relevant to this environment" (p. 155). Place identity refers to the component of identity that is associated with feelings about a particular locale. It has typically been discussed with regard to a place of residence, although it may be a place

Box 4.1 Place identity on college campuses

One-hundred and ninety randomly-sampled students at the College of Wooster rated the college landscape as highly important, not only for the attractiveness and benefits it provides, but for the way in which it reflects their identity (Fig. 4.2):

It promotes an image for the college and the atmosphere we represent.

At the university of Missouri, campus officials have taken advantage of the school mascot (Truman the tiger) to promote tiger conservation for their “Tigers for tigers” campaign (<http://tigers.missouri.edu>). Student identities, already linked to their alma mater, are extended to encompass the tiger and elicit support for education, research, and protection of this endangered species.

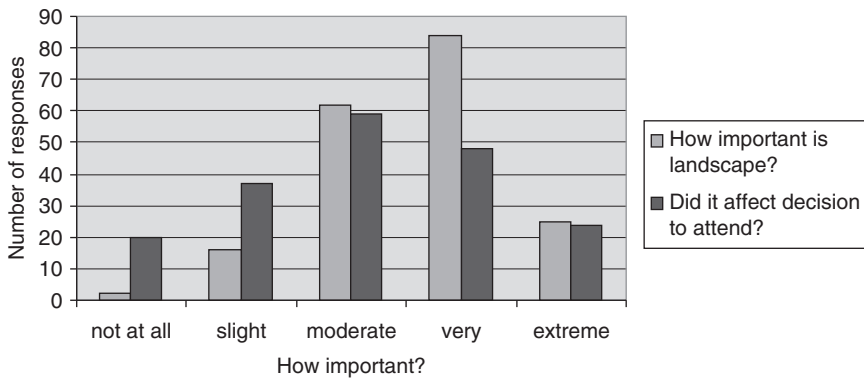


Fig. 4.2 Ratings of college landscape importance. (Unpublished data from S. Clayton.)

where one has lived in the past rather than currently. Identity comes from the way in which memories are intertwined with that place, so that it takes on emotional connotations and symbolic significance. Places can also be used to assert control, through a defined territory, or to express a particular self-image. Twigger-Ross and Uzzell (1996) describe the significance of a physical environment to identity in the ways it can contribute to a person’s sense of distinctiveness, self-esteem, self-efficacy, and continuity. Box 4.1 describes some manifestations of place identity on college campuses.

To examine the attributes of a place that contribute to identity, Gustafson (2001) interviewed 14 Swedish residents about places that were important to them. He found three broad (and overlapping) themes that provided the basis for meaning: self, others, and environment. In other words, in addition to its utilitarian functions, a place can have personal meanings based on: emotional significance and activities; the way in which it socially defines a person (what type of person tends to be found in this place?); and its natural features and climate, which may also have symbolic resonance.

Place identity is sometimes considered to be synonymous with *place attachment* (e.g. Stedman, 2002). Others describe place identity as a subcomponent of place

attachment, which also includes *place dependence* – the extent to which one is dependent on a particular place to fulfill one’s goals (Kyle et al., 2004). Certainly identity and attachment are related. As Russell Belk stated, “To be attached to certain of our surroundings is to make them a part of our extended self” (1992, p. 38). On the other hand, identity and dependence may be less closely tied: Moore and Graefe (1994) defined place dependence as valuing a particular setting for a certain activity.

Attachment and identity do have slightly different connotations. Attachment seems to emphasize the emotional ties between a person and a place, whereas identity can also include the definitional aspects whereby a person feels that alterations in an environment reflect well, or poorly, on him or her. Thus, one may care about, and take care of, an environment because one is attached to it, but one may also defend that environment because of a sense that it represents the self. Further, people may try to present an environment in the most positive way possible just as they would present themselves in a positive way, minimizing the flaws and even changing the environment to make it more attractive (as people do with their home landscapes). Bonaiuto et al. (1996) found that residents living near British beaches who had a strong local or national identity perceived their own beaches as less polluted.

Place identity has different implications than a more general environmental identity. Attachment may play a larger role in place identity, in part based on the contribution of a specific place to a sense of well-being or security. Place identity also may be more affected by specific environmental threats, or the threat that one might have to leave that place. Cantrill and Senecah (2001) emphasize the relationship between a person’s ideas about the self and their concepts about a place, as denoted in their term “self-in-place,” which they argue may link how people appraise communications and how they behave regarding significant places. Ryan (2005) asked users of a particular urban park how they might feel about a negative change in that park, and found that they mentioned a feeling of personal loss, along with possible changes in their use of the park and environmental activism. Some of the response to a personal experience of environmental contamination, for example from an accidental release of toxic chemicals in the area or the destruction of a feature of the local natural environment, may result from a sense of personal involvement, what has been referred to as a “spoiled identity” (Twigger-Ross et al., 2003).

Place identity is important to consider when implementing policies of sustainable development. Conservationists have sometimes been guilty of disregarding or even displacing the people indigenous to a place, with the aim of protecting the non-human residents. In addition to being ethically questionable, such policies may backfire if they lead to resistance by the local populace and/or activism by concerned outsiders. There are both positive and negative environmental consequences of a strong place identity: people may care more about threats to that place, but also be willing to simply reassign those threats to another location.

Are there psychopathologies of place? Hummon (1992) describes four kinds of sense of place, two of which are negative – alienation and placelessness – suggesting that some grounding in place or places is important to human identity. On a societal level, Relph (1976) argued that historical lack of attention to the experience of place in modern society has led to the loss of significant places, and the flourishing of meaningless

places, embodied in kitsch, mass communication, mass culture, big business, and spaces dominated by a central authority. Since subjective meaning is integral to the concept of place, these place pathologies may be linked to cognitive deficits in the orientation of contemporary individuals to their surroundings.

Animals and identity

Like places, animals can be tied to people's identities. Biology creates a domain where humans and animals are on a continuum; modern evolutionary views affirm our shared membership in the animal kingdom (Ingold, 1988). Even for those whose worldviews reject this connection between humans and animals, there are other ways in which people playfully or seriously identify with animals.

Earlier we discussed how animals may be important to a developing sense of self-in-relation. If such a sense of self is grounded in interaction with the other (as social psychologists hold is the case between humans), then we might expect it to occur as well in some instances of human–animal interactions. Such systems have been studied between humans and dogs (Millot & Filiatre, 1986; Mitchell, 1987; Shapiro, 1989; Sanders, 1999), cats (Alger & Alger, 1997), horses (Hearne, 1986; Brandt, 2004), primates (Strum, 1987; Goodall, 1990), bears (Burghardt, 1992; Myers & Russell, 2003), and elephants (Hart, 1994), among other settings. Irvine (2004) employed social interactionist theory to argue that interactions between humans and domestic dogs, for example in decisions to adopt a shelter animal, affect not only the person's but also the dog's core sense of self. The experience of the death of a pet may be much like bereavement due to the loss of a close human, suggesting the depth of attachment (Stewart, 1999). While only suggestive, these examples support the idea that the human core self incorporates relationships to non-human animals. Many people's closeness to their pets reflects strong identification, as discussed in Chapter 6.

Animals may also enter identity symbolically or metaphorically, expressing something about the self. This has been a classic observation in anthropology. The Nuer of Africa practice *teknonymy*, giving a name to an adult that reflects his or her offspring's name. Tellingly, a person may also be named after his or her favorite cattle, the center of the Nuer cultural system (Evans-Pritchard, 1940). *Totemism* entails the identification of social groups with animals (Lévi-Strauss, 1966). Anthropologists Crocker (1985) and Levy-Bruhl (1966) report that the Amazonian Bororo, for example, claim to *be* red macaws – or, at least, to be metaphorically like them. This process may reflect our propensity for creating essentialist categories of unchanging entities, as described by the folk biological system discussed in Chapter 5, with social distinctions being mapped metaphorically onto animal categories (Hirschfeld & Gelman, 1994).

More broadly, many aboriginal hunter-gatherer cultures were (and some still are) *animistic*, assuming an original and persisting spiritual continuity between human and non-human worlds. For example, Kalahari Bushman hunters report the bodily sensation of being “in” a prey animal's body, suggesting a “profound level of identification with animals” (Serpell, 2000, p. 115). In Hindu reincarnation beliefs, some part of the soul persists after death and is reborn in another form, sometimes animal.

Western civilization has not outgrown such beliefs around the blurred human–animal boundary, as seen in the availability of animal telepathy experts and “channelers” that facilitate owners’ communication with deceased pets, and other less esoteric forms of humanizing our pets, such as pet pedicures, cemeteries, and special “Yappy hour” gatherings (Greenebaum, 2004). The opposing tendency to animalize the self is evident too, for example in the lively subculture of “furries” that has sprung up facilitated by the internet. Devotees take on animal identities for real or virtual gatherings, share art and costumes depicting human–animal hybrids, and animalize their language of the body and (for some) their erotic life.

Animals affect people’s social identities indirectly when a person identifies with an animal-related activity or career. Here the person may be seen by others as intimately involved with animals, for example as a hunter, bird watcher, whaler, or animal rights crusader. The effects of such identities can be pervasive and subtle, as in the way that a person walking a dog is perceived and treated as a more socially “open” person (Robins et al., 1991). Social stereotypes develop around various animal identities too, such as that there are shared perceptions of the characteristics associated with a “cat” person, a “dog” person, or a “horsey” type. See Chapter 6 on whether such stereotypes are supported by psychological research.

Environmental social identity

Environmental identity develops not only through interactions with the natural environment but also, crucially, with the social environment. Although some nature experiences are solitary, people also experience nature in more social settings, as members of social groups and in their communities. Our experiences of nature in the company of others affect our understandings of what nature signifies as well as the way we conceptualize our own relationship with nature. Environmental identity can be examined with varying degrees of attention to social factors (Clayton & Opatow, 2003). A relationship with the natural world may affect, for example, how a person affiliates or conflicts with others, or how other people define and perceive a person. Engaging in environmentally sustainable behaviors connotes a particular social identity; not doing so suggests a different one.

The social implications of place identity are clear when the place with which one identifies is essentially a social construct. This becomes apparent when considering the value of a community place identity – for example, a sense of place and involvement with a residential neighborhood. Kim and Kaplan (2004) describe this kind of identity as resulting from the distinctiveness, continuity, compatibility, significance, and cohesiveness of a place. They found a number of factors associated with community identity in two Maryland neighborhoods; notably, the local natural features had a strong impact. Other researchers have examined the effect of specific features of the natural environment in urban communities. Community gardens (Stuart, 2005; von Hassell, 2005) and tree-planting programs (Austin & Kaplan, 2003; Sommer, 2003) affect the way people think about their residential communities, and about their own identities as members of those communities.



Fig. 4.3 Cultures may encourage defining oneself through consumption rather than environmentalism. (Photo courtesy of Susan Clayton.)

Sadalla and Krull (1995) make the important point that a relationship with nature may serve to define a person in the eyes of others. They asked college students to describe the probable personality of someone who engaged in a variety of behaviors that would reduce the use of environmental resources: drying clothes on a clothesline, taking public transportation, and recycling. Although there were some differences depending on the behavior being examined, conservation behaviors were uniformly seen to indicate lower status. Sadalla and Krull explain their finding by noting that consumption indicates higher status in most, if not all, cultures (Fig. 4.3). It is important to note, however, that many cultures or religions evaluate a person's worth according to non-material values and virtues. When considering why someone may or may not engage in environmentally protective behavior, we need to think about the image that the person may be trying to project and the social identity that may be attributed to the person based on his or her actions by his or her social reference groups. In some cases it may be more effective to portray a behavior as motivated by concerns other than environmental ones, if environmentalism is not part of the identity that a person wants to convey.

Recognizing that the social implications of an identity as an environmentalist are not always positive, Stephen Zavestoski (2003) interviewed participants in a deep ecology workshop about strategies for maintaining their identities in the face of an unsupportive society. He found that many of them had chosen careers that were compatible with their environmental interests, and that they worked hard to maintain social networks that encouraged them to express the environmentalist side of their identity. Nevertheless, many of them felt that their sense of connection with nature was not supported or respected in their day-to-day activities outside of the workshop.

Zavestoski concluded that an environmental identity (he uses the term “ecological identity”) must be nurtured and affirmed through social interactions in order to be fully developed and expressed.

Identity and behavior

Does identity matter? Research suggests that it does. One of the best-supported theories explaining the relationship between attitudes and behavior is the Theory of Planned Behavior (TPB), described in Chapter 2 (Ajzen, 1991). This theory proposes that behavior follows loosely from behavioral intentions, which in turn are a function of attitudes, subjective norms, and perceived control over the behavior. Recent studies have found that adding identity to the model increases its ability to explain behavior. For example, self-identity accounted for a significant proportion of variance in recycling behavior among a sample of Australian householders, above and beyond the more traditional TPB components (Terry et al., 1999). People who agreed that “recycling is an important part of who I am” and disagreed that “I’m not the sort of person who recycles” were more likely to say that they intended to recycle; intention, in turn, was a significant predictor of whether or not they did recycle. Mannetti et al. (2004) found a similar effect of identity on recycling behavior in an Italian sample. Inclusion of identity in Stern et al.’s (1999) Value–Belief–Norm (VBN) model (also described in Chapter 2) would be important for explaining committed environmentalism, perhaps by creating a personal environmental norm. Clayton (2003) found that environmental identity mediated the relationship between values and behavior.

Identity can affect responses to environmental problems by affecting attention. Typically, we monitor the condition of our own houses, yards, and children more closely than we monitor those belonging to others. Kyle et al. (2004) found that Appalachian Trail users who had a higher level of identification with that place were more likely to perceive negative environmental conditions on the trail. In surveys of adolescents working in Colorado on natural-resource-based work programs (e.g. trail maintenance), Vaske and Kobrin (2001) found that identification with the place was associated with a more general measure of environmentally responsible behavior. The personal connection to a place that represented the natural environment may have led the teens to be more aware of environmental issues.

Identity can also elicit motives related to self-presentation. As described in Chapter 1, the Toyota Prius (a hybrid car) seems to have enjoyed more sales success than other hybrids precisely because it serves as a public statement of the owner’s environmental credentials. Self-presentational motives do not always have a positive impact on the environment; the “not in my back yard” phenomenon refers to people’s tendency to protect their own localities from environmental threats by displacing them to other sites. But a personal connection to a place can be tapped for environmental benefit. Residents of two different regions of Italy showed more support for the establishment of a local protected (natural) area when they had a strong regional identity (Carrus et al., 2005). This support was not explained by environmental attitudes. In other words, identification with the locale was enough to encourage people to support the development

of a local natural area even in the absence of a general support for environmental protection. Presumably this was due to residents' desire to enhance the positive distinctiveness of a region with which they identified. Even more simply, identification with a place can lead one to feel personally implicated in threats to its well-being. Stedman (2002) surveyed property owners in Wisconsin and found that place identity predicted intention to protect the local area from overdevelopment.

Finally, a social identity as a resident of a place may be associated with taking personal responsibility for group-level outcomes, and thus predict behavior as well as attitudes: several studies assessing social identity (in an English neighborhood, a Barcelona suburb, and the Olympic Village in Barcelona) found that it was positively correlated with a propensity toward sustainable behavior (such as considering ecological factors while shopping and taking responsibility for neighborhood upkeep; Pol et al., 2002; Uzzell, Pol, & Badenas, 2002; Valera & Guàrdia, 2002).

Looking at a more general conception of environmental identity, Kals et al. (1999) found that emotional affinity toward nature predicted environmentally protective behavior and behavioral intentions in a German sample. Notably, experiences in nature had little direct effect on behavior. Instead, experiences in nature predicted emotional affinity, which in turn predicted behavior. Clayton (2003, 2008) has found that her measure of environmental identity predicted environmentally protective behavior among American college students, as well as position on an environmental conflict and support for providing rights to animals and to the environment in general. Winter and Chavez (2008) surveyed visitors to wilderness areas in California and found that respondents with higher scores on Clayton's EID measure were more supportive of managing natural resources for environmental protection (e.g. for protection of plants and improved air quality as well as the need for more areas for that purpose).

Because it involves an experience of being part of something greater than oneself, an environmental identity may encourage a sense of oneself as a member of a collective. Such a collective identity tends to encourage more group-oriented behavior (e.g. Kramer & Brewer, 1984; DeCremer & Van Vugt, 1999). This is important for environmental issues because of the need for people to take personal responsibility for what are essentially group-level outcomes (cf. Chapter 2). Due to the spatially and temporally diffuse nature of environmental threats, most people will not experience significant individual loss from those threats. However, if one is interested in the welfare of the group or even the ecosystem, the need for environmental action is clear.

The way identity entails a position with respect to different social groups has implications for how one responds to certain social and political issues, including environmental issues. Kempton and Holland (2003) found that the choice of terms people used to describe themselves was related to the actions they reported performing: among a sample of members of environmental groups, those who described themselves as "environmentalists" were more likely to report taking civic environmental actions. Among ranchers and farmers, environmental activists may be seen as the enemy, setting in motion a range of psychological techniques to enhance the image of their own group and delegitimize the concerns of the outgroup (cf. Chapter 3). Opatow and Brook (2003) describe the way in which group identity as a rancher, combined with a history of mistrust between ranchers and environmentalists, encouraged ranchers to

oppose protection for a threatened species even while promoting their own role as environmental stewards. Attempts to resolve environmental conflict need to acknowledge the impact of competition between social groups as well as between humans and non-human nature. Opatow and Brook suggest that existing identities be respected but brought together under wider umbrella identities that emphasize characteristics and values shared by all the parties to the conflict. In the case of rangeland conflicts, they point to examples such as the Quivera Coalition (<http://www.quiviracoalition.org>), the Diablo Trust (<http://www.diablotrust.org/>), and the Malpai Borderlands Group (<http://www.malpaiborderlandsgroup.org>).

Identities do not always have the same impact on behavior. Identities vary in socio-cultural significance, and individuals vary in the extent to which they think about their identities. Self-awareness has been shown to increase consistency between one's personal values and behavior (Gibbons, 1983). With regard to environmental identity, Amara Brook (2003) found that the relationship between identity and behavior depended on the extent to which the identity was salient.

Putting identity to work

If identity is important to understanding the ways in which people treat their natural environments, how can we usefully apply this understanding? Identities can be used to nurture conservation behavior when the natural objects being protected are tied to the self. Broadly, this is one of the aims of place-based environmental education (see Chapter 11). Several programs already in existence successfully utilize identity by creating or strengthening a sense of personal connection to a particular piece of the natural environment. Programs that allow people to “adopt” a part of nature are a clear example. What does adopting mean but to make something a part of oneself or one's sphere of personal concern? For different organizations, individuals are encouraged to adopt a particular endangered animal, or an acre of a rainforest, so that they will take a personal interest in its well-being and feel a personal responsibility to provide financial contributions. Earthjustice (the legal defense arm of the Sierra Club) even instituted a program in 2007 that encourages people to “adopt the sky” and petition the US Environmental Protection Agency for stricter air pollution controls (www.adoptthesky.org). A more mundane example is the (primarily) US program to “adopt a highway.” This program allows groups to take responsibility for keeping a certain stretch of highway clean and in return posts the group's name on a highway sign. From its origins in Texas in 1984, the adopt-a-highway program now claims to encompass 90,000 groups in 49 different states. The program works because the clean stretch of highway is considered to project a positive image of the group's identity, and the group is motivated to maintain that stretch of highway in order to protect its public image.

One highly successful campaign asks people to take responsibility not just for a particular stretch of highway, but for the entire state. The “Don't mess with Texas” campaign, sponsored by the Texas Department of Transportation, draws on the regional identity of Texas residents by using icons (e.g. cowboys) that are symbolic of Texas and language like “we Texans” and “Texans are full of state pride” to evoke a collective



Fig. 4.4 Volunteer and visitors at the Bronx Zoo. (Photo by Larsen Maher, © WCS, reprinted by permission.)

identity. In addition to having received multiple marketing awards, the campaign claims to be responsible for a 52% reduction in roadside litter since 1995 (www.dontmesswithtexas.org). This program also resonates with environmental virtue ethics, as discussed in Chapter 3, because it extends an existing community consensus about a virtue to include treatment of nature.

John Fraser of the Wildlife Conservation Society and the Bronx Zoo studied volunteers at the Bronx and Central Park Zoos to examine the process by which environmental identities were nurtured and facilitated in a social context. He found that people reported becoming volunteers because of their love for animals, but that the identity of zoo volunteer was intimately connected to a general environmental identity, based on its implications for attitudes towards animals, nature, and conservation initiatives. Just as important, volunteers reported a highly positive sense of group identity associated with being a zoo volunteer, as well as describing strong in-group bonds with their fellow volunteers and a high degree of pride and value in the identity in their interview responses (Fraser et al., 2008a). Finally, responses from the zoo volunteers suggested that the experience of volunteering both strengthened and focused their environmental identities. They reported having become active promoters of zoos and of conservation, and more committed to conservation than they were before joining the zoo. Particularly important was the ability as zoo volunteers to inculcate their values in the public (Fig. 4.4).

Fraser et al. (2008a) stress that the power of collective identities, both existing and new, has often been overlooked in research on environmental identity. Conservation-minded professionals should think not just about how to tap into existing place- and

environment-based identities, but how to nurture an environmental identity in order to encourage more attention to and care for the natural environment. Identities develop through experience, and experiences are interpreted in part through social understandings. Giving people the opportunity to be involved together in conservation activities allows them to label themselves as conservationists and to be so labeled by others. As long as those labels are socially valued, they are likely to result in increased activity on behalf of nature.

Conclusion

In sum, the physical – particularly the natural – environment is important to identity development in both children and adults. People feel a strong attachment to the natural environment, evinced through connections to specific places, animals, and nature in general, in part because experience with natural environments and with animals helps in self-understanding and self-regulation. Childhood experiences in nature, particularly with family members or other significant adults, may promote a value for the natural environment and commitment to protecting it that become a defining part of the mature adult's identity. However, adult experiences are also significant in strengthening, focusing, and supporting an environmental identity. A strong sense of connection to the environment has been shown to predict relevant behavior, both in regard to a specific locale and more generally.

Exposure to the natural environment occurs within a social context, both literally and figuratively. A “big picture” approach to encouraging conservation behavior suggests that we recognize, as a society, the importance of providing places that nurture environmental identity in both children and adults. It is important to protect biological diversity through preserving “wild” nature, but it may be equally important to promote environmental concern by allowing people to connect with nature in urban settings through public parks, green school grounds, arboretums, community gardens, and zoos. Far more research needs to be done to understand how such areas can be designed to encourage connection to nature.

Theoretical foundations for the human response to nature

- The heritage of environmental psychology
- Ecological perception and psychology
- Evolutionary psychology and biological thinking
- Biophilia
- Combining nature and nurture
 - Conceptual development
 - Gene–culture evolution
 - Attention Restoration Theory
- Experiential approaches
 - Ecopsychology
 - Depth psychology
- Conclusion

What explains the human experience of, and response to, the natural world? This chapter will review some core theoretical perspectives. Our emphasis will be on underlying processes more than applications as we explore the sometimes competing and sometimes complementary approaches psychology offers. Beginning with environmental psychology, we examine perspectives that make different fundamental assumptions about the extent to which the human experience of nature is biologically determined or a product of experience, and entail different emphases on human perception, cognition and emotion, mental functioning, or mental health. Our discussion will refer to data but will focus on the different abstract systems, illustrating how conservation psychology is connected to the history of psychology, and to foundational questions still very much in play in the discipline. Whereas other parts of this book have a more applied focus and attempt to show the utility of a wide range of theories in psychology to conservation challenges, this chapter will delve into the ways the human relationship to nature relates to new research on basic questions in psychology, making some critical comparisons along the way.

The heritage of environmental psychology

Environmental psychology traces its roots to figures like Kurt Lewin (1890–1947) and his students, including Roger Barker (1903–1990). Although the natural environment

was not their principal focus, these founders challenged the psychological research tradition of studying the person in isolation from the environment. Notably, people are part of each other's environments, and Lewin is regarded as the founder of social psychology. Not coincidentally, Lewin also stressed the importance of action research, where researchers investigate a social problem in order to develop effective models for intervention. Although his principal focus was on prejudice and discrimination, the model works equally well for conservation. Environmental psychology examines the person–environment *system* itself, as a holistic unit of analysis. While the external environment can in principle be described in physical terms, and while the person's subjective environment can be recognized as a selective, motivated mental construction, it is the interaction of these two that produces behavior. One immediate implication is that all environments, including natural ones, need to be included in psychological study.

The interaction of person and environment has been elaborated in numerous ways, notably in Barker's (1968) concept of behavior settings. Barker and others observed that settings can have strong influences on behavior, producing patterns or regularities as people interact with each other in a physical environment; these are as simple as how lines form near entrances and exits, or more complex settings involving social rules and roles. He argued strongly that psychologists should not study isolated psychological variables via highly controlled laboratory manipulations. Such studies lack "ecological validity" or the ability to generalize findings to settings where everyday behavior occurs. To understand the importance of nature to people, for example, requires direct observations of what they do and experience while in natural settings, such as Moore and Cosco's (2007) studies of parks and play areas as behavior settings. Ecological validity is also relevant in applications of psychology, for example in the attempt to design environments that support sustainable behavior and connection to nature (Kellert et al., 2008).

Ecological perception and psychology

The most fundamental way in which people respond to their environment is by perceiving its properties. The ecological perspective on perception is oriented around a basic principle: sensation and perception are holistic and relational, and an approach to perception that separates the person from the environment is inadequate. The usual "information processing" view of perception posits an external world of physical energies that must be transduced to brain association centers, where it gives rise to an internal mental representation that bears no inherent relation to the original stimulus. As Hume and the early empiricists concluded, the mental world of mind is fundamentally different from the world outside. This does not mean that "nature" is just a product of our mental constructions. Such problems result from our ways of conceptualizing.

One alternate account is termed *ecological* because of its holistic rather than atomistic focus. With roots in early 20th century psychologist William James' work (e.g. 1890/1981), and especially in the more recent work of James J. Gibson (1979) and Eleanor Gibson (1969, 1997), ecological psychology is essentially a theory of perception, but its implications are so fundamental that the wider term may be justified. The Gibsons' fundamental departure from the problematic duality of subject and object

was to consider organism and physical environment not as entities to be analyzed by separate principles, but as mutually and reciprocally defined. In developing the notion of “perceptual systems” they were moving towards an analysis that accounts for the structure and functions of perception.

The Gibsons addressed one of the confusions generated by standard accounts of perception: how the material can become mental. Aristotle’s notion of “formal” causation, a synonym for which might be “structural” or “organizational,” helps resolve the problem of perception. (“Causation” must be broadened here to mean “how something is the case,” rather than our more limited notion of a chain reaction of material events, or what Aristotle called “efficient” cause.) Indeed, Aristotle used formal cause in his work on psychology, *De anima* (1973): he described the “soul” or “psyche” of different “grades” of living things according to types of organization and function. Plants shared with animals, for instance, the capacity of self-nutrition, where the organism transforms the matter (but not the form) of something else (food) into its own “form” or pattern. Perception, setting animals apart, is the capacity to take on the form of an object without incorporating its matter. In Aristotle’s analogy, the shape of a seal is left in wax onto which the seal was pressed; the form but not the substance is preserved. Building on this tradition, the Gibsons developed the notion of direct perception as a variant of philosophical realism, or the assumption that we experience things as they actually exist rather than the usual assumption that external objects can be known only by inference, and the mind can directly “know” only its own contents (Gibson, 1979; Gibson, 1997).

This theory was not a simple realism, but one that recognized the relational nature of perception. For example, James Gibson demonstrated “optical flow” or the “visual streaming or outflow of environmental features” when moving forward, or the converging flow when looking to the rear (Heft, 2001, p. 119). Similarly relational is our perception of the self. We see parts of our own bodies (which we also perceive by proprioception, balance, and cutaneous sensation) in context; visual information changes in correspondence to motion of our head. Neisser (1988) termed the self known within its perceptual context as the “ecological self.” Gibson also examined the familiar phenomena of “occluding edges,” when one object is gradually juxtaposed or revealed by another in relation to their movements. What is interesting is that the occluded object is experienced as persisting even when not in view. Studies of infants show that they learn by age 3 months to smoothly track continued trajectories of viewed objects with various paths (occluded, varied acceleration, etc.), showing that they recognize the continuity of the object behind the discrete images (von Hofsten, 1997). Together with perceptual inference based on generalized rules, perception, von Hofsten argues, “is designed to provide detailed predictions of what is imminently going to happen” (1997, p. 180).

Gibson argued that perception is not just a series of momentary snapshots of a sliver-thin “now” but encompasses a bit of the past as well as the future. The usual account of perception must rely strongly on inference and memory, as the mechanisms that make just-preceding stimuli available to create a full mental representation of the environment. By contrast, the ecological approach says the environment serves as its own representation, and perceptual awareness allows one to inspect an environment further.

It distinguishes memory and imagination as forms of awareness that are non-perceptual: memory is denied the chance of further inspection, and imagination can be elaborated through sheer cognition. Thus perceptual awareness is functionally different from other cognitive phenomena (Heft, 2001). In perception we are able to actively and directly “pick up” information by exploring our environment. Note that the information is there to be picked up, illustrating Gibson’s brand of “ecological realist” direct perception:

The act of picking up information . . . is a continuous act, an activity that is ceaseless and unbroken. The sea of energy in which we live flows and changes without sharp breaks . . . Discrete percepts, like discrete ideas, are as mythical as the Jack of Spades.

Gibson, 1979, p. 240, quoted in Heft, 2001, p. 177

Rather than considering perception in passive/information-processing (stimulus–receptor) terms, the ecological approach emphasizes how perception derives from action in the world. To consider vision as an example, recent theory and findings look at vision in terms of active organism–environment adaptation. Our visual system evolved for a world of movement and motion. Action gives rise to perception, rather than the commonsense view of perception making action possible. In a classic experiment, young kittens were placed in one of two treatment conditions when their eyes opened a few days after birth. Some kittens were harnessed to little wagons that they hauled around as they navigated their environment. Other kittens were paired with the wagon-pullers, by being secured in the wagons. Thus both kittens had a similar visual input, but very different motor experiences. After a few days, all the kittens were allowed to roam. Those who had been pulling the wagons navigated easily, but the ones which had had passive experiences bumped into things – they had not learned to “see” (described in Humphrey, 1984).

O’Regan and Noë (2001) have argued against a (traditional) mental-representational view of vision:

Instead of assuming that vision consists in the creation of an internal representation of the outside world whose activation somehow generates visual experience, we propose to treat vision as an *exploratory activity*. . . The central idea of our new approach is that *vision is a mode of exploration of the world that is mediated by knowledge of what we call sensorimotor contingencies*.

O’Regan & Noë, 2001, p. 940, emphasis in original

Their theory is that the sensory-derived nerve signals, once in the brain, are not themselves “labeled” as (for example) “visual” or “auditory,” although we might expect they are from gross neural anatomy. Rather, the brain sorts out the senses by detecting what kinds of actions or changes in other inputs the signals are contingent upon. As a simple example, visual percepts are affected by eye blinks, but auditory stimuli are not. The brain integrates the inputs that share contingencies into coherent visual experience, coherent hearing, etc. Contingencies are determined by the attributes of objects – consider the differences between touching versus seeing a three-dimensional object: blind people whose sight has been restored report being dumbfounded at the sight of

small photographs of faces, since they are not able initially to integrate their experience of the contingencies of touching a face with the experience of seeing such a small representation of one (O'Regan & Noë, 2001). The implication of this line of research is that we directly perceive the world, *which thus serves as its own continuous "representation" as we act*. What is learned, for example by the kittens mentioned above, is how the rules of the different senses interact with the world's features. Our experience of the world is not exclusively mediated through our cognitive processes, but is fundamentally integrated with objective physical reality.

A key ecological concept is the idea of *affordances* (Gibson, 1982). An affordance is "the perceived functional significance of an object, event, or place for an individual," or a "perceptual meaning" (Heft, 2001, p. 123). It is not simply a physical stimulus, for it is defined in relation to the animal's perception: it is a perceivable property of the world whose patterns of occurrence in space and time are matched by the animal's life activities (Reed, 1996). At the same time, affordances are "properties of environmental features existing independently of a perceiver" (Heft, 2001, p. 124), and in principle describable by natural science. Affordances are linked to ecological theory by way of the concept of the niche, or set of environmental features needed by a particular organism (Reed, 1996). An example would be a tree cavity of the right placement, opening, size, and so forth to serve as a nest for a particular bird species. The close adaptation of the organism to its niche (subjectively apprehended as an affordance) is a product of evolution.

Affordances can further be clarified by contrast with conceptual meanings. The perceptual meanings of an object (affordances) relate directly to all the purposes it can serve, depending on the user's intentions, but also constrained by the possible uses to which it can be put. Heft (2001) uses the example of how a book might be used as paper weight, doorstop, etc., but not other things. Conceptual meanings, on the other hand, can be separated from everyday realities, giving them powers to create as well as to distort, for example in ideologies.

The effect of ecological psychology is to "displace" significant portions of what has been assumed to take place in the organism or "in the head" out into the environment. Any given thing, object, or layout can in principle be specified by a set of invariants that are available to be picked up (Rader, 1997). Objects lie within nested sets of affordances; within such a structure, their meaning is directly perceived. Examples might be an animal choosing an individual prey out of a herd found in its typical hunting grounds, or a person selecting an appropriate tool within the context of a particular fabrication project. In both cases, nested information is directly picked up from the environment.

Some cultural artifacts embody cognitive processes directly (D'Andrade, 1984), and thus play a role in explaining the acquisition of "mental skills" previously unpossessed: the individual acquires skills required to use the embodied information (Heft, 2001, p. 357). Indeed, in psychology, we may have mistaken some of these very tools as metaphors for more basic mental processes. This may be the case with maps, and the related concept of "cognitive maps," presumed to contain representations of the configuration of an area. Certainly, we retain images and other knowledge of places we have navigated. But in the standard perception/information-processing account, such a mental map is necessary even when actively navigating. Gibson, on the other hand, suggests

that knowing an extended route or how a place is laid out derives from actively using its sequence of perspectives, or its “nested sequences of transitions connecting vistas, a flow of information generated by a perceiver moving through the environment... [This] perspective structure concurrently specifies movement of the self through the environment” (Heft, 2001, p. 187).

The perspective of ecological psychology can be summarized through several general propositions laid out by Eleanor Gibson (1997), including: organism–environment reciprocity, as shown by affordances; perception–action reciprocity, as shown by studies supporting the “pick up” of information; “tasks” or larger functional units of behavior that have goals, rules, and constraints; ecologically nested units of tasks and affordances; control or agency by the organism; prospectivity or the future-looking, predictive quality of perception and behavior; and flexibility. The implication for conservation psychology is that our view of human perception as dominated by our supposedly unique mental abilities may have underestimated our intimate perceptual and cognitive linkage with our concrete surroundings. Action in the world is the primary basis of perception and cognition.

Evolutionary psychology and biological thinking

The highly interdependent account of organism and environment proposed by ecological perception theory invites an evolutionary explanation of its origins, though such an account is not required. Evolutionary psychology has arisen as a way of understanding a wide variety of human behaviors. Evidence of several kinds has been assembled to support the idea that features of mind and behavior evolved because they enhanced the fitness (or number of surviving offspring) of individuals or groups possessing them (Geary, 2004). Evolutionary psychologists search for “modular” parts of the mind, or stable complexes of perception, thoughts, and behavioral and learning biases that pertain to specific domains of the environment (Barkow et al., 1992). Such modules have been supported for tasks including understanding other minds, and for ecology including physics and biology. In addition various cognitive and social biases may be explained as adaptations.

Evolutionary psychology assumes that innate psychological mechanisms or modules arose in response to the Environment of Evolutionary Adaptiveness (EEA). This environment, generally the late Pleistocene in which *Homo sapiens* emerged from *H. erectus* or *H. habilis* lines, posed adaptive problems for our ancestors concerning: reproductive challenges such as mating patterns and mate choice; social group functioning such as cooperation, competition, and sensitivity to cheating; capacity to learn spoken language; categorizing living things; and preferences or aversions for aspects of nature. Each of these poses specific information-processing problems; the job of research is to develop and experimentally test models of cognitive programs capable of solving them. If followed rigorously, the methods of evolutionary psychology should avoid the problem of creating “just so” stories of adaptationism, where any feature can be rationalized to have emerged from a putative selective pressure (Gould & Lewontin, 1979). Evolutionary psychology is a fecund source of hypotheses and answers about the

human mind's adaptedness to such problems (Barkow et al., 1992; see Cosmides & Tooby, 1997, for a short primer).

The argument that the mental faculties of the brain should be viewed as selected structures goes back to Darwin (1871/2004), who pointed to continuities between humans and other species. On the level of brain anatomy, studies of the sensory areas of the brain in animals with different ecological specializations show enlargement for specializations related to feeding strategy, for example. Other enlarged associative areas of the brain are related to social group complexity, according to the social brain hypothesis. Old World monkey species, which tend to live in complex social groups, have larger volumes of neocortex than do New World monkeys that do not live in such social groups (Geary, 2004). Parallel evolution of brain size in hyena species supports this theory. Spotted, brown, and striped hyenas and their relative, the aardwolf, vary in brain size in close relationship to the species' typical group size and complexity of interactions (Holekamp, n.d.; Zimmer, 2008). Evolutionary psychology has been applied to many problems associated with social exchange and threat, such as cooperation, trust, reciprocity, and detecting cheaters. These have relevance to the social dimensions of conservation, as discussed in Chapter 10.

Probably the best-developed line of evidence from evolutionary psychology regarding the human relation to nature is biological thinking. Building on a substantial corpus of studies, Medin and Atran (2004) hypothesized that humans have a mental "folk biological system" (FBS) attuned to living things and enabling categorization, interpretations, and inferences about this domain of experience (Table 5.1). For example, there is evidence for specializations for food finding and preferences across many species (Geary, 2004). The human FBS was presumably shaped by early foraging subsistence patterns. Humans, as generalist feeders, have to learn and remember successful food items. Human groups everywhere categorize their local flora and fauna, and cultures in natural environments develop complex classifications systems and ways of predicting the growth and behavior of other species. Such systems are similar to scientific classifications, although the degree of elaboration depends on how socially or economically important the taxonomic group is in the culture (Atran, 1998).

Among the more strongly supported findings is that people universally believe that members of biological categories share an inner essence, reflected by common patterns of body shape, behavior, growth, and ecological niche. People believe that superficial changes could not change the plant's or animal's underlying essence. This belief enables inferences, such as patterns of relatedness to unfamiliar species, and a correlation

Table 5.1 Characteristics of folk biological systems that interact with experience and culture.

-
- Biological categories determined by inner unchanging essence
 - Categories show some hierarchical structuring
 - Level of "basic" categories: genus or species
 - Behavioral and ecological similarities inferred from taxonomic relatedness
 - Biological and psychological characteristics distinguished
 - Reproduction, growth, illness, and death characterize living things
-

between taxonomic category and internal anatomy. Knowledge of a species of fish will not be used to predict characteristics of birds, but only of other fish. But accurate predictions are knowledge-dependent. Similarly there are variations by culture and expertise as to which biological level (species, genus, family) is regarded as the essential type. Interestingly, people tend to believe that essence resides at the rank of species or genus (e.g. oak) rather than the life form (e.g. tree) (Atran et al., 2005). Essentialism may explain why the theory of evolution is counter-intuitive to many people.

Some elements of the FBS develop early in child development, including: essentialism; the beliefs that biological or bodily characteristics are inherited whereas psychological traits such as beliefs are not; that illness is a biological process (including contamination, contagion, and symptoms); and that growth characterizes living things (Coley et al., 2002). To the extent these developmental patterns have been studied cross-culturally, it is clear that the FBS interacts with cultural knowledge systems (Atran et al., 2005). There is some evidence for neural correlates of the FBS, such as injuries to some brain areas producing selective disabilities in recognizing names or pictures of living versus non-living things. Other evidence, for example using brain imaging, however, has not been conclusive (Geary, 2004). Psychologist Howard Gardner (1999) considers the mass of evidence related to specialized cognition of biological phenomena sufficient to merit a category of “naturalist” intelligence in addition to his original seven types. (See Chapter 11 for more on children’s attainment of biological and ecological knowledge.)

Atran et al. (2005) are cautious not to prematurely conclude that the FBS is an innate, evolved-in, adaptive module. For instance, they note important interactions of the module’s biases with cultural beliefs, and they admit that their theory only partially predicted findings.

Evolutionary psychology has been criticized on a number of grounds. For example, it may be unnecessarily complex: general intelligence and learning may be more efficient ways to solve many problems than multiplying specialized modules. The conception of the Pleistocene EEA may be artificially constraining; some adaptations may have arisen earlier. Further, if a selective pressure is inferred from adaptive practices of hunter-gatherers, the notion is circular as well as assuming an equivalence of (highly variable) hunter-gatherers and earlier prehistoric conditions (Foley, 1995). Irons (1998) argues that an alternate concept, the Adaptively Relevant Environment, is more appropriate because it denotes specific parts of the environment to which specific modules respond.

On a methodological level it is not clear why psychologists should privilege hypotheses about the functions of specific mental features derived from speculation about evolutionary settings. As Davies (2002) explains, the larger problem is that the function and structure of the mind must be fully described first, before we can determine what evolutionary forces shaped it. Grantham and Nichols (2002) elaborate on this by comparing the case of physiology. The functions and structures of the major organs were fully understood long before evolution was available as an explanation of their origins, and recent work still is not typically guided by analyses of adaptive problems. Yet evolutionary psychologists claim the parallel between early physiology and the project of evolutionary psychology as a justification for their inquiries. Understanding the mind is a wide-ranging task. While evolutionary psychology may advance some new hypotheses

and has brought together new constellations of findings, we must still work to describe how the human mind is set up to solve the problems we encounter in life, including how we relate to nature.

Biophilia

The *biophilia hypothesis*, developed by sociobiologist E. O. Wilson (1984; Kellert & Wilson, 1993), proposes that evolutionary pressures led humans to develop a genetically-based predisposition to take a strong interest in and affiliate with nature, including plants, animals, and landscape features. Behaviors and emotional experiences are not directly heritable; that is, they are not encoded in our genes but are responses to external stimuli. The tendency to respond to certain stimuli in certain ways, however, can have a genetic basis. Genotypes that promoted attention and emotional responses to natural objects could have conferred adaptive value and thus come to predominate if such attention and feelings promoted effective responding to those elements of nature that support life (edible plants, safe havens) and those that represent threats (dangerous predators, poisonous snakes).

As just implied, nature can prompt not only positive but also negative responses, termed “biophobia.” In our evolutionary past, it would have added to one’s reproductive success (or fitness) to fear organisms that were potentially fatal and contexts that were dangerous. This could have led to a prepared learning for biophobias. It is easier to learn a fear response to a dangerous natural object than to a dangerous manufactured object, and, more particularly, experimental studies show it takes longer to unlearn a reinforced fear response to an image of a spider or snake than of an object like a gun (Öhman et al., 1985; Cook et al., 1986). Even today, fears of snakes and spiders are among the most common and easily acquired phobias (Ulrich, 1993) – despite the fact that modern people are more likely to be killed by guns, car crashes, or other threats that were unfamiliar to our ancestors. The thought of being lost and alone in dark wilderness is fearsome even for rural dwellers (Bixler & Floyd, 1997). Research supports the suggestion that there is a biological basis to these fears. Studies comparing people with different degrees of genetic relatedness show that genetic factors are implicated in animal phobias: if a close relative has a fear of snakes, you are more likely than an unrelated person to share that fear (Kendler et al., 1992, cited in Ulrich, 1993). The persistence of these primitive fears, and our intense fear and fascination with dangerous animals, may be further evidence for biophobia.

If it has been adaptive to form attachments to landscapes, there should be a tendency for people to prefer landscapes that are more able to support the things we need to live: food, water, and shelter. Research has supported this hypothesis. In numerous experimental studies, people have been shown to prefer landscapes with water to those without, and they like flowering trees, which suggest fertile vegetation. Some research has suggested that people prefer savannah landscapes (Kaplan & Kaplan, 1989), but more recent research, carefully controlling for natural scene features, has not supported the savannah hypothesis. Han’s (2007) study of Texan undergraduates, in combination with earlier studies, gave stronger support for a “forest hypothesis.” Even more predictive



Fig. 5.1 A landscape showing preferred features. (Photo courtesy of Gene Myers.)

of landscape preference than biome, however, were the levels of three physical features in the scenes: openness, complexity, and water (Figs 5.1 and 5.2).

People seem to like landscapes offering two affordances. Prospect, or the opportunity to see some distance away, means that a person in that landscape is less likely to be ambushed by a predator or an enemy. Refuge, or the availability of a shelter or hiding place, would have provided protection from the elements or detection by predators (see Appleton, 1975). Heerwagen and Orians (1993) have suggested that people look for cues in a landscape to see whether it will fill their needs. These cues include: availability of resources, which can be signaled by flowering plants and the presence of water; the availability of shelter; and the ability to navigate successfully across a landscape as opposed to being lost in a morass of untracked underbrush. Kaplan (1993) has also found that people do not like landscapes that are characterized by extreme openness (and thus no refuge) or by blocked views and dense vegetation (and thus no prospect). She argues that people evaluate landscapes in terms of how well the landscapes satisfy human needs for understanding and exploration.



Fig. 5.2 A landscape showing non-preferred features. (Photo courtesy of Gene Myers.)

Many of the biophilic/biophobic preferences postulated for humans should also apply to other species, particularly closely related ones, and perhaps to an even greater degree if the species rely less on learning. Verbeek and de Waal (2002) summarize evidence that non-human primates are highly attuned to their natural habitats and are very good at obtaining the resources they depend on and at avoiding hazards. Primates appear to rely on emotional assessment of and arousal in response to nature, as would be predicted if biophilia is emotionally mediated. Verbeek and de Waal also provide anecdotes of captive primates relishing the chance to be in and explore outside areas. It appears we are not the only primate that may enjoy the outdoors and take an interest in other species as well as our own (Preston & de Waal, 2002).

The argument for genetic predispositions is provocative but not definitive. A genetic explanation can be supported only by a few kinds of evidence and, as yet, evidence for biophilia falls short. Snake and spider phobia learning rules are most strongly supported by behavioral experimental evidence. While prospect–refuge theory provides a plausible explanation for certain preferences, more research is needed to determine how cross-culturally universal such preferences are. Given the

extremely varied biomes to which human cultures have adapted, it is also conceivable that landscape preference is shaped by experience.

Combining nature and nurture

Most conservation psychologists probably take an interactionist perspective on the root causes of human relations to nature, acknowledging a combination of nature and nurture. We consider several examples of interactionism, some trying to unify ultimate causes, and others more concerned with explaining more circumscribed trends.

Conceptual development

Among the more interesting middle-ground conceptions of biophilia that nonetheless engage basic questions of origins is that of Kahn (1999, 2002). He argues that genetic explanations do not go far enough either theoretically or as a guide to practice. “Pragmatically, we as a species can make bad choices and become extinct” (Kahn, 2002, p. 105) or suffer greatly in our quality of life in a highly degraded environment. In other words, we need ways of thinking about our relation to nature that make room for the capacities for choice, reasonableness, and meaning by which we can make better decisions. Kahn’s structural developmental theory (discussed in Chapters 3 and 11) provides a way of understanding how individuals construct their understandings of nature and their roles in it from their experiences. The cross-cultural similarities in the forms of children’s reasoning about nature which Kahn has uncovered may or may not reflect genetic causes; they may be due to commonalities in our environmental dependencies and the ways that the developing mind processes them. Similarly, Kahn’s idea of cognitively-mediated biophilia has revealed the potential for the integration of biophilic and biophobic tendencies into a higher-level conception of humans’ place in nature – a feat that at least requires we see mental modules as not functionally separate but potentially integrated by higher cognitive processing.

Gene–culture evolution

Evolutionary psychology theory may rely overly on modularity. There would have to be some limit to the specificity of the mental modules, due to the cost of proliferating dedicated neural circuitry to the myriad of specific stimuli. Instead, humans may be distinguished as a species by reduction of mental specificity and an increase of general mental processing. The ability and propensity to learn may be called our “docility,” or susceptibility to vicarious learning and instruction from others. Cultures vary within closely-related human genetic lineages and across similar environments, so neither genetic nor environmental determinism alone explains culture. Instead, much of culture must be learned and transmitted. Gene–cultural evolution theory proposes that units of cognitive beliefs may be transmitted and change in frequency within and between populations; culture can cause genetic selection. For example, the practice of dairy farming coevolved with the retention of the genetically-based ability of adults to

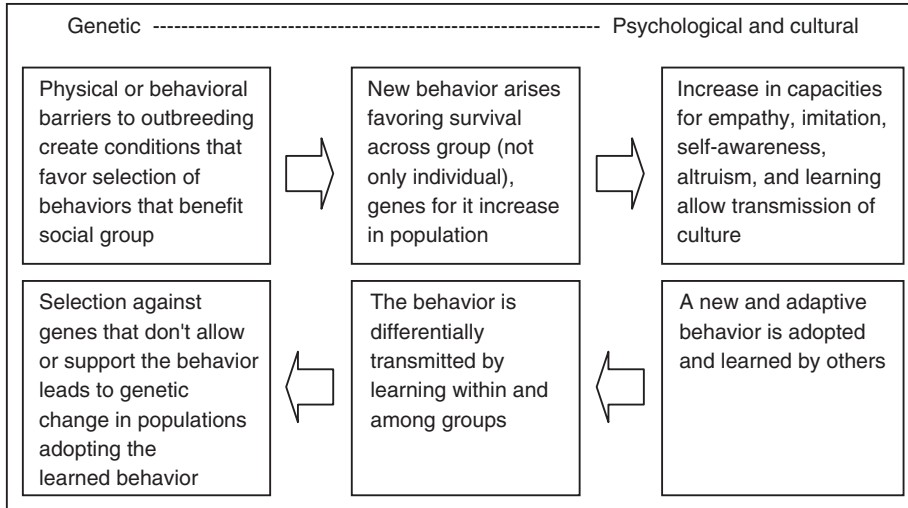


Fig. 5.3 Bidirectional influences in gene-culture evolution.

digest lactose (see Laland & Brown, 2002, for an excellent introduction and critical analysis to this and related theories). Cultural evolution is a form of group selection (Boyd & Richerson, 1985): culturally transmitted beliefs or behaviors that favor other group members can evolve in adaptation to new challenges (Fig. 5.3). Boyd and Richerson use cultural evolution to explain the emergence of conformity, within-group altruism, protection against cheaters, and hostility to outsiders. The social psychology of conservation may spring from such roots, as social norms supporting sustainable behavior emerge in response to environmental problems.

Attention Restoration Theory

Psychologists have described several direct and immediate ways in which exposure to natural environments has positive effects on humans. Rachel Kaplan and Stephen Kaplan (Kaplan & Kaplan, 1989; Kaplan, 1995) developed Attention Restoration Theory (ART) to explain these effects. Because this theory makes assumptions about innate capacity for attention, and about environmental qualities that interact with this capacity, it is an interactionist theory. According to ART, many of our daily tasks require mental effort in order to direct our attention toward the required objects and processes while avoiding distractions and delaying extraneous thoughts and activities. This effort draws on cognitive resources that can be exhausted, but which can be restored in the appropriate environment. Restorative environments have the following characteristics: they are “away,” removed from everyday activities and demands; they are fascinating, able to attract attention effortlessly rather than requiring people to consciously focus; they have extent in time and space, so it is more than a momentary experience to be in the environment; and they are compatible with a person’s current goals (even an idyllic beach is not restorative if it conflicts with one’s goal to complete an urgent task). Many people believe that spending time in nature reduces stress (van den Berg et al., 2007),

and some natural environments have the qualities to be particularly good at restoring the ability to direct attention (although dangers might decrease this effect). Indeed, research has shown that people rate natural environments as particularly good at restoration (e.g. Herzog et al., 2002; Staats et al., 2003). This could simply be a result of learning how to manage one's genetically shaped "economics" of attention.

Concomitant with its ability to restore attentional capacity, the natural environment may facilitate other beneficial psychological processes. These benefits, as described in a 2004 report from the Health Council of the Netherlands, include improved mood, enhanced concentration and self-discipline, and a general reduction in stress. This stress reduction may be responsible for a wide variety of health benefits associated with exposure to nature. Even driving through a natural rather than a built environment may be important. Russ Parsons and colleagues (1998) exposed people to a source of stress and then simulated a drive through a variety of environments while measuring physiological responses such as skin conductance and blood pressure. Overall, the physiological response to stress was higher in the simulated urban environments than in those that were dominated by nature. Similar physiological effects – for example, lower heart rate, lower blood pressure, and lower skin conductance activity – have been found with very brief exposure to nature, including videos of nature and office plants (Health Council of the Netherlands, 2004).

One of the benefits provided by natural environments is that they encourage not only restoration but reflection and enhanced self-knowledge. The level of stimulation provided by some natural settings – neither boring nor overwhelming – and the relative absence of social constraints may give people the time and space to think about themselves and their own values, goals, and priorities (Kaplan & Kaplan, 1989; Herzog et al., 1997; Clayton, 2003). Fredrickson and Anderson (1999) interviewed women who had been on a trip to the Grand Canyon, and found that many talked about being free from the distractions of everyday life. Herzog et al. (1997) suggest that attention restoration may be possible in a variety of settings, including sports or entertainment contexts, but that nature is more likely to spur personal reflection. They asked college students to rate slides of a variety of settings according to how well those settings would support attentional recovery or personal reflection, and found that sports and entertainment settings were considered more conducive to recovery than reflection. Nature settings, however, were rated highest for both goals, and urban settings were rated lowest. Intriguing evidence of a relation of biodiversity to psychological well-being was found in a recent study by Fuller and colleagues (2007). They quantified plant, bird, and butterfly species richness in urban green spaces, and asked users of these green spaces questions about how restorative they felt their time in the areas was. The researchers found not only that people can perceive species diversity fairly accurately, but that the plant and bird richness and number of habitat types were associated with aspects of restoration, including clusters of items they denoted as reflection, a sense of distinct identity, and a feeling of continuity with the past.

Experiential approaches

Moving away from an emphasis on evolution and inherited tendencies are theories that focus on individual experience, within both a physical environment and a social context.

These approaches emphasize learning from other people and being part of a linguistic community as the determining elements in how humans experience nature.

Ecopsychology

Ecopsychologist Andy Fisher (2002) suggests there are four central and overlapping tasks for this approach:

- 1 *The psychological task*: how is the human psyche constituted by relationships to non-human nature? We have emphasized the ways in which humans experience and benefit from nature; Fisher and other ecopsychologists suggest further that the problems we have caused in nature and our internal psychological ailments are part of the same pattern of psychopathology.
- 2 *The philosophical task*: ecopsychology must reject many dualisms that are built into Western thought, including scientific psychological thought, such as inner/outer and human/nature. It must rebuild a philosophical account that makes sense of the experiences unearthed in the psychological task.
- 3 *The practical task*: psychology has various practical dimensions. Conservation psychology, for example, emphasizes the nurturing of sustainable behavior patterns. Ecopsychologists stress therapy and what Fisher (2002) calls “recollective practices,” such as vision quests, that aim at “recalling how our human psyches are embedded in and nurtured by the larger psyche of nature” (p. 13).
- 4 *The critical task*: this task requires engaging in the spirit of the critical theory, responding to critical currents within both ecology (e.g. ecofeminism, environmental justice) and psychology. Fisher (2002) says, “if we are, in good faith, to understand the psychopathology of the human–nature relationship, we cannot avoid an examination of the social mediation of this relationship” (p. 21).

It is clear that this is a form of psychology that does not pretend to be neutral or objective. Fisher approaches this task by drawing on the work of phenomenological psychologist and philosopher Eugene Gendlin. Basic to Gendlin’s work (e.g. Gendlin, 1992, 1997) is the idea that everything about us is grounded in ongoing living processes that unite us with our environment. This is as true of language and creativity as it is of breathing. Gendlin’s research has demonstrated the efficacy of this in psychotherapy and creative thinking. Fisher uses Gendlin’s work to reveal a connection between psyche and nature and to provide a method by which distortions and obstacles to life process can be identified and worked through. Fisher applies it to the four tasks listed above, providing a critically sensitive psychology of the human experience of nature, and social action on its behalf.

Depth psychology

A very different kind of theoretical tradition in psychology, perhaps best conceptualized as mythopoetic or depth psychology, may suggest another way to think of the significance in nature. As one example, Swiss philosopher Jean Gebser (1984) examined ways

of relating to nature that may be true for children and some adults, though dismissed by the mainstream social sciences (Chawla, 2002). Gebser considered experience in its own right, while “bracketing” questions of causation. He thought of nature as an “ever-present origin,” a self-organizing energy. Different human cultures and different moments in an individual’s life may be characterized by different forms of consciousness in our experience of self and world.

The most basic form of consciousness is the *archaic*, which Gebser (1984) regarded as “identical with origin” and with the consciousness of some animals, of infants, and with states of reverie. One feels an identity with the world, an immersion and receptivity that is inexpressible in words. *Magical* consciousness experiences the world in terms of magical “union,” a “self-aware coming together of self and other” in which one experiences the power of being connected to the world (Chawla, 2002, p. 209). Magical consciousness is vulnerable to a fear of the world’s power and a resultant desire to control it – as expressed in our obsession with technologies.

Gebser also described *mythic* and *mental* forms of consciousness, both accessible through symbolic thought and communication. Myth is cyclical, associative, emotional and empathic, and multivocal. Mental consciousness is that governed by the “observing I/eye that assesses the environment objectively, evaluates it in the abstract, and measures it rationally and often quantitatively” (Chawla, 2002, p. 211). Mental consciousness can create dualities, which if reified (taken as reality rather than idea) may reduce nature or other people to an object to treat without feeling. For many this is the most familiar form. Gebser denied any linear progression or hierarchy among these forms – all make necessary contributions to life – but he reserved one as representing the developmental goal. This is the *integral* form of consciousness that is able to use the others appropriately to overcome the defective forms that are creating a planetary crisis for humanity. This implies a new kind of attention not only to how we inhabit the world but also to how we mentally approach it.

Conclusion

This chapter has surveyed a range of theoretical perspectives, some “grand” and some more humble, that attempt to explain how and why nature has psychological significance. The human relationship to nature is a complex affair, and our understanding of it is sensitive to our starting assumptions. Some of these assumptions are open to being tested, even unexpectedly, by data. Other assumptions may be useful for theory generation, insight, or personal reflection. Scientists and philosophers, trained and untrained, use the tools at their disposal to understand questions about: the significance of nature for us; how we know nature in a particular place or aspect; the nature of our psychological dependence on nature; potentials and constraints in our relations to nature that are interwoven in the fabric of psychological development; and how such understandings relate to our practical concerns. These questions are part of our enduring legacy as a remarkable sensing, feeling, acting, and wondering animal on a precariously still wondrous planet. As some have said, we are a bit of nature struggling to be conscious of itself.



Interactions with nature

Domestic nature: Cohabiting with animals and plants

- Animals in the home
 - History and variations in pet-keeping
 - Relationships with pets
 - Health effects of domestic animals
 - Social effects of companion animals
 - Connections with nature
- Plants in the domestic sphere
 - Effects of indoor plants
 - Window views of nature
 - Plant-facilitated therapy
 - Experience and effects of gardening
- Conclusion

Nature can seem to be a vast conception, remote from human affairs (see Chapter 2). But many people have constructed a very intimate relationship with nature, by making natural entities a part of their homes. There is a large body of research on people's interactions with companion and other domestic animals. Interactions with plants around the home and garden have received less study, although they clearly are meaningful to many people. We will review both literatures as they reflect on the ways in which people directly care for nature, both in the sense of emotional responsiveness and in the sense of practical caretaking.

Animals in the home

Pets are a principal example of what we consider "domestic nature." The definition of a pet, however, is not simple. Eddy (2003) considered first Webster's notion of a pet as a "domesticated animal kept for pleasure rather than utility." If domestication means a species' reproduction has been controlled by people over time so as to select specific traits, then this definition applies well to the prototypical cases. But it does less well in cases where cats or dogs are bred for sale, or are allowed to go feral, or may serve both pleasure and utilitarian functions. Further, the variety of captured and tamed wild

Table 6.1 Pet ownership statistics in the United States (2007).

	Dogs	Cats	Birds	Horses
Percent of households owning	37.2	32.4	3.9	1.8
Number of households owning	43,021,000	37,460,000	4,453,000	2,087,000
Average number per household	1.7	2.2	2.5	3.5
Total number in the USA	72,114,000	81,721,000	11,199,000	7,295,000

animals that some human owners would consider pets are left out. A second entry in Webster's is intended for human-human relations: one "who is treated with unusual kindness or consideration." Extending this to non-humans broadens our view of the relationship between people and their animal companions. Still, some animal relations may fall outside either definition: for example, the popular practice among Japanese children of keeping insects. Called "mushi," they may be referred to as pets, and are anthropomorphized in media, but are rarely given names and their deaths are not grieved (Laurent, 2000).

Simple statistics available for the USA suggest the huge importance of domestic nature. Sixty-three percent of American households report having at least one pet. The American Veterinary Medical Association (AVMA) reported estimates for 2007 are shown in Table 6.1, based on a national survey of over 47,000 households. In addition, the AVMA (2008) estimates about 9 million households hold a total of about 76 million fish, 1.9 million homes keep 6 million rabbits, and 1.1 million residences host 2 million turtles – among many other creatures. The economic investment is correspondingly large. For the four animals in Table 6.1, veterinary expenditures totaled \$23.3 billion; total US pet expenditures for 2007 were \$41.2 billion (APPMA, 2008). Nearly 27% of elementary school classrooms have animals other than dogs and cats (Rud & Beck, 2003). What some people consider to be excessive pet pampering has continued to expand in the recent decades, with trends like dental braces, antidepressant drugs, designer foods, and cancer surgery for various pets (Brady & Palmeri, 2007).

History and variations in pet-keeping

Do such excesses suggest that bringing animals into the home is a frivolous side effect of affluence? The domestication of cats and dogs from their wild forebears originated in the emergence of agriculture and its stores of rodent-attracting grain in the case of cats; and possibly in the partnership of wolves raised at the hearth in the case of dogs. Dogs and cats were kept in 16th century England for their usefulness in shepherding, ratting, hunting, and so forth, but they were not regarded as pets. Historians such as Ritvo (1987) attribute the increasing popularity of pets in modern times to industrialization, which made it economically feasible to support pets. By the industrial era, a new level was reached. Dog fanciers and breeders selected for purposeless and exaggerated features; distinctiveness and a lack of functionality among pets signaled the owner's status just as bound feet indicated membership in a privileged class among Chinese women.

An alternate account is offered by historian Grier (1999). An emerging middle class was charting a new ideal of family life that can be called “domesticity.” The home stood in contrast to the commercial domain’s rough pursuit of self-interest and to masculine violence. The special mission of the home was to cultivate the countervailing virtue of gentility, which combined self-control and softened feelings. The potential of pets to encourage such kindness was extolled by parenting advisors in antebellum America as something “natural.” This readily translated into the much wider humane movement.

These historical accounts are not mutually exclusive. But in light of newer ideas about our links to animals and nature, we would add that perhaps pet-keeping expresses a desire to connect with nature, even in the context of the city. Indeed, keeping pets in one’s dwelling turns out to be a much wider-spread impulse than accounts focused on the West suggest. Serpell (1986, 1988) cites numerous examples from antiquity where the gentry and nobility are recorded as having kept a variety of pets, as well as descriptions of pet-keeping in tribal societies documented by early explorers and anthropologists. In the latter accounts, people were hesitant to give up their pets for any price; in some Amazonian Indian tribes women suckled young animals, even bear cubs, from their own breasts. Such animals, it was reported, were never eaten. The Warao, on the Orinoco River near the Amazon, kept wild birds, monkeys, sloths, rodents, ducks, dogs, and chickens as pets, as reported in the 1970s. The M’Buti Pygmies of Zaire hunted with dogs, though they apparently treated them cruelly. The Comanche of North America, on the other hand, revered their dogs, which were kept for no particular use (Serpell, 1988).

In looking at contemporary and cross-cultural evidence, Serpell (1988) holds that neither utilitarian explanations nor those that describe pets as gratuitous “toys” provide a full explanation. Instead, he argues that in most cases the relationship is one of nurturance, protection, and emotional bonds. Perhaps pet-keeping expresses what Taylor (2002) calls the “tending instinct.” Attachment to pets does not strongly correlate with attachment to people, positively or negatively, unless we restrict our sample to people who take pet owning to such an extreme that it may displace other people from their lives (see Paul, 2000, for an overview of this topic). For the majority of modern pet owners pet-keeping is probably a way to augment, rather than replicate or replace, social relationships. There is another possibility: in a close look at pet-keeping in several lowland Amazonian societies, Erikson (2000) suggested that it allows a hunting society to appease the powerful animal spirits by taming and feeding, and thus balancing the relationship. Perhaps for modern people too, pets let us experience reciprocity with nature.

Relationships with pets

How do we examine the relationships between humans and their animals? Are they most similar to human–object relations, human–human relationships (such as attachment), or relationships among non-human animals, or do human–animal relationships require their own kind of categories and methods (Kidd & Kidd, 1987)? All may be useful and tell us different things. If the animal is regarded as an object, one model

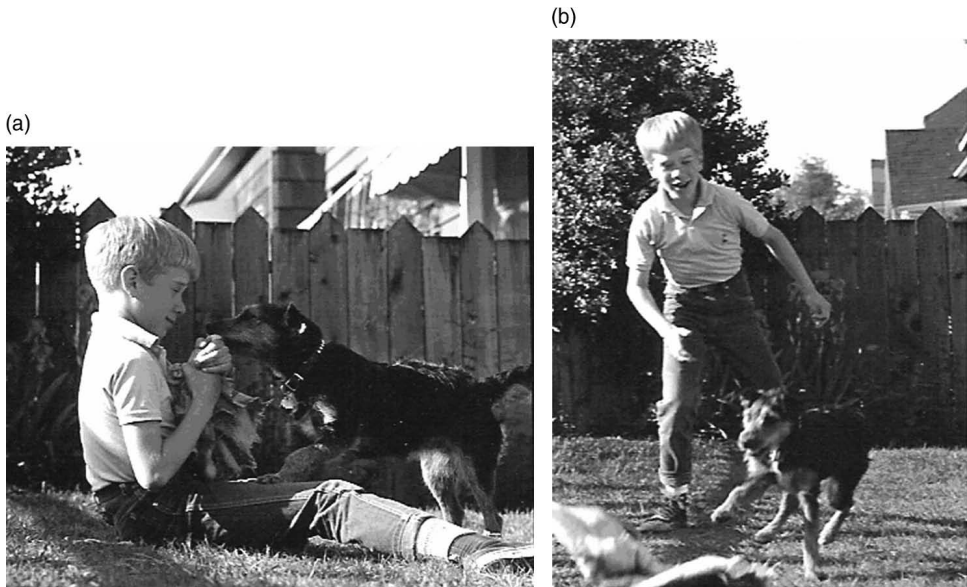


Fig. 6.1 Gene Myers as a child, in primary research about child–dog relationships. (Photos courtesy of Olin Myers Sr.)

may be appropriate, but if it is seen as a subjective being, alternative models are more accurate. Ethological studies of the behaviors of pets and their people have shown that for both dogs (Millot & Filiatre, 1986; Mitchell, 1987) and cats the “relationships are indeed two-way partnerships, with both parties adjusting their behaviour to that of their partners” (Turner, 2000, p. 258). Human–animal relations are indeed a special territory, and a diverse one at that.

One topic suggesting mutuality between pets and owners is play (Fig. 6.1). In careful studies of bouts of play between dogs and their owners, Mitchell (1987) found a large overlap in the kinds of mutual play routines enacted by humans and both familiar and unfamiliar dogs. Both engaged in contingency games, although only people attempted manipulations and complex deceptions.

Speech with pets would appear to be only subjectively mutualistic, but on closer inspection it may be more objectively so, at least with dogs. Reports from therapeutic contexts suggest children may talk to an animal (sometimes silently) in the same fashion as to a confidant (Rochberg-Halton, 1985). In a study of military families, Cain (1985) found that 77% “believed that the pet understood when they talked or confided in them” and that 73% said that their pet “communicated back to them;” half or more indicated that the pet responded to moods such as when someone was anxious or upset. During play with dogs, people use short utterances to get attention or try to control the dog (Mitchell & Edmonson, 1999). Mills (2005), outlining a cognitive approach to dog training, highlights the multi-channel nature of even simple commands and the extent to which dogs may understand the concept behind commands and generalize them to novel contexts.

Looking at ordinary speech behavior with animals, it may be easy to overestimate humans' anthropomorphism. Hirsh-Pasek and Treiman (1982) suggested that people talk to dogs in similar register to how they talk to very young children. Adults do appear to be very casual in the apparent assumptions they make about animals' linguistic abilities. But there may be an important clue here. Myers (1998/2007) argues that in social development children deploy their basic social interactive abilities in ways that reflect the differences presented on a bodily level by the animal, a pattern also observed by Millot and Filiatre (1986). This ability may be refined with practice to produce nuanced interactions with and understandings of an animal (cf. Shapiro, 1989). No research has yet been done to determine whether and how the human "mirror neuron" system underlying human empathy (Sommerville & Decety, 2006) may be recruited when we try to understand animals. Humans use many of the same brain areas to recognize dog and human faces (Blonder et al., 2004). But when people study dog and cat faces for emotion, they are biased to look at eyes, whereas cats and dogs use their ears as a means of communication (Sims et al., 2005). The unimportance of our own ears as expressive tools leads us to ignore this cue.

The way people speak about, as well as to, pets also reflects the nature of the relationship. Many people consider pets as family members or friends; in 2006, half of pet owners (49.7%) said they considered their pets to be family members (Cain, 1985; APPMA, 2008). Some are beginning to suggest that pets be considered "companion animals" and that the person be considered as a "guardian" rather than an "owner." A study of a random US sample showed that those considering themselves "guardians" practiced significantly higher levels of spaying or neutering, registering, providing celebrations, and expressing affection toward their pet (Carlisle-Frank & Frank, 2006). This difference in language thus appears to capture different underlying value orientations and relationships to the animals. Another linguistic indicator of the personalization of pets is the use of the term "who" rather than "which" to refer to them in writing. In a study of a 100-million-word corpus of writing collected from well-balanced sources in Great Britain between 1991 and 1995, Gilquin and Jacobs (2006) found that the animals most frequently referred to in this personal way were dogs, horses, cats, birds, and rabbits – pet or domestic animals. Interestingly, when style manuals did permit the use of "who," they tended to stipulate that it was allowable when the animal had been personalized with a name or other individualizing features (Gilquin & Jacobs, 2006).

Attachment to companion animals includes several elements: an emotional bond, a sense of compatibility, a sense of security, a desire to be together, and a mental representation of the other and the relationship. Attachment between humans may also vary on all these dimensions. Perhaps the most tempting human–human attachment on which to model human–pet relationships is that of parent and child. Like children, pets need food and medical care, oversight in dangerous situations, and someone to explain them to authorities such as doctors, and both are subject to behaviors at the dominant partner's will, such as petting and touching (Beck & Katcher, 1996). Both pets' and children's range of movement is restricted, their sexuality controlled, their excrement tolerated, and their dependence accepted.

As with children, most relationships between humans and pets are mutualistic: both parties benefit, although in different ways. Some, however, are "parasitic" relations,

where one partner is benefited at a cost to the other. Neglect, abuse, hoarding, and sexual exploitation are examples. Although these patterns are often pathological, the extent to which this is the case has sometimes been exaggerated. Arluke (2006), for example, highlights the perspectives of animal hoarders in contrast to media portrayals, and discusses ways in which casual animal abuse by adolescents (recalled by them as college students) served as what might be called “serious play” that let them experiment with adult-like decisions. These qualifications do not justify the abusive behaviors, but give insight into the complex social dimensions of animal cruelty.

Although not pleasant, the study of issues such as animal cruelty and abuse and euthanasia, and the similarities and differences compared to the treatment of humans, provide insight into the psychological meanings of our close attachment to animals. Interestingly, concern for the abuse of both children and animals arose simultaneously in England and the USA in the 19th century (Unti, 2002). Euthanasia of animals is routine in several contexts, including animal shelters, animal research, and veterinary practice; if a bond exists between the workers and their subjects, some kind of psychic defense should emerge. In a study of 148 animal workers, Rohlf and Bennett (2005) found that 11% reported experiencing moderate levels of traumatic symptoms. Social support and time in the job seemed to buffer against this, while concern about animals’ deaths predicted trauma.

Between mutualistic and parasitic relationships are “commensal” relations, such as when people care for semi-tame or feral pet animals. Many developing countries have large feral or free-roaming dog populations, which are a major contributor to human rabies infections. Studies suggest that cats hunting outdoors (including an estimated 60 million feral cats plus 35% of owned cats in the USA) hunt birds whether hungry or not. If only 20–30% of prey are birds, this still results in millions of birds killed by cats every year (Crooks & Soule, 1999). From a social and psychological point of view, the feral cat issue illustrates how people caring about different aspects of nature can create contention. People who help semi-owned cats were found to have positive feelings toward them, and to believe cats are independent and thus in less need of care (Toukhsati et al., 2007), although in fact cats living outside are subject to multiple risks.

In other ways, however, relations with animals are on a more equal status, although they may provide things that humans cannot as easily supply (or that we cannot receive as willingly). Myers (1998/2007) suggested that interaction with familiar animals provides children’s developing sense of self with a number of important qualities, including: similarity-within-difference that confirms the child’s own self; an implicit feeling of self–other clarification; a vivid “symbolism” of the life process itself; and an early sense of connection with the non-human. Interaction with animals also may foster perspective-taking and empathy. As Shepard (1996) observed, animals make us human because they offer different points of comparison that clarify what it means to be human.

The ways in which animals differ from humans offer other advantages. Because animals are typically unable to enforce or apply standards of human convention or morality, we experience them as non-judgmental. Since language is used to define, negotiate, and adjudicate an often ambiguous social reality, animals offer interaction free from such demands, tensions, and accountability. Animals thus may feel more

authentic to us, since it is rare for a creature without language to conceive or send a double message. Language itself entails the potentially challenging job of putting our experiences, needs, and wishes into words; with an animal, a child or adult can simply feel a connection (or act out a feeling) without the worry of articulating it. Rather than taking turns, being polite, and listening carefully, conversations can be delightfully one-sided, or, alternatively, insightful. Nonetheless, despite language often having been used to signify human superiority, it is because of the very structure of human language that we can wonder and care about the subjective meanings of animals' behavior (Myers, 1998/2007). Language is also positive and essential to our humanity. To speak and to listen are affirmations of our humanity, and denial or refusal of these actions can indicate inhumanity and injustice. Through words among humans we create shared meanings, and open new domains of connection and compatriotism – but also of misunderstanding and separation. It is no wonder that in a complex human world, animals offer us something essential.

Health effects of domestic animals

Domestic animals contribute to human health and well-being in numerous ways. One relatively well-studied effect is on cardiovascular health (Friedmann et al., 2000). Beginning in 1980, Erica Friedmann and colleagues began to find that cardiovascular patients who were pet owners showed better survival than non-owners. Larger, more controlled studies found striking effects: for example, independent of social support or severity of illness, dog owners were 8.6 times as likely to be alive 1 year after heart attacks (Friedman & Thomas, 1995), but cat ownership predicted lower survival (and was associated with lower social support). Male and female pet owners were also shown to have fewer risk factors for heart disease in a study of 5541 Australians (Anderson et al., 1992). Some benefits of pets arise fairly obviously: adopters of dogs (but not control subjects nor those adopting cat), who showed better health 10 months after adoption, reported a four- to five-fold increase frequency and amount of walking (Serpell, 1991). Recent studies illuminate one of the physiological mechanisms responsible for these effects: elderly hypertension patients showed less blood pressure elevation in a stressful situation when accompanied by a friendly dog than without the dog present (Friedmann et al., 2007). Similar effects had already been found for children aged 9–15 years, although college students seem less affected by the presence of a dog (Friedmann et al., 2007). The familiarity of the dog makes a difference too; owners' blood pressure decreased significantly while they petted their own dogs, but not others' dogs (Baun et al., 1984). (Worth noting, though, is that pets can also pose risks to humans in the form of allergens, physical injuries, and diseases.)

Studies have shown more subtle effects of animals on stress reduction. Viewing an aquarium of fish has sometimes, though not always, reduced physiological measures of stress or improved patient recovery. Fairly consistently, however, fish tanks have positive psychological effects. In the same studies of stressful conditions that found little change in blood pressure and heart rate, subjects reported feeling calmer, more comforted, and greater delight (Barker et al., 2003). Overall, the health benefits of pets may primarily

come indirectly through a variety of psychological benefits associated with well-being (Crawford et al., 2006). Although findings are not consistent (probably due in part to measurement issues), companion animals have been found to reduce anxiety, increase reported happiness, and buffer stressful periods; those under stress report greater attachment to a pet, and that attachment is negatively correlated with depression.

Several studies have found that living with a pet is associated with lower levels of loneliness among elderly women (Goldmeier, 1986), women living alone (Zasloff & Kidd, 1994), and elderly respondents living at home (Roberts et al., 1996). This may not mean that obtaining a pet causes the decrease in loneliness; a quasi-experimental, longitudinal study of pet adopters (Gilbey et al., 2007) found that those having obtained a pet did not report lower loneliness when controlling for gender, presence of other pets, or type of pet sought. Experiments examining the presence of animals in settings such as nursing homes, however, have shown decreases in loneliness (Banks & Banks, 2005). A study of singly-living and married cat owners and non-owners found that spouses, but not cats, increase positive affect, whereas cats (and spouses) decreased negative affect (Turner et al., 2003). If an animal is experienced as an added burden, however, by people whose lives are too busy or who have low attachment to the animal, then it does not have positive effects for the person.

Social effects of companion animals

The above effects may be due in part to the animal itself, and in part to the animal's way of facilitating social interaction. Mugford and M'Comisky (1975) randomly placed either a budgerigar or a begonia in the homes of solitary elderly people, and found that those with birds were significantly more socially involved at the end of the study. The tendency of strangers to talk more frequently with a person walking a dog has been well-documented (e.g. Messent, 1983). McNicholas and Collis (2000) put the facilitative effect of the mere presence of a dog to a stringent test by using a highly trained dog that did not directly initiate interaction itself; being accompanied by the dog still increased interactions with strangers in a variety of everyday settings. In another study, the researchers varied how well attired the man with the dog was. When he was "scruffily" dressed, interactions were lower, but the presence of the dog still had a positive effect.

Employing a sociological analysis, Sanders (1990) explained that dogs act as sources of "mutual openness," providing a shared focus of non-threatening attention. At other times, dog behavior in public, because it reflects on the owner, can pose significant "impression management" challenges, and owners, unable to completely deny their involvement, use a variety of "excusing tactics" (such as justifying, redefining, situating, quasi-theory explanation, demonstrative disciplining, or, as a last resort "unlinking" or denying) (Sanders, 1999). Indeed, not only do others make judgments about a person based on a pet's behavior, but they may employ a folk psychological theory to impute personality traits based merely on the breed of dog they believe the person to own (Mae et al., 2004).

Despite stereotypes about the type of people who own certain pets, research on the relation of personality variables to pet ownership has failed to find consistent differences,

even when the strength of attachment is taken into consideration (Podberscek & Gosling, 2000). The researchers point out that, aside from widely different measures and methods, this may be because former pet ownership is not considered in these studies. It may be that only a small fraction of the adult “non-owners” have actually never owned a pet. Further, to the extent differences are found, since all studies are cross-sectional, we do not know if we are seeing causes or effects: do nice people become pet owners or do pet owners become nice people? Despite tempting stereotypes, studies looking for personality differences between dog and cat owners have generally shown none, perhaps because these are the most common pets and many people own or have owned both. When owners of more widely diverse animals (such as birds, snakes, rabbits, ferrets, hedgehogs, horses, and turtles) or of different breeds of dog have been studied, some personality-related differences have been found (Kidd et al., 1983), but there are few studies and inconsistent findings (Podberscek & Gosling, 2000). Emerging studies are looking at animal personality as a measurable variable, and at the interaction between owners’ personality traits and the animals’ behavior (e.g. Podberscek & Serpell, 1997).

We might anticipate sex differences in involvement with animals. According to a thorough review by Herzog (2007), however, studies have shown that men and women are nearly identical in keeping pets and desiring to live with animals. Only modest differences favoring women are typically found in attachment to pets, and women are more likely to express concern for animal rights. The magnitude and direction of gender differences vary with the type of interaction, and can change; in general “the sexes are more similar than they are different” (Herzog, 2007, p. 15). It may be that animals provide men as well as women with a way to express care and affection. Melson and Fogel (1988) found that animals were especially important for middle-childhood boys because they provide an object to nurture without feeling girlish.

Connections with nature

Does keeping pets create bonds with wild nature? Myers and Saunders (2002) suggest that the developmentally potent route in which children think of animals as individuals and originally care about them on that level may be used as a route to concern for wider levels of the ecological world. The research, however, is mixed. Kellert (1996) described links between humanistic (pet-like) attitudes and more ecological ones only in some populations. Sometimes care for animals as individuals can conflict with caring for other levels of biological organization, as in opposition to management options for deer overpopulation (Miller, 2002), and caring for pets does not necessarily inform people about caring for wildlife (Shore, 2002, cited in Vining, 2003). But Kafer et al. (1992), using a psychometric instrument (the Pet Relationship Scales), found relationships between three affective aspects of pet attitudes and beliefs about wild animals. Adults who see their pets as members of the family, who are affectionate towards them, or who share activities with the pet are more likely to believe that humans and wild animals have similar cognitive experience and intrinsic value (correlations of about 0.60), to prefer closer physical distances to wild animals, and to be less favorable to

hunting and sealing (correlations of about 0.25). Vining and Merrick (2006) also report some association between attachment to pets and non-anthropocentric world views. Bjerke et al. (2003) found that pet owners in Trondheim, Norway expressed more liking for common urban wildlife species (birds, squirrels, hedgehogs, butterflies, ducks, geese, foxes, bumblebees, etc.) than did non-pet owners. There were no differences in liking for less attractive species such as rats, snails, and mosquitos. Again, these findings cannot indicate a causal relationship, and may reflect a general predisposition toward nature.

It is clear, however, that emerging patterns in pet-keeping pose a problem for conservation when they lead to wildlife poaching and habitat destruction. Rare animals become more valuable as they decline, fueling illegal pet trade. With increasing affluence, developing countries such as China now have a booming pet trade, with many animals caught fresh from the wild sold in cages on street markets. Even when suitable animals are chosen, lack of knowledge about their needs and appropriate care often lead to negative consequences for the pet or for the local ecosystem. Thus, while our fascination for nature expresses something important about us, it is an appetite that itself must be tamed and educated.

Plants in the domestic sphere

The meanings and benefits of plants in domestic contexts have not received as much research attention as have pets, but there is some evidence for their impact. Certainly landscaping, gardening, and house plants are something many people find important and engaging. In his history of relations to nature in early modern England, historian Keith Thomas (1983) notes the incredible emotion attached to trees on the estates of nobility. Their ancient age attested to the stability and status of the landlord, and for the same reason they were targets for vandalism, attacked as proxies for their owners. People still make personal connections to trees, as can be seen when they plant a tree to commemorate a marriage, celebrate a birth, or memorialize a death. Robert Sommer reviewed research on the way people feel about trees, concluding that “there is something deeper, spiritual, and almost ineffable about people’s attachment to trees” (2003, p. 180). In perhaps a less dramatic way, smaller plants can also have psychological and emotional significance for people, as well as having implications for the way they present themselves socially.

It is estimated that the US landscaping services industry includes about 50,000 companies with a combined annual revenue of over \$44 billion in 2006 (National Gardening Association, 2006). A 2006 study of 2287 US households by the National Gardening Association found that 40%, of respondents – equivalent to about 43 million households – regard themselves as “gardeners,” with estimated annual expenditures of about \$21 billion. In the United Kingdom, 67% of adults say that they are gardeners (Gross & Lane, 2007) (Fig. 6.2). More involved gardeners tend to be over 55 years of age and have no children at home. Although 18–34-year-olds are the largest segment of the US population, they participate in gardening less than others. Gardening sales in the US have increased 300% since 1980 (Hyland, 2004).



Fig. 6.2 Gardening is a common leisure pursuit. (Photo courtesy of Susan Clayton.)

In biophysical terms gardening, landscaping, and indoor plants can have negative environmental impacts. They entail flows across space of material (nutrients in fertilizer, topsoil, peat mining) and organisms (conversions of ecosystems to produce flower or seed crops; transfer and sometimes depletion of native populations; introduction of intentional and unintentional exotics), not to mention the application of toxic chemicals in the form of pesticides and herbicides. More sustainable approaches are available, and increasingly landscapers promote the use of native plants and organic pest control. Aside from their ecological impacts, these relations with plants also have impacts on their human caretakers by providing an intimate active connection to living organisms and natural processes.

Effects of indoor plants

Some house plants provide direct health benefits. For over 25 years NASA (US National Aeronautics and Space Administration) experimented with plants as it sought effective ways to purify air in space stations. In carefully controlled studies they found that philodendrons and spider plants were efficient at removing formaldehyde, and *Gerbera* daisies and chrysanthemums removed benzene (Wolverton, 1997). A Norwegian study of 51 office workers found that health problems decreased after plants were placed in the office (Fjeld et al., 1998). On the other hand, it should be noted that a few house plants contain toxins and could pose hazards to pets or young children (for a database on poisonous plants, see Munro, 2008).

The mere presence of an interior plant also appears to facilitate cognitive function and positive emotion (Health Council of the Netherlands, 2004). Although Larsen et al. (1998) found that performance on cognitive tasks decreased as the quantity of plants increased, participants' mood became more positive. Larsen et al. argue that their results may have been due to the repetitive and uncreative nature of their experimental task. Shibata and Suzuki (2004) looked more closely at the interaction of task demand and mood. They gave undergraduates the task of generating associations to adjectives (a cognitive demand) and gauged their mood in the presence of a plant, a magazine stand, or an empty area. Subjects evaluated the plant as generating more calmness, less distraction, and more tranquility. Women had more positive moods under the plant condition, and their task performance was better. When plants have a positive effect on task performance, it may be because of their effect in reducing tension and arousal; the presence of plants has been shown to lower blood pressure (Health Council of the Netherlands, 2004). In Shibata and Suzuki's (2004) study, subjects' evaluation of the plant (or other object) had an effect on performance beyond the object's mere presence, showing that the effects of nature may be partly emotionally mediated.

Window views of nature

Besides plants in or around the dwelling, a view of nature from a window has been shown to have a number of positive effects. Ulrich (1984) showed that post-gall bladder surgery patients who were placed in rooms with window views with natural elements needed less pain-killers, had shorter recovery times, and had fewer negative evaluations by nursing staff, as opposed to those with built views. Kaplan (1993) surveyed 615 American office workers and found that those with a view of nature were more satisfied, which in turn was associated with more positive ratings of work and fewer health problems. In a more residential setting, Tennessen and Cimprich (1995) found that university students with a natural view from their dormitory room window performed better than students whose view comprised built elements on attentional tests that were given in that setting. Wells (2000) found that children moving into homes with windows looking onto a greater extent of green compared to their pre-move homes, showed better attentional capacity; and, in an important line of research, Taylor et al. (2002) have found that the ability to view nature from one's home can increase concentration and self-discipline. Kaplan (2001) found that window views of nature were restorative – adding to residents' satisfaction and sense of well-being: feeling less distracted, more at peace, energized, competent, and focused. Views of trees were especially important in a sense of having one's attentive capacity restored. Kaplan (2001) also found that the view of a garden increases satisfaction with one's community.

Plant-facilitated therapy

The psychological benefits of house plants have been studied in the context of horticultural therapy with special populations. Plant-based therapy has been used with brain-injury patients, domestic violence victims, people with mental illness, and others.

Relf (1998) outlines the major aspects of horticultural therapy, including explaining why people respond to plants. Studies by Gigliotti and colleagues (2004; Gigliotti & Jarrott, 2005) have carefully observed participants with dementia in adult day service programs using traditional and plant-based therapy techniques including cooking, crafts, and planting. They found that all kinds of horticultural therapy activities generated more engagement and positive affect, and less non-engagement, compared to conventional activities. Although these studies are promising, the evidence for their efficacy is not extensive (Relf, 2005) and falls short of clinical research standards. A comprehensive review of research on the health effects of nature notes that in many ways the results are suggestive but methodological shortcomings undermine definitive conclusions (Health Council of the Netherlands, 2004). Frumkin (2004) urges an expansion of rigorous research on the therapeutic effects of plants.

Experience and effects of gardening

Like the effects of pet ownership, the impacts of gardens range from the obvious to the more subtle. The physical activity required by gardens is a health benefit, as is eating the food a garden produces. In the context of a school-based nutrition education program, research reported by Morris et al. (2000) showed that children were willing to taste and eat more vegetables when they had helped grow them in a school garden than when they had received either no nutrition education or education without the gardening experience (we explore other aspects of greenery from children's perspective in the next chapter). The opportunity to relax in a garden and to engage all the senses can also have cognitive benefits. More subtle benefits were explored by Gross and Lane (2007). In interviews with gardeners aged 18–85 years they found three main themes whose meanings differed according to subjects' life stages but which were salient to all the gardeners. *Escape* referred to the sense that they were removed from their usual worries and demands (compare the benefits described by Attention Restoration Theory, reviewed in Chapter 5). *Identity* acknowledged the way in which a garden is a public display of one's own effort, skill, and preferences (as suggested by the discussion of environmental identity in Chapter 4). *Ownership* fulfilled the desire to exercise control over a territory. Similarly, Clayton (2007) used surveys and factor analysis to explore the benefits of gardening; she found that the primary benefits were relaxing and spending time in nature, controlling the appearance of the garden, and demonstrating effort and expertise (Fig. 6.3).

As early as 1973, Rachel Kaplan found that gardeners with different kinds of gardens had somewhat different benefits. Vegetable growers put the heaviest weight on tangible productivity from their gardens, whereas gardening activities themselves were more important to others. A third kind of benefit was cognitive in nature, deriving from the intrinsic fascination of helping plants grow. In Clayton's (2007) study, gardeners who sought to appreciate nature through their yard and gardening were more likely to express environmental concerns.

Like perceptions of domestic animals, perceptions of gardens vary. Some people recognize the connection between the backyard and the broader ecosystem, while others

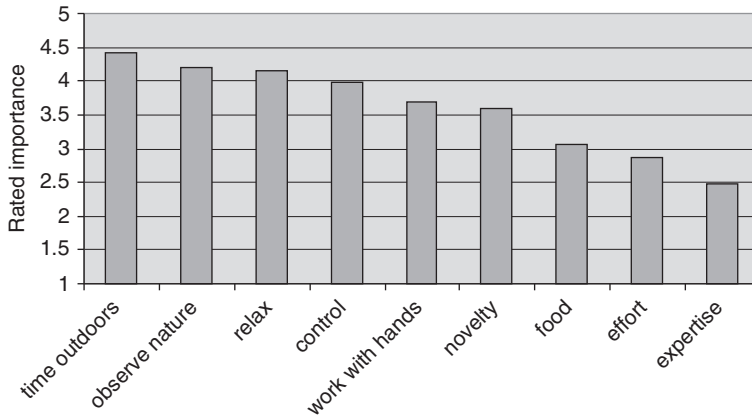


Fig. 6.3 Perceived benefits of gardening. (Based on data from Clayton, 2007.)

think of the backyard more like an outdoor living room. Clayton (2007) asked homeowners whether they considered their gardens as an extension of their home or as part of the natural world and found a range of responses, but on the whole slightly closer to being part of the home. As a negative side effect, people do not tend to think of their gardening practices as having an impact on the ecosystem. It is possible, though, that working closely with plants can connect people to wider realms of nature. A community-based gardening program for juvenile offenders not only increased horticultural knowledge, but also improved environmental attitudes, in proportion to how regularly the youths participated (Cammack et al., 2002). It is important to stress that the primary benefit of gardening identified by Clayton's (2007) sample was the opportunity to enjoy nature. Gross and Lane described the garden as a "deliberate construction of a relationship with nature" (2007, p. 237). Taking care of the garden may not generalize to sustaining the ecosystem, but it can be an opportunity to remind people of what they value in nature.

More than most interactions with nature, gardening occurs in a social context. A garden can facilitate social interaction and a sense of community (Robbins et al., 2001). Carol Werner (2003) has looked at the social transactions that shape Americans' perceived need to maintain weed-free verdant lawns; she cites a study of citizens in the northwestern USA who gave as reasons for using chemicals to maintain their lawns: a desire to be good neighbors (68%) and to have proper appearing yards (58%). Gardens are discussed and evaluated by one's neighbors, and form a part of one's identity in the community (see also Nassauer, 1988).

Conclusion

With gardening and household pets, it is easy to see how nature has become part of our social worlds, allowing us to benefit from contact with nature in our day-to-day activities. As we move into the wider spheres of managed nature and wild nature, it is

important to keep that social context in mind. Our relations to nature in the domestic sphere can be a metaphor for our relationship to nature on a larger scale. Gardening may not be the appropriate lens for every kind of human–nature relation, but it does highlight the need to balance science and human values. Ecological restoration projects are like gardening on a grander scale but perhaps with a humbler attitude, one that acknowledges the relevance of other values beside human utility or aesthetic preference (Higgs, 1997). With many individuals taking care of small elements of nature, humans are managing nature, in the aggregate, with all the benefits as well as responsibilities that are entailed. We turn to more public examples of managed nature in Chapter 7.

Managed nature: Zoos, aquariums, and public parks

- Zoos and aquariums
 - Reasons for visiting
 - Visitors' experiences of zoos
 - Impact on learning and attitudes
 - How can zoos maximize the experience?
- Urban parks and green spaces
 - Children and green space
- Conclusion

The typical image of the natural environment, as seen in Chapter 2, is of something remote from populated areas and unaffected by humans – the remote wilderness we will discuss in Chapter 8. (Even faraway nature is not unaffected by humans, of course, but the management is less apparent.) However, their very remoteness and isolation from human activity means that most people experience these environments infrequently. For citizens of developed countries, exposure to nature occurs predominantly in managed settings: zoos and aquariums, which display animals, and urban parks and arboretums, which present more natural green settings. Officially, a zoo is an urban park, but because the type of experience it presents is very different for the most part we will discuss these two settings separately.

Parks and zoos are particularly notable for the way in which they create and support a social context surrounding the interaction with nature. This social context is important in allowing people to develop an environmental identity that is nurtured rather than inhibited. When nature is found in human areas, it may discourage the relegation of “human” and “natural” to separate spheres and encourage a perception that a typical human lifestyle should include exposure to nature. As environmental historian Roderick Nash put it, “A meaningful relationship with nature does not necessarily depend on a rejection of the urban context” (2005, p. viii).

This chapter will review some of the rapidly accumulating evidence suggesting that encountering nature in a social context can have an important effect on people, their social interactions, and their relationships with nature.

Zoos and aquariums

Zoos and aquariums both serve to exhibit animals to human visitors. Although we will primarily refer to them together, it is worth noting a slight difference in their challenges. Both bring an unfamiliar world to the visitor, but the world represented by aquariums is profoundly unfamiliar. Rachel Carson, in the 1961 edition of her 1950 best-selling *The sea around us*, warned that “there has long been a certain comfort in the belief that the sea, at least, was inviolate, beyond man’s ability to change and to despoil” (p. x). The picture today is different. Marine science has expanded greatly, but the oceans are in trouble (USCOP, 2004). A study by the American Association for the Advancement of Science (AAAS, 2004) found that about 80% of Americans were concerned about coastal and ocean degradation. Belden et al. (1999) also found public concern and support for oceans, but knowledge was weak and very few rank oceans as an urgent high priority. Abadia et al. (2004) suggest that the public has positive attitudes toward the ocean but knows little about specific ocean issues; although people worry about its vulnerability and care about its health, the public is “not at all aware of the current degree or sources of threat” (p. 187). The mission of aquariums is to inspire conservation of a fragile world that we, as terrestrial creatures, are biased not to notice. The Monterey Bay Aquarium, among others, has led the way in refocusing and evaluating aquariums’ activities to achieve this mission (Yalowitz, 2004).

Although zoos and aquariums originated purely to satisfy the curiosity of the viewers, they have developed into institutions with the combined missions of recreation, education, and conservation. They play the roles of “model citizen, wildlife conservationist, agent for conservation, and mentor/trainer” (Rabb & Saunders, 2005). Most accredited zoos put significant resources into educating people about animals and their needs, as well as into protecting animal species both in the zoo and in the wild. Zoos are very conscious of their role in affecting knowledge and attitudes. Educational programs are a core component of zoos, including school and community programs, informal education (zoo visitors’ experiences), and using the public image of the zoo to deliver messages about conservation and the zoo’s role (Mazur, 2001). Stoinski et al. (1998) found that more than 60% of North American zoos do visitor research, while more than 40% do education research. Conservation education programs in Association of Zoos and Aquariums (AZA) accredited zoos and aquariums reach almost 45 million people each year; in addition, 48,000 teachers attend formal training workshops every year (AZA, 2008). Although the educational mission used to emphasize teaching facts about animals, it now encompasses a focus on encouraging care and concern and inspiring conservation action – a shift reflected in the name change from the Public Education Committee to the Conservation Education Committee of the AZA in 1997 (Ogden et al., 2004).

Zoos are highly popular destinations; zoos accredited by AZA attracted 143 million visitors in 2005, more than the annual attendance of all National Football League, National Hockey League, and National Basketball Association games combined (AZA, 2008). They are the most frequently visited type of museum in the world (Mason, 2000). Moreover, they draw from across society. People of all ages, ethnicities, religions,

and socio-economic classes visit zoos. Schools often incorporate zoo visits into their curricula, particularly in the early grades. Many zoos offer a “free” day every week for local residents, with the result that zoos have a broader cross-section of visitor types than other museums (Mason, 2000). Thus zoos represent one of the principal ways in which a wide variety of people encounter nature.

There is a great deal of debate over the morality and function of zoos. This has ranged from sometimes well-deserved criticism of the ways in which animals are treated to more fundamental challenges to the practice of confining and displaying animals. Philosopher Dale Jamieson (1985, 1995), for example, asserts that animals’ pursuit of their own interests creates a moral presumption against keeping them in captivity that can only be overridden by more substantial human interests than entertainment or even education. In his view, the conservation interests of animals may justify keeping some in captivity, but not displaying them. Others argue that this overlooks a wider class of conservation problems in which the welfare of individuals is pitted against some benefit to a composite such as a species (Norton, 1995). Although ethical arguments are not the focus of this book, data on the effects on human visitors are relevant to the debate. For example, observing captive animals could make people feel sad or depressed, with the result that they try to avoid thinking about the problems of animals. More insidiously, Beardsworth and Bryman (2001) argue, zoos may serve to rationalize human domination over animals, suggest that captivity is in the animals’ best interests, and reassure visitors that animal species are safe from threats because zoos, as agents of human concern, are looking out for them. Very likely there has been historical change concerning such basic values, on the part of both zoos and visitors.

Contemporary empirical results are somewhat reassuring on these issues. Woods (2002) collected Australians’ “best” and “worst” wildlife experiences. Among over 300 best and 300 worst captive animal experiences, respondents were consistently upset by signs of poor care of the animals. The most important “best” experiences were ones affording interaction, including being close, watching, touching, “being amongst animals,” and feeding. Rather than expressing dominance, the illustrative quotes provided suggest more a sense of wonder, surprise, and connection. When “best” experiences with captive and non-captive animals were compared, the profiles of features were overall very similar. The two main differences were “learning things” (18.9% of captive “best” experiences vs. 5.5% of wild) and “natural setting” (4.6% of captive vs. 32.8% of non-captive). This suggests people value the learning opportunities, but do not discount the fact of captivity.

Whereas critics suggest that zoos may promote a feeling of domination over, and separation from, the animals, zoos may instead serve to enhance people’s interest in animals or their appreciation for nature. Zoos may also provide a setting for the social expression and transmission of pro-environmental values. These goals are reflected in the conservation education and activism missions of zoos (Maple, 1995), and are embodied in the mission statements of many zoos. The Wildlife Conservation Society, for example, fosters activities that “change attitudes toward nature and help people imagine wildlife and humans living in sustainable interaction.” Zoo Atlanta “strive(s) to inspire the citizens of Atlanta and Georgia and all visitors to the Zoo to value wildlife” (www.zooatlanta.org/aboutus_vision.htm). And the stated mission of the

Chicago Zoological Society is “to inspire conservation leadership by connecting people with wildlife and nature” (all mission statements are available on the society websites).

Reasons for visiting

Expectations about the benefits of a zoo visit can be discerned through the reasons people give for visiting. Morgan and Hodgkinson (1999) surveyed 447 zoo visitors about their self- and other-oriented motivations to visit the zoo. Highest ratings were given to: “to allow others in my group to have fun, recreate,” “to have fun, recreate,” “to spend quality time with others in my group,” “to allow others to relax and unwind,” “to relax and unwind.” The lowest ratings were for “to spend quality time alone” and “to take photographs.” Education items were rated somewhere in the middle, slightly higher for others than for self. In a study at the Fort Worth Zoo, Tomas et al. (2003) found evidence for six types of benefits, in order of importance: family togetherness, wildlife enjoyment (this factor included an item on “view beautiful surroundings”), wildlife appreciation and learning (this included several items related to conservation), companionship, escape, and introspection/meeting new people. A 1998 study at the Cleveland Zoo identified five principal benefits: family togetherness, novelty seeking, enjoyment, education, and escape (Holzer et al., 1998). In a survey of 241 UK zoo visitors, Turley (2001) found the top reasons for visiting were: to have a pleasurable day out, to experience wild animals up close, to support the conservation activities of the zoo, to spend time with others, to learn about animals, and to learn about conservation – echoing the Fort Worth Zoo findings.

Most zoo visitors (96–99%) go with other people (Turley, 2001), and very often this means family members including young children. Children motivate trips to visitor attractions. By increasing interaction among members of the visitor group, children enhance the experience for adults as well. Parents use animals to promote social interactions between themselves and their children. In Turley’s study, the presence of children increased the importance of a pleasurable day out and the importance of learning about animals. Support for the conservation role of zoos was greater among older visitors. Interestingly, non-zoo visitors felt that the zoo’s educational role was more important compared to ratings by the zoo visitors, which encourages the conclusion that zoos are seen as educational in theory, but as entertainment in practice. Overall, the most important motivators of a visit to the zoo appear to be social, involving opportunities to facilitate interactions with family and friends. Opportunities for personal relaxation and enjoyment are also important. But animals, and the opportunities to learn about them, are more than incidental. People consider zoos to be educational and conservation organizations, and seek them in part for these reasons (Clayton et al., 2008; Fraser et al., 2008). In a study that built from the attributes that visitors sought at the zoo to the consequences they perceived from these, and to the ultimate values that visitors felt were fulfilled, Klenosky and Saunders (2008) found two ultimate values related to having a good time: enjoyment and family togetherness. They also found three values that stemmed from wanting to learn about animals and nature: to grow or develop

better, to encourage stewardship, and to broaden horizons. Many facets of the visit could be grouped under these main values.

Visitors' experiences of zoos

What do people do at the zoo? For one thing, they enjoy themselves. Zoo visits are perceived as positive and are associated with feelings of relaxation, happiness, and attentive interest in animals (Clayton et al., 2008). When Myers et al. (2004) used electronic pagers to cue visitors to complete a response booklet on emotions while viewing zoo animals, visitors reported overall quite positive feelings: on average they reported feeling focused, excited, involved, and relaxed. This combination of affect indicates active engagement with the exhibits. The spontaneous interest may stem directly from the ability of the zoo to evoke or represent nature. Like other nature-based settings, zoos may provide stress relief, relaxation, and the quality of being "away" (Mazur, 2001). As Kaplan and Kaplan (e.g., 1989) have proposed for nature in general (see Chapter 5), zoo exhibits may be fascinating in the sense of attracting effortless attention, and thus enable the restoration of attentional capacity.

People's desire to promote social interactions is also fulfilled: a large part of the zoo experience comprises communication with other people. In an early survey, Cheek (1973) found that 40% of a national sample said that one of their primary activities in the zoo was getting to know their children better. Clayton et al. (2008) coded over 1200 verbal comments by zoo visitors in interaction with each other, and found that the largest category of comment was some description of the animal (e.g. "Look, there he is"). These comments seemed to be generated for the sole purpose of facilitating social interaction. Other types of responses that promoted social interactions were negative comments, often made by teenagers with the apparent goal of evoking a response from another person ("Snakes! I hate snakes"), or the use of the animals to teach, often observed among parents speaking to their children ("How many giraffes do you see?"). Relatedly, a study of zoo volunteers and their motivations for working at the zoo found that many of them referred to the social benefits ("You come for the animals, but you stay for the people") (Fraser et al., 2009).

The zoo also allows people to connect to the animals (Bodamer & Sankovic, 2000; Clayton et al., 2008). In the study by Clayton et al. (2008), a significant proportion of visitors made some comment that reflected a connection between humans and the zoo animals, whether by attempting to infer the animal's state of mind, interacting with the animal, or explicitly making a comparison between the animal's behavior or appearance and that of humans ("That gorilla looks just like daddy!"). A study of responses to chimpanzees showed a similar proportion of comments comparing them to humans (Bodamer & Sankovic, 2000). In a number of different ways, visitors appear to make a behavioral or conceptual connection between themselves and the animals.

Impact on learning and attitudes

Studies find mixed results on the effectiveness of zoo visits in inculcating learning. When Lukas and Ross (2005) surveyed 1000 visitors to the Lincoln Park Zoo on

attitudes and knowledge toward chimps and gorillas, they found that visitors exiting the building had higher knowledge scores than visitors entering. People do not, however, typically take full advantage of the learning opportunities provided. An ambitious study of visitors at 12 AZA zoos and aquariums over the course of 3 years tried to assess the effects of the zoo visit on conservation learning and attitudes. Overall, there was no evidence for a significant increase in knowledge. However, visitors said that the zoo supported their conservation beliefs, strengthened their connection to nature, and made them reassess their environmental behaviors. Nearly half of 1400 individuals surveyed offered comments about the elevated awareness of their role in conservation as a direct consequence of their visit (Falk et al., 2007). It may be more appropriate to consider the zoo as a place that contributes to the ongoing process of learning about the environment and conservation, affecting individuals' understanding of environmental processes and problems, rather than a place where specific information is conveyed (Tofield et al., 2003; Falk, 2005). Like other free-choice learning environments, it may be a valuable contribution of zoos and aquariums to reinforce what people already believe, and affirm their identities (Falk, 2005; Storksdieck et al., 2005).

Apart from enhancing knowledge, zoos may have more indirect effects on attitudes. Some of Kellert's research has suggested this possibility. In surveys of people who engage in a range of activities with animals, zoo visitors were high on the humanistic scale, more so than birdwatchers. Zoo visitors scored relatively low on dominionistic attitudes, which were exemplified by trappers and hunters. All animal activity groups scored relatively low on the negativistic scale (Kellert, 1996).

Myers and Saunders (2002) proposed that zoos enable an empathic connection that can increase the desire to care for the animals at the zoo, and, as a consequence, for the species and the broader ecosystem in which those animals live. As one example, research at the Bronx Zoo demonstrated that personal interactions between gorillas and visitors were positive, and increased conservation concern (Hayward & Rothenberg, 2004). Ballantyne and Packer (2005) also state that, although the research could be more rigorous, there is evidence that a visit does make people more aware of conservation issues. They go on to speculate that an emotional experience may be important in eliciting this effect, because emotional arousal will enhance attention to the emotional stimulus (i.e. the animal) as well as promoting recall. As described above, a positive emotional response appears to be part of the zoo visit (Clayton et al., 2008), although arousal was at moderate levels conducive to learning (Myers et al., 2004).

One of the impacts of a zoo visit may be for people to contemplate their own relationship to the natural world. This may take place at both a conceptual and an ethical level. There is evidence that visitors to the zoo take the opportunity to reflect on the similarities as well as the differences between themselves and non-human animals, perhaps in order to better their understanding of what it means – and does not mean – to be human (Clayton et al., 2008). The impact of these connections has been empirically demonstrated. In two studies comparing people entering a zoo to people leaving, Schultz and Tabanico (2007) found that the people leaving showed higher ratings of an implicit connection with nature (assessed with the Implicit Associations Test, see Chapter 4). No differences were found, however, in environmental concern.

This reflection on the relationship between humans and the rest of nature may lead people to think about their responsibilities to the natural world. Fraser et al. (2008) proposed that zoo visitors use their encounters with wild animals to “explore their own environmental identities.” Such identities may encourage the contemplation of how one’s own actions can have a positive or negative impact on the environment, as described in the results from the AZA study. In surveys of 206 zoo visitors, Clayton and colleagues (2008) found that perceived learning, wanting to know more, and a stated feeling of connection with the observed animal in an exhibit, were all related to a desire to help the individual animal and the species. The reported feeling of a sense of connection was the strongest predictor of the desire to help. Similarly, Myers et al. (2004) found that the strongest correlations between discrete emotions and caring about saving the animal observed were feelings of caring ($r = 0.33$) and love ($r = 0.32$), and a sense of connection ($r = 0.31$). This connection to the animals and increased concern for animal well-being may be facilitated by the social quality of the zoo visit. The visit to the zoo may not only remind people of their support for the well-being of animals in the wild, but also provide an opportunity to affirm and communicate that support within a social group.

The impacts of a zoo visit are not the same for every visitor. Falk (2005) described five different types of visitors: the explorer (generally interested in discovering more about the subject and did not care whether others in their social group enjoyed the visit); the facilitator (visiting in order to satisfy the needs and desires of someone they cared about, usually their children); the professional/hobbyist (possessing a strong professional or other knowledge and interest in the topic, and motivated in learning how the information was conveyed); the experience seeker (wanted to say they had been there, or looking for experiences emblematic of the location); and spiritual pilgrim (relatively rare, visited in order to reflect, rejuvenate, or wonder). Most people (87%) could be categorized as explorer, facilitator, or both. Research showed that a year or two after the visit, what people remembered about it varied depending on what type of visitor they were. In the multi-institutional study described above (Falk et al., 2007), experience seekers were the only group to gain a significant amount of knowledge from a visit to the zoo. Clayton et al. (2008) found that people who came to learn about animals were more likely to say they wanted to know more about the animal and the species as opposed to those who came for entertainment or for a social outing. Compared to the visitors who came primarily to enjoy themselves, these learning-motivated visitors were more likely to say that they did learn something about the animal and the species, to agree that they felt a sense of connection to the animal, and to agree that they would like to help care for the animal and protect the species.

The impact of the zoo may be strengthened, and thus particularly visible, among people who work there. Groff et al. (2005) conducted focus groups with staff members at Disney’s Animal Kingdom (which is an AZA-accredited institution), and found that they reported enhanced knowledge of conservation issues, greater support for conservation initiatives, and more sustainable behavior as a consequence of coming to work at the Animal Kingdom. Many zoos have “career ladder” type programs targeting teenage workers that may capitalize on this effect. Fraser et al. (2009) conducted an

in-depth study of zoo volunteers, combining interviews and surveys in order to explore the extent to which experiences as a zoo volunteer helped to create or to strengthen an environmental identity. In response to open-ended questions, some volunteers reported that they had become more committed to conservation and environmental concerns, and that they had increased their understanding of conservation issues. They also talked about their interest in continued learning about animals and, importantly, identified the community of zoo volunteers as a source of social support for this learning.

In general, the volunteers in Fraser et al.'s (2009) study described their experience as both satisfying their interest in animals and conservation and motivating them towards a fuller expression of their concern for nature, all within the social context provided by their fellow volunteers and by significant others who valued and respected their identities as zoo volunteers. In other words, it was not just their experiences at the zoo but the social context surrounding these experiences that encouraged them to feel a deeper connection and commitment to the natural world. The opportunity to socialize with people who share a love of animals and nature both validates those values and empowers people to act in ways that promote their values.

How can zoos maximize the experience?

As managed settings, zoos have the opportunity to construct their exhibits and the overall zoo experience in a way that, informed by the research, is designed to achieve the best effect on environmental learning and attitudes. Interactive experiences appear not only to be appreciated by visitors, but to have positive educational effects. Lindemann-Matthies and Kramer (2006) studied the impact of a "touch table" at a Swiss zoo. The touch table provided physical objects to explore, as well as zoo professionals who could answer questions and engage in discussion. Compared to a group who did not use the touch table, zoo visitors who did visit the table were more likely to say they had learned something as well as being more likely to correctly answer questions about the exhibit. This was true even at a 3-month follow-up. (There were no differences between the two groups before exposure to the touch table.) Swanagan (2000) found modest support that visitors who had more interactive experiences with elephants (watching a demonstration or handling biofacts) expressed more support for conservation than visitors who only had passive experiences.

Given the importance of enjoyment as a motivation for zoo visits, it is important to consider visitor preferences as well as educational outcome. People spend more time viewing active than inactive animals; exhibits where animals are visible; exhibits with baby animals; and exhibits with naturalistic settings (Bitgood et al., 1988; Shettel-Neuber, 1988; Davey, 2006). Ward et al. (1998) found that people spend more time viewing larger than smaller animals, and also demonstrated a preference for larger animals. Price and colleagues (1994) compared reactions to caged and free-ranging monkeys and found that people were more likely to ask questions and to say they had learned something at the free-ranging exhibit; they also spent more time at the free-ranging exhibit, even though it was more difficult to see the monkeys there. In a

review of take-home lessons for enhancing wildlife viewing experiences, Ballantyne et al. (2007) highlighted these findings from the zoo literature:

- When people observe animals in a more “natural” setting they enjoy it more, spend more time, and learn more, perhaps due to the fact they feel more positive about the animal when confinement is less obvious.
- Observing animal behavior, including live animal presentations where animals are presented as “ambassadors” to talk about the conservation issues of their wild counterparts, positively affected conservation learning.
- Emotionally engaging animals (symbolically meaningful, larger, anthropomorphic, young, endangered) may serve as “indicator species” for the general public, and are sometimes key ecological indicators too.
- Exhibits should include multiple levels of information and motivational themes to allow visitors with different background knowledge, experiences, and motivations to create meaning by combining their previous experiences and the issues being interpreted.
- Persuasive communication strategies, such as discussed in Chapter 9, may provide incentives to extend learning beyond the visit.
- If the conservation challenges of a species or its ecosystem are highlighted, the zoo should provide information on concrete steps individuals can take in their everyday lives to further conservation goals. Studies have shown that visitors to exhibits with conservation themes have more knowledge and concern about conservation than the general public (Falk & Adelman, 2003). Carr (2005) urged that these audiences should not just be aware of the problems but should also be informed what to do about them.

Immersion experiences are now fairly common in zoos. Some zoos have moved toward settings that embody the perspective and practice of caring in conservation, and fostering connection (Box 7.1). For aquariums, both kinds of exhibits are important. Immersion experiences at aquariums take the visitor literally under the waters to see the world from

Box 7.1 Exhibits that promote connection

When you walk into the Hamill Family Play Zoo (HFPZ) at Chicago’s Brookfield Zoo for the first time, you realize this is nothing like a traditional children’s zoo. There are no goats or cows or raccoons. In fact, live animals are not conspicuous. Instead, arranged around a central “mountain” are many activity centers, some in separate spaces off to the side. Children (ages 1–10 years) can pot or mist plants in the greenhouse that will be used elsewhere in the zoo; paint their faces like an animal; represent their nature experiences in the art studio “workshop;” pretend to be a veterinarian in a child-scale animal hospital; dress up as lemurs right next to real lemurs; be the zoo director either answering queries by phone from a companion across the hall or arranging a manipulatable habitat model; learn about pet choices and care; or swap a good nature story for a cool bone or rock (Fig. 7.1). Outside are zones for house-building play, mud play, a creek, a demonstration “sustainable” backyard, and more. There are live animals too – house cats, armadillos, and others. But most conspicuous are the “Play Partners,” workers trained in developmental psychology and in helping parents help their children connect with nature.

Box 7.1 Continued

(a)



(b)



Fig. 7.1 Hamill Family Play Zoo: (a) Play Partners share enthusiasm and facilitate the development of caring attitudes, and (b) pretend is a powerful form of caring. (a, photo courtesy of Jim Schulz/Chicago Zoological Society; b, photo courtesy of Mardi Solomon.)

(Continued)

Box 7.1 Continued

Everything at the play zoo is designed to foster caring for and about nature. The HFPZ is housed in the retrofitted old small mammal house and was designed by researcher/children's playspace architect Robin Moore. It won the 2001 Exhibit Award from the American AZA. This mold-breaking new concept was a research-based innovation that illustrates the potential of conservation psychology in applied settings. In early conceptual phases of the play zoo, Brookfield Director, zoologist Dr. George Rabb instigated extensive collaboration between in-house talent and outside experts in child development and nature. Among the key ideas eventually embodied in the design and operation of the zoo are: that children relate to animals as individuals, and connect individuals to habitat and ecology; that hands-on caring is a powerful experience even if only in pretend; that children are active, constructive learners; that imagination, imitation, and pretend enable identification; that children need to start with the familiar; that the family is the basic audience for conservation education; that children are losing chances to interact with nature; and that the zoo can make its own caring visible and help parents make connections to nature and pro-environmental behavior at home.

a sea creature's point of view, probably for the first time. One dramatic example is the pioneering "Jellies" exhibit at Monterey Bay Aquarium (MBA) – huge tanks in a darkened area, lit from above to reveal the jellies' bodies in motion. Evaluation by Yalowitz and Tomulonis (2004) found that the exhibit not only had a large aesthetic impact, but also a conservation impact, with about half the visitors remembering something about conservation 2 or 3 months later, thus demonstrating the power of aesthetic experiences to motivate. The MBA also looked at an exhibit and program that directly tackled conservation issues and actions, the "Vanishing wildlife" exhibit. Two to 3 months afterwards, 79% recalled learning something about conservation, and almost 40% remembered the *Seafood watch*, a short list of which fish to buy and which to avoid, distributed by the MBA; a similar number recalled information in species at risk (Korn and Associates, 2003). These findings show that innovative aquarium exhibits may be very effective in communicating conservation around hard-to-appreciate marine issues.

Urban parks and green spaces

Neighborhood parks may not seem glamorous, but they are widely used and often much loved. Overall, the research suggests that they may have significant psychological benefits. It is worth remembering that the argument made for including parks in urban settings was based on their presumed salutary effect. America's most well-known landscape designer, Frederick Law Olmsted, had been the US Sanitary Commissioner during the Civil War and was a strong believer in the influence of physical environment on health (Maller et al., 2005). The opportunity to experience a natural environment and fresh air was expected not only to reduce disease and promote health but also to promote a healthy community by reducing the crime rate. A hundred years later, data are being collected that support those theories.

If we consider merely the quantity of use, urban parks certainly play a significant part in social life. In one study of 688 northeast Ohio residents, 78% had visited a park in the past 12 months (Payne et al., 2002). In a national survey, respondents reported an average of 43 visits to a local park in the past year. Urban parks are intended both to provide opportunities for experiencing nature and to promote recreational opportunities, and the disparate design of urban parks – from baseball fields and skating rinks to wilderness areas – reflects this. Passive encounters with nature certainly represent a significant proportion of the visits, however. In a case study of Boston's Franklin Park, picnicking, walking, sitting, children playing, and even sitting in a car accounted for 70% of the activity recorded (Hayward, 1989).

The presence of urban parks may be more significant than is commonly realized for the well-being of local residents. Observations of public parks in low income, minority communities, along with interviews of park users and local residents, led Cohen et al., (2007) to conclude that neighborhood parks are critical resources for physical activity in such areas: interviewees said that the park was the most common location for them to exercise, and exercise levels were predicted by the proximity of their residence to the park. Two large epidemiological studies in the Netherlands found that people living in areas of cities with high levels of close by and somewhat further (1–3 km from home) green space reported fewer health problems on average. This correlation was not explained by age, sex, or socioeconomic status, but the effects were stronger among seniors, housewives, and lower socioeconomic groups (De Vries et al., 2003; Maas et al., 2006). In Japan, a study of over 3000 Tokyo residents found that the mortality rate was significantly lower for people with walkable green spaces near their residences; again, this was unrelated to age, sex, or income (Takano et al., 2002). The positive effects of green space may be explained partly by the Attention Restoration Theory (see Chapter 5), but also through the healthy benefits of exercise, increased social contacts, better air quality, and less noise (van den Berg et al., 2007). The salience of green spaces in reducing the stress-related impacts of urban noise was shown in a study of dwellings near noisy corridors by Gidlof-Gunnarsson and Ohrstrom (2007).

In rigorous quasi-experimental work, Frances Kuo and colleagues have demonstrated that the impact of parks extends well beyond physical health. Through comparisons of residents of low income communities that do or do not have access to greenery but do not differ in other ways, they have found that the “greener” neighborhoods show less aggressive and violent behavior (Kuo & Sullivan, 2001); stronger social ties (Kuo et al., 1998); and stronger academic performance. Other studies have explored the impact of urban parks on community relations. When Krenichyn (2004) interviewed women in Brooklyn's Prospect Park, her interviewees reported finding social support for both relationships and activities, among both friends and strangers. This support enabled the fulfillment of athletic interests and contributed to an overall feeling of safety, which arguably could affect overall satisfaction with the community and feeling of connection to the neighborhood.

There are differences in use of, as well as attitudes toward, parks. As suggested by Krenichyn's (2004) study, some groups may be more concerned with issues of safety in public areas. A number of studies have found ethnic differences, with African-Americans less likely to visit parks compared to whites. (Asians show a more mixed pattern of

results; they are not always included in the research, and there appear to be differences among Chinese, Japanese, and Korean respondents.) Some of these differences are due to constraints on access. Minority and low socioeconomic status citizens are less likely to live near parks, and may find it more difficult to reach them. Differences emerge, however, even when access is taken into account; as seen in the next chapter, similar differences are found in attitudes toward wild nature. In a study of 1500 survey respondents, women were less likely to use the parks for exercise, and considered logistics such as access to be more important. They also preferred more open and manicured settings than men do. They did not differ from men in the perceived benefits of public parks. African-Americans also prefer more managed settings than whites do, and rate the presence of wildlife as less important. They perceive fewer social and health benefits of parks. But overall, all groups perceived far more positive than negative effects of parks on environmental, physical, social, and spiritual well-being (Ho et al., 2005; see also Payne et al., 2002).

Children and green space

Children are important beneficiaries of parks and less structured nature areas, as shown by growing evidence that time in nature plays unexpected roles in child development (Kahn & Kellert, 2002). Studies have shown that children prefer natural areas for play (Maxey, 1999; Chawla, 2002; Korpela, 2002), including asphalt playgrounds reconstructed into a more natural state (Moore, 1986b). Hart (1979) and Moore (1986a), among the first to track children's use of space and interview them about it, both found that natural, neglected, and semi-wild places were among the most significant to the children. Children often spontaneously construct shelters or use shrubs, bushes, trees, and other vegetation as "hide-outs" and natural refuges (Heerwagen & Orians, 2002).

Many health and developmental factors are encouraged by natural playscapes that offer complex environments for the three main types of play: functional (motor), construction, and symbolic (Frost, 1992). In contrast, traditional playgrounds foster rule-bound play that inhibits development (Frost & Klein, 1979). Motor fitness, balance, and coordination were found to be superior in a group of 5–7-year-old children that played in an area with trees and shrubs, as compared to a group with a conventional playground (Fjørtoft, 2004). The researcher noted that "the rough surface provides movement challenges, and topography and vegetation provide a diversity of different designs for playing and moving" (Fjørtoft, 2004, p. 22).

Natural areas provide havens when children are stressed. Korpela (1992) found that adolescents went to natural areas to calm down and gain perspective after stressful events. Studying rural 8–11-year-olds with access to varying amounts of nearby nature (extent of natural window views, indoor plants, and outdoor plants), and controlling for family income, Wells and Evans demonstrated that "the impact of stressful life events on [children's] psychological stress is weaker under conditions of high nature than under low nature" (2003, p. 320). Children with more nearby nature also perceived higher self-worth. The researchers suggest that nature may provide the greatest buffering for the children most vulnerable to distress and low self-worth. Among



Fig. 7.2 Children and community members benefit from school ground greening projects, as seen here at Columbia Elementary, Bellingham, Washington. (Photo courtesy of Chuck Holtorf.)

children with attention deficit hyperactivity disorder symptoms, Kuo and Faber Taylor (2004) found that parents of a nationally representative sample reported that their children showed reduced symptoms after activities in natural settings as compared with indoor and built outdoor settings. The positive effect of a green setting was found even after controlling for the social setting and the activity itself (e.g. reading).

Nature appears to enhance both cognitive and social outcomes for children. The attention children pay to nature, and the rich sensory information available to them in a natural setting, help to foster cognitive abilities such as concentration (Wells, 2000). The opportunity to explore a relatively unstructured physical environment is important in developing a sense of direction as well as problem-solving abilities (Wohlwill & Heft, 1987). Derr found that children in rural New Mexico “invest creativity and imagination into their place-making and other place interaction” (2006, p. 114). Boys invented names for their areas such as “my green mountain” or “the mighty jungle,” and girls made little houses or *casitas* for social activities. In traditional “hardscaped” play settings, social groupings tend to be structured according to hierarchies based on physical competence, but Herrington and Studtmann (1998) found that more natural landscapes encouraged fantasy play and social hierarchies based on command of language, creativity, and imagination. Plantings that create differentiated spaces or “green rooms” offer important social play opportunities. Fjørtoft (2004) reported that a prickly juniper bush was highly favored because it offered several enclosed spaces as well as a

view to the outside, accommodating a group of 12 children in games of pirates, house, cowboys, etc. Kirkby (1989) made similar observations about green rooms. Finally, children's experience in nature also has implications for environmental identity and for environmental education, as discussed in other chapters.

These results all point to the importance of incorporating nature into the everyday landscapes where children spend a great deal of time (Raffan, 2000; Moore & Cooper Marcus, 2008), such as by turning school playgrounds into green spaces and providing public parks for every urban neighborhood (Fig. 7.2). They also suggest that parents and others rethink the overstructuring of children's days, and the many forces that are reducing time in nature. A lively movement to "leave no child inside" has sprung up in response to journalist Richard Louv's (2005) book, *The last child in the woods*, which has brought this pattern to the public's attention. Although we believe Louv's hyperbolic term "nature deficit disorder" is not merited by the research, it is clear that children lacking substantial exposure to nature may miss out on significant benefits.

Conclusion

Managed nature is clearly an important part of human social experience, as reflected in the extensive use people make of zoos and urban parks and perhaps also in the impact of these parks on human health and social functioning. These experiences may emerge from people's attitudes toward nature, but they also have the potential to feed back into those attitudes, strengthening people's perceived connections to the natural world and possibly their support for conservation. Many parks, and zoos in particular, also have extensive resources devoted to visitor research, involving an increasing number of psychologists. They present a valuable opportunity to understand the human relationship with nature as well as to promote a positive relationship.

Wild nature: Encounters with wilderness

- Defining wilderness and wild nature
- Wilderness use and wilderness values
- Wilderness solitude
- Natural forces and features
 - Wildfire
 - Wild animals
- The edge of control: Wilderness remoteness and challenge
- Activity in wild nature, connection and caring
- Wild nature and spiritual experience
- Conclusion

Whether we are experiencing it or merely talking about it, wild nature seems psychologically potent. Backcountry travelers frequently describe “peak” moments, and wild animals provoke intense positive and negative emotions. This chapter will explore the meanings of wildness, describe patterns of contact with wild nature and values people hold toward it, and examine the psychological experience of key aspects of wild settings and creatures. Acknowledging the social and other influences on the experience of wild nature, we will especially ask what may be the distinctive contributions of wild nature itself to experience. Along the way we will consider some psychological theories that help account for these effects and examine some applications and implications.

A healthy ecosystem may require curtailing access to wilderness, or at least restraining human activities. Access to wild areas, however, arguably informs people about the values of wild nature and fuels political support for preservation. Decisions about the best way to protect wilderness require an understanding of the complex ways in which humans approach it.

Defining wilderness and wild nature

Before examining the experience of wilderness, we should consider what it means. This turns out to be a complex matter where psychology, history, culture, and landscape meet. Historian Roderick Nash has said that wilderness “is so heavily freighted with

meaning of a personal, symbolic and changing kind as to resist easy definition” (1982, p. 1). In the USA, the idea of wilderness as a deliberately preserved natural area was born of the preservationist movement of the late 19th century. It became institutionalized in the 20th century, first as the “preservation” portion of the National Park Service’s mission as laid out in 1916, then soon after as the “primitive area” administrative designation used by the US Forest Service, and later as the 1964 Wilderness Act. The symbolic meanings of wilderness that derived from the Romantic period – wilderness as pure, sublime, and spiritual, and as an antidote to overly civilized life – are by no means the only associations with wild nature, however. In Medieval Europe, some viewed wild areas as the antithesis of the creator’s garden, and thus to be avoided as the realm of the devil, or to be reclaimed physically from pagan presence (Nash, 1982). Harrison (1992) argues that the forest edge literally and psychologically bounded “civilization,” containing dangers both external and internal. Settlers in North America sometimes feared not only the natives of the wild, but their own capacity to maintain civilized behavior in a land so lacking in external social constraints (Nash, 1982). Tuan suggested the source of this attitude:

We owe to the city our aesthetic appreciation of nature: directly because it is in the city that artistic sensibility is cultivated; indirectly because to be keenly aware of something we need to have its antithesis, and the city is the antithesis of nature. Through the millennia of written history we repeatedly find sentiments for nature expressed in reaction to the failings of urban life.

Tuan, 1971, p. 34, cited in Graber, 1976, p. 21

Callicott and Nelson (1998) argue that the “received” wilderness idea many people hold today, which stemmed from the 19th century preservation movements, could only be possible in countries such as the USA and Australia where nature could be found in a “pristine state” beyond the frontier of civilization. “Wilderness” would probably be a nonsensical concept to native peoples who did not see a clear distinction between their own status in nature and that of the other spiritual beings and landscapes with which they coexisted. Unfortunately, native peoples around the globe have sometimes been displaced in order for lands they used to become national parks or other kinds of wilderness preserve (see Chapter 10 for a discussion of contemporary issues related to this). In the developing world, denying access may destroy political support for conservation. An important theme in environmental thought since the 20th century has been the attempt to reconcile the wilderness ethic of keeping some parts of nature free of human influence with the reality of the human presence in and use of nature.

Whatever may be the cultural specificity of the concept of “wilderness,” it was an unprecedented historical moment when nature was recognized by modern industrial people as worthy of protection in a wild state. Today the US Wilderness system includes over 700 designated Wilderness areas (conventionally with a capital W), totaling over 107 million acres (Wilderness.net, 2007). Even outside the designated areas, there are vast expanses where people may still experience wildness. For example, the analysis of wilderness attributes and federal land status by Aplet et al. (2005) showed that the Bureau of Land Management (BLM) has only 6.5 million acres of Wilderness out of its

270 million acre holdings, but 58 million non-designated BLM acres possess the highest Wildness Index score (30) in Aplet et al.'s (2005) rating system. Official protection is important, but may not be necessary for a psychological experience of wilderness.

The degree of wildness can be described in terms of observable attributes. Wild nature means: (i) natural composition, or an essentially complete set of native species; (ii) unaltered structure, or retention of the historical arrangement of the parts; (iii) lack of pollution of water, air, soil, darkness at night, and noise; (iv) capacity to provide opportunities for solitude; (v) remoteness, particularly lack of, and distance to, roads; and (vi) uncontrolled processes such as fires, floods, migrations, and evolution (Aplet et al., 2005). Some minimum spatial scale is probably required, depending on which ecological or evolutionary processes are to be left to operate uncontrolled. It is the work of conservation biologists and ecologists to inform our choices regarding which areas will best preserve ecological diversity and functions. But if “wild” nature is partly humanly defined, then it cannot be described only in biophysical terms. This chapter will discuss the features of wild nature that describe its experience psychologically. After briefly describing wilderness use, we will turn to the themes of solitude, domination by natural forces rather than by humans and their technologies, and the uncontrolled and remote qualities that lend wild nature particular qualities of challenge and risk. Particularly intriguing is the possibility that wild nature, nature in its most other-than-human, offers something singular and possibly universal to our fulfillment as humans. The exploration of that possibility is a key theoretical and empirical challenge for conservation psychology.

Wilderness use and wilderness values

Human activities in wild nature vary along a continuum from heavily exploitative, to subsistence, to recreation, to appreciative or aesthetic. Many people place high value on the mere existence of wild nature, even if they themselves never experience it directly. It is clear that wilderness serves many different human functions as well as values (see Cordell et al., 2005, p. 49, for a list produced by an interdisciplinary national workshop in 2000). Wilderness management is a complex human–nature interaction. By way of practical illustration, the Wilderness Stewardship Reference System maintained by the Arthur Carhart National Wilderness Training Center and the United States Forest Service (USFS) Aldo Leopold Wilderness Research Institute lists over 65 legislative, administrative, judicial, and scientific issues about which federal managers of wilderness areas must be concerned (see <http://www.wilderness.net/index.cfm?fuse=WSRS&sec=intro>). Nickas and Proescholdt (2005) examine problems with “non-conforming” uses of wilderness, and Woods (1998) provides a conceptual analysis of paradoxes that have unfolded from the implementation of the Wilderness Act itself. The wider set of social and economic forces impinging on wild nature globally makes it clear wild areas and creatures can continue to exist “freely” only through great human effort.

Approximately 12 million people visit US-designated Wilderness areas annually (Wilderness.net, 2007), and many others encounter wild nature on other lands or settings with minimal technological mediation. In addition to individual visitors,

wilderness users include participants in programs offered by over 700 organizations in Wildernesses, a number growing at 15% per year recently (Ewert & McAvoy, 1999). Wilderness visitors are more likely to be male, to have attended college, and to have higher than average incomes (Johnson et al., 2005). Understanding the constituency for wilderness and the trends in use helps focus the question of the perceived values of wilderness among its traditional constituency as well as others.

Driver and colleagues developed an exhaustive scale of benefits, termed "Recreation Experience Preferences" (REP), to understand visitors' reasons for Wilderness travel. Sixteen main categories of REP include enjoying nature, physical fitness, tension reduction, escaping noise and crowds, outdoor learning, sharing values, independence, family kinship, introspection, achievement or stimulation, and other items. Studies across eight varied Wilderness areas found remarkable consistency in users' ratings on these scales. First on the preference list was to enjoy nature, followed by physical fitness, reducing tensions, escape, learning, and values sharing. These items added to satisfaction with the experience "most strongly" or "strongly" (Driver et al., 1987). More recent studies in the REP tradition have focused on personal benefits, including developmental, therapeutic, physical, self-sufficiency, social identity, education, spiritual, and aesthetic or creative benefits, and have included structured group expeditions as well as independent wilderness excursions. These studies, summarized in Schuster et al. (2005), show positive effects from wilderness experiences for self-efficacy-type constructs, personal and problem-solving skills, and some therapeutic successes, in programs aimed at each of these outcomes. Social identity enhancement is also found.

Wilderness values of groups that are not like typical wilderness users have been gleaned from the National Survey on Recreation and the Environment (NSRE). As summarized by Johnson et al. (2005), immigrants were significantly less likely than native-born respondents to actively use Wilderness areas, to anticipate using them, to see a relationship to off-site environmental quality, or to perceive option values, intra-generational bequest values, or existence values. On other items (scientific/medicinal value, intergenerational bequest, and intrinsic values), immigrants were not different than natives. Roughly similar results were found for blacks or latinos versus whites. Members of Asian groups showed fewer differences from whites, and while being less likely to visit or expect to visit wilderness, they were more likely to express existence and intrinsic values than whites. Interestingly, urban versus non-urban dwellers differed significantly only in terms of the former showing more scientific/medicinal and existence values. The strongest predictor of using and valuing wilderness in the ten different ways measured was acculturation, measured as how long the respondent had lived in the United States. In general, Johnson et al. (2005) concluded that while cultural differences are most pronounced in site-related values, there are relatively few differences in off-site (environmental quality) and passive values (option, bequest, existence), especially when acculturation is taken into account. These findings suggest that non-traditional users might value wilderness if they were introduced intelligently to it, and that ethnic differences in valuing wilderness in indirect ways should not be exaggerated. Winter and Chavez (2008) found that whites and people of color agreed that natural resource areas should be used for recreation. They adapted Clayton's (2003) Environmental Identity (EID) scale, finding ethnic differences in one study (whites,

particularly wilderness users, had higher scores) but not the other. In both studies, higher EID values correlated with support for managing forest lands for environmental quality, and with perceived need for more area to be protected.

Indeed, other methodologies show a convergence in the public's wilderness values. The largest values of wild lands derived from economic studies, again across demographic sectors, come from off-site use and passive use values (e.g. Loomis & Richardson, 2000; Bowker et al., 2005). While such studies and the NSRE use fairly abstract questions to obtain estimates of the values of wilderness, Brown and Alessa (2005) used the geographical information system (GIS) to examine the association of values with specific areas known by respondents. They asked respondents to place dots coded to represent different wilderness values on maps of nearby lands in Alaska (including Wilderness areas but not showing their boundaries). On this local scale, strong associations emerged between Wilderness locations and indirect life-sustaining, intangible (intrinsic and spiritual), and deferred or future values. Tangible values such as economic, recreational, and subsistence tended to be located outside preserved areas. There were no differences by area (Wilderness or not) for biological diversity, learning, and therapeutic and cultural values. These results strengthen the picture derived from the NSRE results of a historical shift toward the public most highly valuing non-use, ecosystem-support benefits of wilderness.

In addition to the values associated with wilderness use, wilderness programming has been widely used and shown to benefit people facing diverse challenges including psychiatric problems, cancer and other medical ailments, bereavement, addictions, and sexual abuse (Frumkin, 2001). Caveats must accompany such results: the actual therapeutic "treatment" people receive is often complex, involving much more than just nature; there are few random assignment controlled studies; and some studies lack rigor in other ways. But the volume of such research suggests there may be some psychological health benefits from wilderness experiences.

Wilderness solitude

The experiences of people in wild nature can be characterized according to the outstanding psychological features of wilderness: solitude; encounter with natural forces and features, especially wild animals; wilderness remoteness and challenge; and the spiritual dimension of wilderness experiences. Wilderness may be directly encountered alone, with a small group, or with many other people. Even when others are present, the wilderness seems to contain the potential for solitude – by lagging behind on the trail, or taking a detour into an untracked area – in part because of the (relative) absence of built objects and human artifacts. Because of these contrasts with most people's daily lives, we might expect that solitude would be a psychologically compelling aspect of wild nature.

Although sometimes romanticized as blissful and transcendent, actually being alone is an uncomfortable experience for many people, particularly adolescents (Larson, 1997; Buchholz & Catton, 1999). Using surveys and interviews, Bobilya and colleagues (2005) studied 126 college students' experiences during 2–3-day solos that were part of

an 18-day wilderness orientation program. They found that participants' expectations were important. Generally the students expected chances for spiritual growth and reflection (this was how the solo was framed by the leaders), as well as autonomy and rest. But students also worried about loneliness, uncertainty, lack of structure, and whether they would fulfill their expectations for what was "supposed" to occur. The experience of solitude was affected not only by the wilderness setting, but by experiences preceding the solo, such as positive or negative group interactions, which affected feelings of support, comfort, and safety while alone. The contrast between wilderness solos and everyday life "encouraged participants to reflect on their role in the universe" (Bobilya et al., 2005, p. 113) and heightened sensory experience: participants reported noticing details of nature that had escaped them before, and saw common events such as sunsets in new ways. Such attention may be enhanced by prior "micro solos" designed to focus the person on nature (Maxted, 2005).

Wilderness was not without its challenges for solo participants, some of whom reported discomfort and anxiety. Maxted (2005) enumerated adolescent solo participants' anxieties about external elements, such as wild animals, wet weather, long dark nights, unidentified sounds, and strangers; and internal fears like not knowing how they would cope, and fear of the unknown within. Such insecurities were acknowledged much more readily after the solo than before. Maxted's participants also reported boredom. These findings highlight the challenges the wilds pose, which demand practical and emotional skills. In everyday life, socialization agents such as parents, teachers, employers, institutions, and physical settings provide structure and control. In contrast, wild spaces offer freedom and potentially the discovery of self-reliance and responsibility. This freedom and discovery, however, are enhanced by good orchestration. Talented and attentive program designers and leaders weave together cognitive framing of the experience, group facilitation, timing, challenge level, emotional intelligence, risk assessment, and instruction for use of specific features of the setting (Miles & Priest, 1999; Knapp & Smith, 2005).

Solitude was mentioned as the one of the two most difficult aspects of a solo experience in a retrospective study of 227 people who had participated in a college wilderness expedition program (the other difficult aspect was fasting) (Daniel, 2005). Daniel also reported that a "great majority" of participants found the solo significant because of its novelty – such an experience was singular in their lives before and after. As noted by Neisser (1982, quoted in Daniel, 2005), life events are more likely to become significant if they are relatively unique and strongly emotional, as was the case for these participants. Perhaps counterintuitively, the power of novel wilderness solitude means that one of its greatest benefits is a strengthened relationship with others (Buchholz & Catton, 1999). Participants in the programs described above dwelt upon their family and friends and their own roles with those significant others while alone. Whether the same would be found among those who become skilled and habituated to living in wilderness solitude is another question.

The flip side of solitude is an issue of concern to wilderness managers: crowding and its impact on visitors' experiences. In one early study, Heberlein (1977) found that crowding reduced river recreationists' satisfaction. Such evaluations were found to be relative to how long the visitor had been coming to the location

(Vaske et al., 1980). In another early project, Twight and colleagues (1981) examined preferences for privacy, measured in several dimensions (intimacy, lack of neighbors, solitude, anonymity, and seclusion). They found that backpackers preferred to be in a small group but had a greater desire for privacy compared with car campers. The implication was that managers should scatter backpackers rather than cluster them at campsites.

Wilderness managers have had to face such questions because of the legal mandate to maintain the wild character of designated protected areas, and the negative social and ecological impacts that occur with increased numbers of users. Questions about the standards for visitor experiences in wilderness involve psychology and have been approached via social norm theory (Shelby et al., 1996). Examples of approaches include Visitor Impact Management (Graefe et al., 1990), Visitor Experience and Resource Protection (National Park Service, 1997), and consensual approaches to recreation management decision-making such as Limits of Acceptable Change (Stankey et al., 1985; McCool & Cole, 1997). Manning et al. (2002) acknowledge that it may be difficult to identify norms for outdoor recreation because of the lack of effective social sanctioning where people are few, and because norms may not be shared across social groups. But research has documented some degree of consensus on recreation-related norms. As an illustration, before running the Middle Fork of the Salmon River in Idaho each season, thousands of people receive mandatory leave-no-trace instructions. Despite almost nil official enforcement, successive groups of boaters encounter apparently unused campsites, suggesting a high degree of social group sanctioning and norm internalization (R. Hebert, personal communication).

Conservation psychology may contribute to such pragmatic problems, in part by unearthing other important variables. For example, one psychological factor influencing visitors' judgments of environmental conditions is place identity. As described in Chapter 4, Kyle et al. (2004) found that Appalachian Trail hikers with higher place identity tended to perceive social and environmental conditions as more degraded. Taken together, the evidence on perceptions of impacts and the experience of solitude suggest the need to better balance and integrate biophysical indicators of ecological health with social-psychological models of values in wild lands management.

Natural forces and features

Wild nature is various, and it seems likely that humans respond to different kinds of wild nature in different ways. Dramatically different psychological meanings are suggested by the metaphorical and literary associations of biomes and landscapes as disparate as hot dry deserts or cold arctic tundra, tropical forests, estuarine deltas, high mountain peaks, and inter-tidal shores. Given the 867 distinct terrestrial ecoregions identified by Olson et al. (2001) (see <http://www.nationalgeographic.com/wildworld/terrestrial.html>), there is clearly an opportunity for research on reactions to different natural features. Further, within any given ecosystem are its wild inhabitants which also evoke widely different responses. Two distinctly wild features that have been researched are wildfire and wild animals.

Wildfire

Fire burning uncontrolled through dry vegetation would seem to embody wild nature's destructive power. Fire evokes a deep fear in people, and with good reason. When wildfires burn residences, survivors may suffer post-traumatic stress disorder (Jones et al., 2003). Helping victims cope with such disasters is an important area of counseling psychology. Historically in the USA, wildfires were universally suppressed when possible, consistent with a broadly utilitarian ethic that viewed them as destructive of the resources that humans need. Forest fire-fighting expenses today have shifted dramatically toward protecting people's dwellings, particularly in the mountain west and southwest where many have settled "close to nature" in homes in the new "wild land-urban interface." Ironically, it is people's very attraction to nature that is driving this trend.

Attitudes toward fire have changed as scientists have learned of its ecological roles in many types of natural communities. US federal wild land fire policy shifted in 1995 toward allowing certain natural fires to burn. At the same time, there are institutional pressures to prevent fires or lower fire intensity, and pro-suppression attitudes remain (Aplet, 2006). Slowness to change may be reflected in the continued use of Smokey Bear and his slogan "Only you can prevent forest fire!" instead of the adoption of the alternative Reddy Squirrel (proposed by the group Forest Service Employees for Environmental Ethics) and her updated saying, "Wildfire happens. Be ready!" (To his credit, Smokey has updated his web page to reflect some newer thinking.)

Researchers have applied Ajzen's (1991) Theory of Planned Behavior (see Chapter 2) to understand individuals' cognitive disposition toward fire and its management. Broad value orientations lead to attitudes, perceived norms, and behavioral intentions (Knotek, 2006). These factors then inform peoples' decision-making on the individual level (i.e. whether to sacrifice loved trees in order to create a defensible space around one's cabin), as well as on the management level (whether to let a fire burn in a roadless national forest area; whether to support salvage logging after the fire). Qualitative studies of residents in Montana's fire-prone Bitterroot River valley revealed that people's place meanings interact with their perception of using fire as tool to manage fuel-loads in the Bitterroot National Forest (Gunderson & Watson, 2007). Many forest users accepted intense wildfire as an inevitable and desirable aspect of a forest they had intimate knowledge of, while others considered stand-replacing fires in special spots to be undesirable. Such social and psychological meanings have large implications for the acceptability of management decisions. In a series of case studies, Jakes and colleagues (2007) found that landscape, government, community, and citizen-level factors all contributed to how well the communities dealt with wildfire.

Wild animals

Relations between humans and wild animals have deep evolutionary roots and demonstrate remarkable diversity and complexity. One of the earliest and most widely used schemes for categorizing attitudes toward wildlife was developed by Kellert (1989, 1993,

1996). Initially based on interviews, but repeated with various sets of survey questions, in many different studies and settings over many years, Kellert argues that attitudes toward wildlife consistently fall into about nine different categories (see Box 2.1 for eight of them), which he suggests may have evolutionary roots. It is easy to see that different species in different ecological relations to people might spark these attitudes, and yet there may be universal possibilities of interest, concern, and connection to most other species. Consider, for example, Kellert's (1996) comparison of attitudes in different countries. He found that most respondents in the USA, Germany, and Japan valued individual animals (usually domestic or culturally important varieties), but showed low concern for wildlife species and low ecological knowledge. Most of Kellert's American respondents expressed "humanistic affinity for wildlife possessing physical and mental attributes frequently associated with humans – particularly animals of large size, considerable intelligence, familiarity, and the capacity for social bonding" (1996, p. 41). Kellert noted that humanistic valuing "can sometimes be extended to creatures quite unlike people" (1996, p. 21). The variables affecting this extension may include availability for intimate relationships; whether the animal is exploited (e.g. 65–70% of respondents in two whaling countries, Japan and Norway, support whaling if the species is not threatened, compared to less than half that in other countries); and similarity. The moralistic attitude, in Kellert's (1996) description, is derived from a worldview of human kinship with nature. It is biased toward sentient and intelligent species, but is based less on affection than on the application of concepts of right and wrong to relations with animals. It is easy to see, with such widely varying attitudes, symbolic meanings, and relationships to wildlife, why social conflict over wildlife is common (Herda-Rapp & Goedeke, 2005).

Manfredo and colleagues (Fulton et al., 1996) have identified four value orientations in western US populations that, in conjunction with attitudes, norms, and cultural factors, predict intentions regarding wildlife. These value orientations are "utilitarian," "mutualism," "attraction," and "concern for safety" (Teel & Manfredo, 2006). Included in mutualism are egalitarian attitudes toward other species. Across numerous studies, Manfredo has found that mutualism strongly predicts anti-fishing and anti-hunting attitudes and behavioral intentions, as well as (more weakly) partaking in non-consumptive wildlife activities. Mutualism has been increasing in recent years as the population in the West becomes more affluent and less economically dependent on natural resources (Manfredo et al., 2006). Manfredo and colleagues explain mutualism partly by what they regard as a human tendency to anthropomorphize, and suggest that release from economic dependence has allowed mutualistic attitudes to increase.

Coinciding with this shift are increases in non-consumptive or appreciative activities regarding wildlife, in the USA and internationally. At the same time consumptive uses like hunting and fishing have decreased recently in the USA. The US Fish and Wildlife Service's 5-yearly report on wildlife activities recently found that the number of hunters declined 4% from 2001 to 2006, to 5% of the US population aged 16 years and older (down from 10% in 1980). Fishing was practiced by 13% of this population, but proportionately fishing had declined 12% over the same period. Meanwhile, many more Americans aged 16 and older – 31% – reported watching wildlife in some way, an increase of 8% since the preceding survey. These differing activities contributed to the

economy substantially in 2006, with an estimated \$41 billion spent on fishing, \$23 billion on hunting, and \$45 billion spent by wildlife watchers. Overall, 87 million people, or 38% of the US population, were active with wildlife, and their expenditures amount to 1% of the US gross domestic product (USFWS, 2007).

Wild animals are important objects for indirect experiences (mediated by institutions such as zoos) and vicarious experiences (including symbolic, literary, etc.). Conservation advocates use wild animals in such situations to motivate and inform important contributions to conservation. “Flagship” species are those that can attract a politically potent following, and whose protection may help various other components of their ecosystems. More directly, communities and groups whose choices directly impinge on wild populations have been targeted with custom-designed, often highly successful, wildlife-centered conservation education programs, as reported in the many studies in Jacobson (1995).

The human encounter with wild animals is clearly multifaceted. We are in the role of predator when animals are killed for income, food, status, excitement, safety, sanitation, or other motivations. People’s reasons for hunting are various and, counterintuitively, do not always rule out positive or protective emotions towards animals. Twenty-one percent of hunters hunted to “be close to nature,” fewer than do it for “sport or recreation” or “meat,” but still a surprising trend (Responsive Management, 1998, n.d.). Haymond (1990) showed that although large percentages of forestland owners in South Carolina described “lifestyle enhancement values” derived from wildlife (such as observing and appreciating animals, preserving a way of life, providing a better environment for future generations, and hunting), only hunting was positively related to the number of land management practices that favor wildlife which owners implemented. These findings show that utilitarian use of animals may motivate care for their habitat.

Significant threats from or conflict with wildlife may diminish empathy and probably reduces sympathy. One study of sheep farmers in Norway found that farmers with deeper attachment to their sheep had more negative attitudes toward carnivores (bears, wolves, wolverine, lynx) (Vittersø et al., 1998). In another study, farmers from a region with high losses of sheep showed more negative attitudes toward predators than farmers from a region with lower losses. Interestingly, however, when farmers’ anticipated personal losses were controlled for statistically, farmers from the high-loss region expressed more positive attitudes toward the predators (Vittersø et al., 1999). The authors speculated that farmers from high-loss regions had more sophisticated cognitive representations of the predators, perhaps reflecting the role of familiarity and knowledge in boosting perspective-taking and cognitive empathy.

Some species place us in the role of prey (see, for example, McNay, 2002). Certainly, fears of animals such as bears, large cats, and wolves, historically overblown, have slowly subsided in the USA. Nonetheless, perhaps the most puzzling aspect psychologically is the disproportionate persecution and malice directed at creatures that only very rarely consume humans (Coleman, 2004). Kellert et al. (1996), for example, noted differences in public attitudes toward three large predators: wolves, cougars, and grizzly bears. Although cougars and wolves are comparably sized, have similar prey requirements, and occur at about the same densities (originally across much of North

America), the cougar arouses much less concern and passion than the wolf. This is especially puzzling since cougar attacks on livestock and humans are more frequent and better documented. Possible explanations include that wolves are more conspicuous, and that cougars did not occur in Europe so immigrants did not harbor Old World prejudices as they did toward wolves and bears. For all three species, attitudes are a complex mix, and also reflect people's reactions to government interventions on the species' behalf.

Threats to one's safety can influence attitudes toward animals and support for wildlife management strategies. Kaltenborn et al. (2006) asked residents around the Serengeti National Park in Tanzania about their responses if an animal: (i) was sighted near the village; (ii) killed domestic livestock; or (iii) threatened humans. Would they do nothing, scare the animal off, report the incident to a game officer, or kill the animal? Across these worsening threats, higher percentages favored the more severe responses. The animal species had some effect: stronger responses were reported for lions, cheetahs, leopards, and especially the highly disliked hyenas. Interestingly, although less stringent measures were favored for a liked or preferred species, this effect was shown only for the low threat situations.

It is important to acknowledge these "negative" human–animal realities for several reasons. They help counter idyllic conceptions of simple human harmony with nature, and they explain some of the diversity in attitudes toward animals. Conflicts between humans and animals over prey, space, or other resources represent common challenges to conservation (see Chapter 10). Finally, we cannot appreciate the complex emotional and cognitive achievement when people come to value, empathize with, and protect even dangerous animals unless we appreciate the negative realities that exist (see Chapter 3 on integrated biophilia).

Positive, non-harmful experiences of wild animals must be common, given the large numbers of wildlife watchers reported above. Careful empirical studies of such phenomena are, however, relatively few. Fiedeldej (1994) found that the birds and mammals encountered by 91 hikers on guided nature walks in African wild lands were a significant part of the experience and deepened subjects' appreciation of ecological complexity.

Several researchers have examined human encounters with dolphins. DeMares (2000) documented positive emotions in response to wild dolphins and concluded that human–wild cetacean interaction showed marked effects on sense of self. Curtin's (2006) in-depth interviews with a small number of subjects who swam with dolphins describe attraction, as well a feeling of connection through eye contact or touch. Subjects' statements also reflect the influence of their prior conceptions. Some studies have attempted to experimentally determine the effects of swimming with dolphins: Webb and Drummond (2001), for example, compared swimming with and without dolphins in semi-wild settings. All 99 subjects reported increases in well-being, but those who swam with dolphins reported higher levels of well-being and also reported decreased anxiety. Antonioli and Reveley (2005) measured depression and anxiety before and after a 2-week (1 hour per day) program swimming with captive dolphins, compared with subjects who swam and snorkeled nearby instead; they found improvement in depression scores but not anxiety scores in the treatment group.

Unfortunately the research supporting claims of benefits from swimming with dolphins is weak, leading to serious questions about claims of their therapeutic efficacy. Marino and Lilienfeld (1998, 2007) conducted two methodological reviews of the dolphin-assisted therapy experimental literature and found multiple threats to internal validity in even the best studies. The few studies using randomized assignment and blind rating procedures failed to control for a variety of influences that could have accounted for the results, such as novelty, placebo effects (important because dolphin swimming is marketed as highly effective), or the presence of other people. Often the actual treatment received was poorly conceptualized and monitored, and seldom were longer than immediate effects measured. Meanwhile, Marino and Lilienfeld (2007) cite studies showing that both dolphins and people are injured in these encounters, and that there are risks of parasitism and infection to both parties as well.

The primacy of interaction and intimate knowledge in forging a psychological connection to wild animals was emphasized by Myers and Russell's (2003) study of the experiences of adult males who had intimate knowledge of wild black bears, whether that knowledge came through everyday experience (by old-timers who grew up in an area frequented by black bears), animal tracking, bow hunting, or professional bear biology work. In comparison to suburban homeowners who had reported bears to the state wildlife agency, all those with intimate experience of bears had little fear of wild bears, yet had a high degree of "respect." Their knowledge was based on immediate encounters that included a bodily-based "reading" of bear behavior, and a sense of the bear as a knowing, intentional creature. These perceptions held across not only type of activity (including the hunters) but also aspects of world view, such as religiously informed beliefs about the "place" of humans and bears. The impact of nature comes partly through its social construction, but studies of humans and wild animals in wild settings suggest that the animals also contribute directly to the human sense of meaning.

The edge of control: Wilderness remoteness and challenge

Along with the potential for positive experiences in wild nature, some inherent challenges, both internal and external, may also result from the encounter with natural forces. Indeed, key elements of wilderness are remoteness from civilization and the diminishment of a sense of human control. What is the psychology of this aspect of wild nature?

Wilderness may present characteristics of what are called "extreme environments." Suedfeld (1991) describes these as *extreme*, where survival is not possible unprotected and unprovisioned; *unusual* because they are different from settled areas; and *stressful* because they are difficult to access and contain objective hazards. Suedfeld's prime example is Antarctica, but mountain tops, space stations, offshore oil rigs, and difficult wildernesses also qualify. Despite the natural tendency to avoid such environments, there is a fundamental challenge in the wilderness experience that adventure education and wilderness therapy programs rely on to pull participants into vigorous activity in situations where they cannot hide behind their usual patterns (Luckner & Nadler, 1997). Studies of such adventure education participants, workers in Antarctica, and

individuals in self-chosen wilderness excursions show that those who subject themselves to extreme environments often show similar psychosocial reactions afterwards, including personal growth (Reser & Scherl, 1988; Davis-Berman & Berman, 1994), successful coping responses, increased sense of control and competence, and fewer physical and mental health problems (Suedfeld, 1997).

To a non-participant, even these benefits might seem insufficient to motivate a person to place themselves in such a risky situation. One traditional explanation of the motivation to go into extreme environments is that some people need to have a high level of stimulation in order to enjoy an experience, and thus they pursue high-risk recreation. Netherland psychologists van den Berg and ter Heijne (2005), for example, provided a typology of fear-relevant nature situations: close encounters, forceful situations, overwhelming situations, and disorienting situations. Not all of their subjects responded to these negatively. Those who were attracted to such situations, disproportionately male, were high in sensation-seeking behavior. Some have interpreted such sensation-seeking to represent suppressed suicidal wishes. Koole and van den Berg (2005) found that wilderness provoked more thoughts about death than cultivated nature or city environments among their subjects in lab studies. Reminding these subjects of death lessened their perception of wilderness as beautiful, and lessened their coping responses. Whether this echoes our cultural history of alienation from wild nature as the antithesis of civilization (in which social death meant banishment to the “desert”), whether it applies to those undertaking wild nature adventure activities, or whether it is part of the more general effects of “mortality salience” in inducing self-concern and restricted world views (Solomon et al., 2004) is not clear.

But the story appears more complex than just sensation-seeking or death denial. Interesting insight comes from research on people who had just climbed Mt. Denali in Alaska, the highest mountain in North America and an arduous but popular quest. In interviews with 360 climbers, Ewert (2001) found that social aspects, image, technical aspects of climbing, and catharsis/escape were important, but risk-taking was not motivationally important. The most important motives related to exhilaration, excitement, and accomplishment. Notably, patterns of motivation varied with degree of experience. In general, those with appropriate preparation may regard an extreme environment as a good place to recreate whereas others could not imagine it being enjoyable.

Csikszentmihalyi’s (1990) theory of “flow” offers a systematic and empirical phenomenology of peak experiences, and has been applied to a number of wilderness activities. Csikszentmihalyi (1975) studied accomplished individuals engaged in highly demanding and usually not extrinsically rewarding activities – people such as music composers, rock climbers, chess players, surgeons – and found that across these very different activities, subjects described similar peak experiences at certain times. This experience, dubbed by subjects as “flow” in consciousness, has these characteristics:

- Total concentration on the task at hand.
- A sense that action is automatic, with action and awareness merged in the activity.
- Clear goals and immediate feedback.
- A sense of control such that there is not conscious awareness of control but rather no worry about lack or loss of control; a sense of freedom of choice.

- A lessening of feelings of self-consciousness.
- Alteration of sense of time (speeded up, slowed down, standing still).

Flow experience produces strong positive feelings, a sense of competence, and strong intrinsic motivation to do the activity.

Flow is likely to occur when the person's skills are in balance with the challenge of a freely-chosen situation (Mannell et al., 1988). More precisely, it occurs when both the skills and challenge are slightly above the person's mean on both variables, as described by Massimini and Carli's (1986) "four channel" model (Fig. 8.1). When challenge is above the person's mean and skills are below, anxiety occurs; when skills are above the mean and challenge is below, boredom results; and when both are below the mean, apathy occurs. It is notable that challenge and skills have physical, cognitive, and emotional dimensions. The emotional dimension is important because flow results not from the danger itself but from the person's ability to minimize it by exerting control over risks that would otherwise produce anxiety (Csikszentmihalyi, 1975). Thus, this theory provides a more subtle and systematic way of understanding the attraction and the benefits of activities in extreme environments.

The flow model and similar models such as Martin and Priest's (1986) Adventure Experience Paradigm (AEP) (which predicts five types of experience ranging from "devastation and disaster" to "exploration and experimentation" depending on the balance of perceived risk and competence; Fig. 8.2) have been used to study wild nature activities such as river paddling (Priest & Bunting, 1993; Jones et al., 2003), mountain climbing (Fave et al., 2003; Stebbins, 2005), and snowboarding (Stebbins, 2005) (as well as many other leisure and non-leisure activities and variables). Such research confirms the intrinsically motivating nature of these activities, and suggests that risk-taking per se is not what is motivating. Instead it is the activity itself, the interplay of the person's complement of skills in interaction with an environment that elicits them.

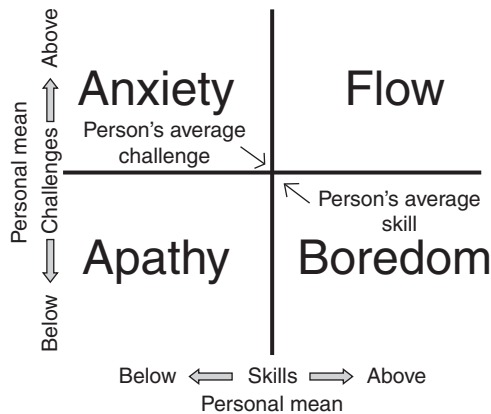


Fig. 8.1 Four-channel model of psychological flow. (Adapted from Jackson & Csikszentmihalyi, 1999.)

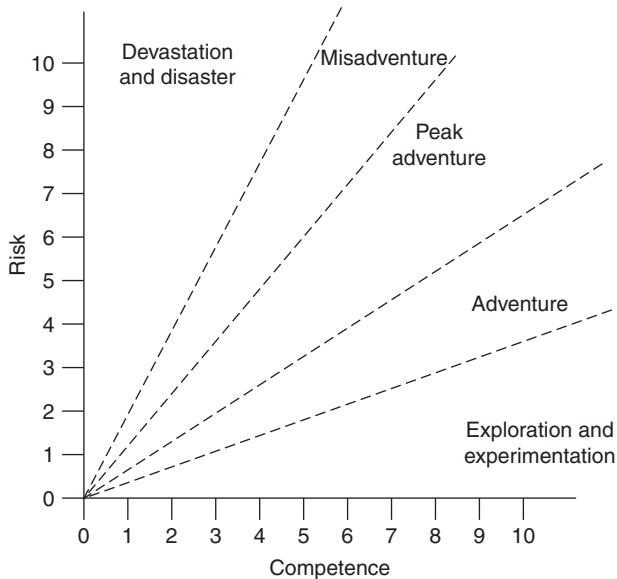


Fig. 8.2 Adventure Experience Paradigm. (Adapted from Martin & Priest, 1986.)

Activity in wild nature, connection and caring

Emotional associations between the highly positive flow state and the setting in which it occurs could lead not only to valuing nature but to a sense of connection to the wild setting. Nature protective activity is practiced by some of those who frequent wild areas, and who may value them as sites where flow has been experienced, perhaps partly in order to preserve the opportunity for future enjoyment. Is there also a direct role of nature, even in activity-centered adventure, and does it lead to caring about nature for its own sake? In a meta-analysis of adventure programs, Hattie et al. note that “the highest ranking of importance for participants is the enjoyment of nature” (1997, p. 76), and suggest that a theoretical model centered on forming relationships with nature could help explain the changes resulting from adventure programs.

The contribution of nature should be more apparent in programs that emphasize nature over activity-based adventure, such as a program run and documented by Greenway (1996) that emphasizes the cultural transition away from the urban everyday world and the layered “reconnection” with wilderness. The primary value experienced by his participants was the “perceptual shift” that occurred during time in the wilderness. Interestingly, 57% of women but only 27% of men stated that a main goal of the trip was to “come home” to nature, whereas 60% of men and 20% of women said a major goal was to conquer fear, challenge themselves, and expand limits. Women experienced the transition into the trip more easily than men, who had an easier time re-entering everyday culture.

Provocative insights into the positive psychological experience of wild nature were revealed by Beringer’s (2000a) qualitative study of five people, previously active in

nature, who had lost mobility (for 10 years or more) due to traumatic, life-changing spinal cord injuries. Beringer described how these subjects felt “distanced” from nature by their disability, but became more active observers with heightened sensitivity to nature. And although therapeutic regimes removed them from nature, and access constraints were frustrating, her subjects felt strongly that nature or outdoor pursuits accelerated healing. “Individuals seem to be able to forget and be free from their physical limitations, if only temporarily, while in nature” (Beringer, 2000a, table II). Psychically and palpably they felt “moved by nature” when they were able to access natural areas. Beringer’s work is interesting because the strongly risk/activity-based rationale of why adventure therapy works is relatively unavailable as an explanation for the benefit her para- and quadriplegic subjects described. Instead, natural places were more prominent. Based on this study, Beringer (2000a) suggests 12 ideas about how nature heals, through conveying a sense of continuity and stability, support, positive feedback, perspective, exploration of self and body, a slowing-down effect, freedom from social judgment, self-worth, transcendence, calming, and euphoria.

Wild nature and spiritual experience

Experiences in nature of both intense, challenge-induced “flow” as well as more subtle and nature-centered effects may be considered “transcendent” states of consciousness. Experiences that transcend the mundane, human-centered sphere have long been of interest in psychology. Some early figures even saw connections between spirituality and nature. William James (1902) noted that solitude in nature may be conducive to religious experience, particularly mysticism. Laski (1961) examined the contexts of ecstasy among religious and non-religious people, and found that nature was the most common trigger among non-believers and the third-most common among Christians. Among early depth psychology theorists, Carl Jung paid the greatest attention to nature, and considered elements of nature in myth and dreams as archetypes or ideas embedded deep in the human psyche: dreams “originate in a spirit that is not quite human, but is rather a breath of nature” (Jung, 1964, p. 36). Schroeder noted that Jung “viewed the wilderness as a symbol of the unconscious mind itself, and has regarded the relationship between modern civilization and nature as an outward reflection of the relationship between the conscious ego and the unconscious psyche” (2006, p. 15). Schroeder notes the implications: that in the unconscious “the division between our own minds and wild nature is not entirely clear-cut” (2006, p. 17), and that despite our alienation, time in wilderness and sensitivity to its emergent symbolic meanings can “reconnect us with the deepest part of our own minds” (2006, p.18; see also Schroeder, 1996). Cognate ideas have old historical roots. Despite the generally negative connotations of wilderness in early Christianity, Nash notes that “a succession of Christian hermits and monks (literally, one who lives alone) found the solitude of the wilderness conducive to meditation, spiritual insight and moral perfection” (1982, p. 18). (For a cogent discussion of secular versus specific spirituality (grounded in a metaphysically

defined “sacred” realm), and the implications for the investigation and facilitation of wilderness experience, see Beringer, 2000b).

Spiritual dimensions of wilderness experience have received much attention by researchers. An early empirical attempt is that of Rosegrant (1976), who suggested that people may have three kinds of religious experience. *Mystical* experiences vary in intensity and are regarded as “brief ineffable intuition[s] that the experienter is one with the universe.” But these may or may not be construed as meaningful; thus, *meaningful* experiences are those the person feels may “have a long term importance for his life.” Thirdly, *communion* is the sense of being mutually accepting towards and accepted by the other (Rosegrant, 1976, pp. 302–3, 309). Rosegrant was curious to test a speculation advanced by Aaronsen (1967) that mountain tops, deserts, and other settings where one can see “interrelationships between objects and each other and objects and space” are conducive to communion and mystical experience. Comparing the experiences of Outward Bound solo participants in two locations differing in their affordance of such an overview (one on a mountain top, the other in dense brush along a creek), Rosegrant found that subjects at the mountain solo sites did report more communal states of relating to nature. Meaningful experiences were modestly more likely on the mountain. In both settings, nature was not without potency.

Frederickson and Anderson (1999) used grounded-theory procedures to study participants in women-only backcountry experiences in powerful but contrasting natural settings: the Boundary Waters Canoe Area Wilderness (BWCA) of northern Minnesota and Arizona’s Grand Canyon. The all-female character of the group was important, but of primary interest were several facets of being in a vast, remote wilderness area, including direct contact with nature, periods of solitude, and the inherent physical challenge. Contact with wild nature gave the women a “great sense of freedom and release [due to] simply having the opportunity to go out and explore, rediscovering the sights and sounds of nature” (Frederickson & Anderson, 1999, p. 30). Different aspects were cited by participants at the two locations: wildlife in the BWCA, and the open sky in the Grand Canyon. A common theme in solitude was contemplating larger questions in their lives. With one or two exceptions, the participants lacked previous wilderness experience, and thus were unaccustomed to the physical challenges, which again differed dramatically between the flat, forested, and wet north, and the steep, open, and dry south locations. Some found just engaging in these challenges to be spiritually inspirational, and a recovery of parts of themselves left behind in their youth. The researchers also explicitly asked about the women’s thoughts and feelings about spirituality. Characteristics that emerged are summarized in Table 8.1.

The participants experienced the locations as spiritual due to the effects of the social setting as well as the ecological site. Social factors such as sharing stories of daily experience played a very important role in the women’s appreciation of their wild places. But an interesting difference emerged regarding the locations. Those describing the BWCA’s meaningful aspects talked about the setting as “an organic whole” or gestalt such as the “green wall” along the edge of lakes, rather than seeing individual trees (Frederickson & Anderson, 1999, p. 35), whereas the Grand Canyon group spoke about “individual features” more. The authors suggest that this may be because the BWCA lacks

Table 8.1 Reported dimensions and feelings related to spirituality. (Reprinted from Frederickson & Anderson, 1999, © 1999, with permission from Elsevier.)

Dimensions of spiritual and spirituality	Feelings associated with spirituality
Ineffable	Empowered
Intangible	Hopeful
Centering force	Grounded and secure
Heightened sensory awareness	Wonder and awe
Timelessness	Humility

opportunities to take in a panoramic vista where isolated features stand out and are important for navigation. This suggests the varying psychological affordances of different environments, helping answer Beringer's (2004) call for research to understand more specifically what about nature has psychological significance.

Williams and Harvey (2001) undertook a quantitative study of experiences in forest environments in order to identify the forms of transcendence that occur there, and to understand the qualities of forest environments that shape these experiences. They described six types of forest experience, which varied on dimensions which they interpreted as: fascination, novelty, and compatibility. Of the six types of forest experience, one type, described as "diminutive experiences," though rare, had a high level of transcendence. These moments were characterized by fascination with "compelling elements of the environment: tall trees, vast views, high waterfalls, extreme of heat or cold" (Williams & Harvey, 2001, p. 255) and were accompanied by feelings of insignificance and humility. Rather than producing a relaxed feeling of belonging, the environment seems potent, novel, complex, and inscrutable, and often contained a single compelling point of attention.

Williams and Harvey called a second type of very absorbing and transcendent experience "deep flow," which occurred in relatively open, familiar settings for which subjects felt affection and belonging. These environments, less novel and more compatible than those evoking diminutive feelings, induced flow in the sense of effortless attention and ease. Four other experience types were not transcendent but of interest: "non-transcendent experiences" were typified by low fascination, novelty, and compatibility, and occurred in environments that were hard to move through, familiar, and not potent seeming; "aesthetic experiences" (high novelty, low compatibility, less sense of insignificance); "restorative-familiar" (low novelty, attachment to place); and "restorative-compatibility" (high compatibility, a less emotionally intense form of deep flow). The authors note,

Nature does not move us simply because of activities undertaken in natural settings. Each natural landscape is a unique and complex system of matter, energy, human purpose and action. . . . Our understanding of the spiritual meaning of nature depends on recognizing the situational characteristics that contribute to deep emotional experiences in natural environments.

Williams & Harvey, 2001, p. 256

Conclusion

This chapter has surveyed several aspects of the psychology of wild nature, especially to describe the uses and values of wilderness, and the human experience of wild lands, forces, and creatures. Wild nature is highly valued in the USA, increasingly for indirect and intangible reasons, and it appears these values are shared broadly. Activities in wild nature are also popular. While the term “wild” has a certain relativity, areas or features with certain characteristics appear to produce fairly consistent psychological regularities in experience. These include solitude, natural forces and features that function independently of people, and remoteness presenting potential stresses and challenges. The literature on these areas sometimes confounds the natural, social, and activity aspects of the experience, and there is still little known about the psychological significance of the many different types of natural ecosystems, forces, and wild creatures. Nonetheless, this is an area of great interest to conservation psychologists and educators or others working with people outdoors to increase caring and connection to nature. Features of wild nature have long been perceived by at least some people as promoting experiences that give a sense of transcendence of the familiar human world, and union with a wider world, suggesting the unique ways in which nature has psychological significance.



Promoting conservation

Promoting sustainable behavior

- Identifying target behaviors
- Influences on behavior
 - External factors
 - Internal factors
- Models for changing behavior
- Collective behavior
- Changing the ideology of consumerism
- Conclusion

Psychologists have long been involved in attempts to promote sustainable behavior. In some ways these attempts have achieved less than was hoped for, yet there are many success stories to examine and imitate. Research on this topic has been so extensive that this chapter cannot hope to include everything. Our goals are to review some of the principal determinants of sustainable behavior, to discuss the interventions that target these determinants and the factors determining the success or failure of such interventions, and to provide illustrative examples of successful interventions. We close by examining some integrative attempts to evoke pro-environmental behavior.

Identifying target behaviors

Environmental degradation has multiple causes, and requires multiple interventions to change human behavior. What behaviors should be the target of change? Specific behavioral changes vary widely in their potential impact. Gerald Gardner and Paul Stern (2002; see also Stern, 2000) rightly caution behavioral scientists to pay more attention to this aspect, noting that a lot of research attention goes to issues, such as anti-littering campaigns, that do not have a major impact on environmental health. When considering how to promote sustainable behavior, both psychologists and the general public tend to think about curtailment behaviors – ones that require us to use less – rather than efficiency behaviors – ones that perform the same function but use fewer resources; efficiency measures, however, are often more effective. With limits not only on time and resources, but also on attention, it is important to choose high-impact target behaviors.

Nevertheless, even behaviors with little impact can be worth examination. Assessments of the effect of particular behavior changes should consider the long term as well as the short term, and indirect as well as direct effects. Picking up litter may have almost no impact on the overall health of the ecosystem, but an anti-littering campaign can serve to increase the salience of environmental issues (Gardner & Stern, 2002). In the right circumstances, people who take one step in a sustainable direction may proceed further along the same path. If people who engage in anti-littering behavior, for example, perceive themselves as motivated by concern for the environment, this may prompt them to take further, more effective actions. Research on the foot-in-the-door effect suggests that a small action may lead to further actions for the same cause, due to self-perception, conformity, a desire to appear consistent, and commitment (Burger, 1999). The strategy is not likely to work, however, if there are barriers to the larger behaviors, and research demonstrating that small steps of commitment gradually lead to more significant environmental actions is lacking.

In addition to considering the potential impact of a behavioral change, it is useful to consider the type of behavior that is called for. Our focus here is primarily on private-sphere actions. We identify three broad categories of individual behaviors: curtailment, behavior choice, and technology choice. Similarly, Kempton et al. (1992) described curtailment, management, and equipment investment as three ways of conserving energy (see also Stern, 2000).

As stated above, people often associate pro-environmental behavior with a reduction in consumption, or *curtailment behavior*. When people use fewer resources, they require less exploitation of the natural environment. This category encompasses reduction in purchasing (e.g. adopting a lifestyle of voluntary simplicity), reduction in water use (e.g. shorter showers), and reduction in energy use (e.g. lowering the thermostat). Less frequently thought of is a very important reduction, a reduced number of children in a family. The decision whether to have children, and when and how many to have, are among the most significant choices a family can make in terms of demand on environmental resources. Curtailment behaviors are often seen as requiring a personal sacrifice. People are more likely to respond positively to curtailment behaviors if they can be framed in terms of the advantages that will accrue, for example in personal savings, increased comfort, or social approval, rather than the costs that are entailed. On the other hand, the idea of using fewer resources is intrinsically appealing to some people. Ray De Young (1996) in the USA, Henk Wilke (1991) in the Netherlands, and Satoshi Fujii (2006) in Japan all found that intrinsic satisfaction can be obtained from frugality, and that positive attitudes toward frugality are associated with the intention to engage in certain types of curtailment behaviors. (Cf. our discussion of environmental virtues in Chapter 3.)

A second category of behaviors comprises *behavioral choices*: decisions not about whether or not to do something, but how to do it. Examples include using public transportation, buying organic produce, recycling, composting, managing one's land sustainably, or reusing products (e.g. buying used clothing). Although the effect of these behaviors is typically a reduced use of natural resources, the focus is not on doing or using less but on doing things in a different way, with less environmental impact. People are asked, not to buy less food, but to buy food that has been sustainably produced.

The challenge behind these behaviors is that they need to be done repeatedly in order to have an impact. Behavior change interventions must try to change someone's habits rather than merely influence a single decision.

The third category of behaviors involves *technology choices*: decisions about buying or using technological innovations, such as hybrid cars, energy-efficient appliances, low-flow showerheads, and green energy sources. These choices may be more effective than other behavior changes because they require only one decision to have a continuing impact rather than needing to be repeatedly enacted; also the amount of energy saved through technological improvements is often greater than that saved through behavioral changes. As Stern (1992) notes, they also are often perceived as improving the quality of life rather than representing sacrifice. However, they typically involve a financial outlay that may serve as a perceptual, or a real, barrier for many consumers.

Although our focus in this chapter is on the individual rather than the society, we do not mean to overlook the significance of more macro-level practices. Individuals and households consume only about one-third of the energy used in the United States (Gardner & Stern, 2002; see also Department of Energy statistics, available at www.eere.energy.gov/states/us_energy_statistics.cfm#consumption). Thus, the impact of individual behavioral choices is limited. Individuals can have a greater impact if they act collectively, either to implement community-level programs or to affect policy at a broader level through voting choices. We return to the issue of group-level behavior at the end of the chapter.

Influences on behavior

Most behaviors are multiply determined; influences include the weather, immediate prior experience, and pure chance. We review some of the causes that are most powerful as well as most amenable to interventions (Fig. 9.1).

External factors

Although many people instinctively explain behavior as due to individual preferences and styles, the situational context is typically more influential than is realized. One of the strongest, and frequently overlooked, determinants of behavior is simply what is allowed or enabled by the physical and social environment – the behavioral *affordances*. Some actions that would promote sustainability are not available options in some situations. Even when actions are physically possible, a lack of information about how to perform them is an effective barrier. In either case, the motivation to perform those actions is irrelevant.

Physical circumstances often prohibit curtailment choices. Lighting or thermostat settings, for example, are often set to fixed levels in office buildings, hotels, or rental units. People may not realize that they can reduce the temperature on their hot water heater, or know how to do so. Women often have little control over their fertility, with major consequences for the environment. Behavioral choices are also affected by the

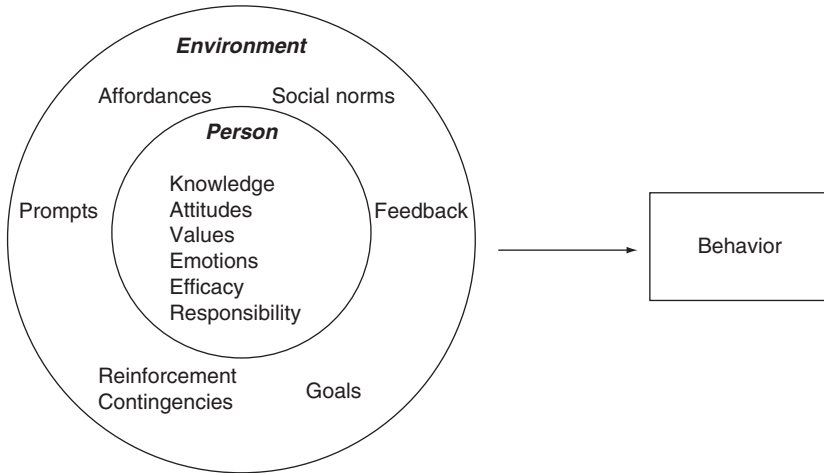


Fig. 9.1 Factors affecting behavior.

presence of behavioral options: littering is more likely when there are no garbage cans, taking the bus may be impractical with infrequent services or missing routes, and organic produce cannot be purchased if it is unavailable. The presence of options is a particularly important factor in considering technology choices: consumers cannot choose to buy cars that get 70 miles per gallon (mpg) if the market has not made such cars available. However, unsustainable options may also be precluded: people will switch to unleaded gasoline if leaded gas is no longer available.

Particular contexts not only allow or disallow sustainable behaviors, they also facilitate or hinder them. Recycling can be easy (bins provided by the city, placed in accessible locations) or difficult (consumers have to provide their own containers and transport them to a central location). Public transportation can be safe and convenient or dangerous and unreliable. The first step in any plan to promote a more sustainable behavior should be to evaluate ways in which that behavior is currently made easy or difficult and consider whether simple changes can be made to facilitate the behavior or if more significant investments in infrastructure are necessary.

Social norms constitute another important and underemphasized determinant of behavior. People are likely to do what they see other people doing. Michel-Guillou and Moser (2006), for example, found that French farmers who used sustainable practices were influenced more by social norms than by their own environmental awareness. Conformity is adaptive for several reasons. First, other people may have knowledge that we ourselves lack; by imitating the behaviors of others with more experience, we take advantage of their knowledge. If my neighbor establishes a backyard wildlife habitat, I not only learn that it is a possible and perhaps acceptable thing to do, I also get procedural information about how to do it. Second, human society rewards conformity. We tend to like people who behave in the same way we do and to dislike those who deviate. Both knowledge and social support are more available to those who conform than to those who do not, and the knowledge that others are behaving in a particular way implies the availability of social support for that behavior.

A recent experimental study by Nolan et al. (2008) demonstrated the power of social norms in affecting behavior. Among residents in a California town, a message describing the actual energy use of a typical homeowner was more effective in reducing energy use than a message based on environmental protection, social responsibility, self-interest, or merely behavioral information. Interestingly, a survey of (different) residents showed that they described social norms as the *least* important reason to conserve, citing environmental protection and benefits to society as the primary reasons. People are not always aware of the explanations for their own behavior.

Norms can be effective for curtailment behavior, behavioral choices, and technology choices, but there are differences to consider: it is easier to observe what someone does than to be aware of what someone is *not* doing (the products that are not purchased, the car trips that are foregone). It may be possible to highlight information about curtailment behaviors by describing them in more active terms: “I reduced my gas use by 15% by shopping once a week instead of twice.” Normative information can be obtained through direct observation of behavior (modeling) or through descriptive information – for example, “87% of Americans have donated to an environmental organization.” Targeting influential individuals to serve as models may be an efficient way of using norms to change behavior. Hopper and Nielson (1991), for example, used block leaders to prompt and encourage recycling. Compared to a group that only received information or information plus prompts, the participants who had a block leader showed personal norms with increased support for recycling. These norms, in turn, predicted recycling behavior.

As noted in Chapter 1, descriptive information about norms can be conveyed unintentionally, with potentially negative effects on sustainable behavior. In a classic study, Renee Bator and Robert Cialdini (2000) looked at public service announcements (PSAs) designed to reduce littering in a national park. Some of these PSAs included the unintentional message that littering is common. Bator and Cialdini showed that a PSA describing littering as normative, though undesirable, was less effective than an alternative statement that avoided the normative message. Many pro-environmental messages suffer from the same problem: while deploring the current state of the environment, they suggest that it is normal to engage in anti-environmental behavior. More recently, Cialdini and his students used the power of social norms to effect positive change in the proportion of hotel guests who reuse their towels. The researchers compared the standard message, “Help save resources for future generations” with one that evoked a descriptive norm, “75% of guests who stayed in this room used their towels more than once.” Whereas a modest 30% of guests reused their towels after the first message, nearly 50% reused towels in response to the second message (Nijhuis, 2007). Pairing descriptive with injunctive norms (e.g. “Many of our guests value conservation”) was even more effective than either message on its own (Schultz et al., 2008).

In a line of inquiry using discussion groups, Carol Werner (2003) has isolated some of the processes by which social norms operate. When high school students were randomly assigned to groups that received information about switching from toxic to non-toxic household products, Werner found that group norms (among groups that experienced guided group discussion) were a stronger influence than information alone (lecture) on post-meeting attitudes about toxics and alternatives (Werner et al., 2008).

Importantly, among the high school girls, the effect of norms was completely accounted for when *perceived peer endorsement* was added to the analysis. Endorsement, derived from content analysis of comments, included expressing preference for the non-toxics, asking questions, sharing knowledge, and giving toxics little praise. For the boys, discussion was also more effective than lecture, but others' endorsements did not mediate the relationship. Instead, the discussion seemed to stimulate them to process the information more deeply, and there was a separate normative influence as well. Clearly knowledge and social support were differentially important effects of norms for the two genders in this study.

The next set of influences on behavior is obvious but still undervalued: *reinforcement contingencies*. What are the positive or negative consequences of behavior for the actor? Behaviors that are rewarded are more likely to be repeated and behaviors that are punished are less likely. Through a vast body of research on behavior modification, psychologists have learned some core principles concerning the effectiveness of reinforcement schedules. One is that rewards are more effective than punishment. Punishing a behavior, for example with a fine, may reduce people's tendency to engage in that behavior, but alternatively it may just encourage people to look for ways to avoid detection, and although it tells people what they should avoid doing it does not always inform people about what they *should* do. In addition, punishment may arouse hostility and resistance if people feel that their behavior is being controlled. Pol (2002) has noted that laws, which traditionally served to punish people, have recently been developed to provide rewards for sustainable behavior: for example laws surrounding the use of eco-labels can reward the distributors of sustainably-produced food by granting them a marketing edge.

Many programs have been developed that use some combination of punishment and incentive to encourage sustainable behavior. Taxes and laws, for example, can provide negative consequences to discourage anti-sustainable behaviors. Because reduced consumption usually entails reduced costs, many curtailment behaviors include monetary incentives by default. Certainly, increasing the cost of a resource may decrease its use. Higher gasoline taxes are often advocated for this reason. There are several obstacles, however, that may hinder the effectiveness of this approach. One is that increased consumption often leads to the possibility of "economies of scale:" consumers may pay more, but the cost per unit is lower. Thus even when people do not need the greater amount, they feel that it is a financially wise choice to buy it. A simple analogy can be seen with food pricing. Cookies or doughnuts are often sold at the rate of, say, 50 cents each or \$2.50 for 6. As the store-owners know, the customer may feel the smart choice is to buy more than he or she originally intended. A second major barrier is that the savings may not be realized by the person controlling consumption. Hotel guests have no incentive to lower the thermostat or reduce the lighting in their rooms, because any savings will accrue to the hotel rather than to the person regulating the temperature. Finally, savings may seem too remote from the reduction in consumption for the consumer to make the connection. Although lowering the thermostat a few degrees will eventually reduce the heating bill, the savings will not show up until the bill is recalculated at the end of the year – by which time fluctuations in the price of natural gas may make it hard to see the impact.

Incentives have also been used to affect behavioral choices and technology choices; often, the incentive is provided by some institutional authority rather than representing an intrinsic part of the decision. Bottle bills – requiring a monetary deposit for beverages bought in glass bottles or cans, with the deposit to be reimbursed when the container is returned – encourage consumers to recycle containers rather than discarding them. Garbage collection programs in which customers pay by the number and/or size of can tend to reduce the amount of household waste that is produced. A little creative thinking can generate non-monetary incentives for conservation behaviors, such as reserved highway lanes for high-occupancy vehicles to reward people for car-pooling. Incentives should be close in time, and clearly tied, to the behavior being rewarded. When it comes to technology choices, incentives are designed to translate the long-term savings into something that can be appreciated in the short term. Although the more efficient technology will always pay off in the long term, rebates for hybrid cars, solar panels, or even compact fluorescent light bulbs may be necessary to encourage people to make the sometimes substantial investments that are required.

A recent success story in Niger shows both how incentives can work and why they may not. In the 1970s and 1980s, desertification was a major problem. Trees were a valuable ecological resource, holding soil with their roots and helping to reduce water runoff. In the short term, however, individuals could gain more economic benefit by chopping the trees down for firewood or construction, or to clear the ground for planting. Because trees were considered the property of the state, farmers received no immediate value for them; with little government oversight, there were no visible costs incurred by cutting them down. More recently, the government has allowed individuals to own trees. Farmers can make money by selling pods, fruit, and bark from the trees, which is more economically rewarding than the one-time sale of the wood. The roots and leaves also enhance the productivity of the soil. Researchers report the result: over 7 million new tree-covered acres in Niger since the mid-1980s, mostly without large-scale tree-planting projects (Polgreen, 2007).

One issue to consider is whether the incentive is designed to be permanent or whether it will be removed after a period of time, during which it is hoped that the behavioral change will have become habitual. A review of many studies on attempts to elicit sustainable behavior, by Dwyer et al. (1993), suggests that behaviors tend to revert to baseline levels when such temporary incentives are removed. This is not a problem for technology choices, which are typically one-time events, but is more of an issue for repeated curtailment behavior or behavioral choices.

Perhaps counterintuitively, incentives should be large enough to motivate the behavior, but not too large. Research on self-perception and intrinsic motivation shows that overly large rewards for behavior can reduce the tendency to engage in the behavior when the reward is not present. People assume that the behavior must be unpleasant if such a large reward is needed. In addition, people's inferences about their own motivations are affected by the reward structure: if I have done something for which there is a large financial reward, I assume that I have engaged in the behavior in order to get the reward. If I have done something for which the reward is less substantial, I will be more mindful of the intrinsic reasons for the behavior, such as my own satisfaction in helping to protect the environment (De Young, 1996). Non-monetary incentives, such as



Fig. 9.2 Prompts on light switches are common. (Photo courtesy of Susan Clayton.)

social approval, may sometimes be more effective than monetary ones because they do not as clearly undermine the intrinsic reasons for the behavior; people do not tend to believe that they are recycling to get the approval of their neighbors, even if they are.

For incentives to work, they need to have an informational as well as a motivational component. That is, people need to be aware of the opportunity to perform a particular behavior and to recognize their own success at performing the behavior, as well as to know that such behavior will be rewarded. There are many things people fail to do simply because they do not think about it. *Prompts* are reminders to people that a particular behavior is called for, ideally located both physically and temporally close to the behavior that is prompted. A classic example is the label on a light switch reminding people to turn it off (Fig. 9.2), or a sign on a recycling bin saying “Please recycle.” Framing the prompt in a way congruent with the audience’s worldview may reduce reactance. One of us observed that electrical light use was reduced in a student coop house where the light switch panels bore a prompt. In this city, served by a private electrical utility, the message was effective among the students because the sticker had a caricature of a person’s face, positioned so that the switch was the person’s nose, and the verbal message was “Flip off capitalist power.”

If people are positively disposed toward performing the behavior and the effort required is minimal, a reminder may be all they need. The reminder may not be effective, however, if it is perceived as rude or demanding. The psychological theory of reactance (Brehm, 1966) suggests that too obvious attempts to control behavior often lead to a backlash. People may deliberately ignore a prompt, or engage in a prohibited behavior, in order to demonstrate their independence. De Young reports, anecdotally, that when recycling was made mandatory in one area, “homeowners [were] found to have neatly stacked recyclable bottles and cans around the inside circumference of the clear plastic bags used for recycling and then filled the center with nonrecyclable trash” (1993, p. 498). Indeed, a general caution in all behavior change campaigns is to avoid

creating a controlling environment and to promote an Autonomy Supportive Environment (discussed in Chapter 10).

People also need to know whether they have been successful in performing the behavior. If I intend to take shorter showers or water the garden less frequently, do I know if I have been effective in reducing my water usage? Individual water meters provide the *feedback* people need to monitor their own effect, and tend to result in lower water use than when people pay a flat rate (Van Vugt, 2001). In some cases, the feedback itself may provide enough reward to motivate the behavior: recycling programs often provide continuously updated information about “how many trees have been saved” by the amount of paper recycled. A target or *goal*, along with feedback about the progress towards it, can be both informative and motivational: it suggests what kind of change is possible as well as desirable, and lets people know how successful their attempts to work toward the goal have been.

Internal factors

All of the above factors are external to the individual – his or her personal dispositions or tendencies are not the focus. But internal tendencies and preferences do matter in determining sustainable behavior, particularly if the goal is to influence a wide range of behaviors rather than a single specific action. Although they may be harder to manipulate than are external contingencies, these factors need to be considered in attempts to promote pro-environmental behavior.

The main principle of environmental education, as well as of many persuasive attempts, is that *knowledge* matters: people are more likely to act in environmentally sustaining ways if they understand the threats faced by the environment and the implications of their behavioral choices. In a thorough review of research, Hines et al. (1987) found that knowledge was a reliable predictor of environmental behavior (correlated at $r = 0.30$). Kals and Maes (2002) note that a general ecological awareness is a powerful predictor of a wide range of sustainable behavior, including energy consumption, traffic-related behavior, and political actions. There may be a limit beyond which increasing knowledge has no impact, but at low levels of knowledge people may lack information about the behavioral options available and/or the environmental impact of those options. Think of the confusion surrounding basic decisions such as “paper or plastic?” grocery bags. In the absence of clear information about the consequences of different behaviors, an intention to protect the environment will not be translated into effective action. Notably, the review by Hines et al. found that knowledge was even more strongly predictive of behavior among people who were environmentalists ($r = 0.69$) than those who were not ($r = 0.27$), showing the importance of adding information to intention.

Attitudes are typically expected to predict behavior. As described in Chapter 2, Ajzen’s (1991) Theory of Planned Behavior describes attitudes as a key determinant of behavioral intentions; Hines et al. (1987) did find that attitudes were associated with pro-environmental behavior (at $r = 0.35$). Attitudes are more strongly associated with behavior when they are based on personal experience, specific to the behavior, and

salient. So, if people have positive attitudes toward specific sustainable behaviors they only need to be reminded of those attitudes (increasing salience). If their attitudes are negative, they need to be persuaded otherwise. Decades of research on attitude change have shown that it is important to consider both the source and the format of a persuasive message, as well as its content. A credible spokesperson and an attention-getting message may be as, or more, important in effecting attitude change than the informational content of the message.

Mass media campaigns are attempts at attitude change that are typically well informed by social-psychological principles of persuasion. Messages in the mass media are available to a wide audience and have the opportunity to be vivid and memorable through the use of catchy music, bold visuals, dramatic scenarios, and famous actors. The spokesperson can be credible because they are attractive, expert, and/or high in social status, or alternatively they can be seen as similar to the audience member and trustworthy for that reason. Bandura (2002) describes a successful use of the mass media to reduce fertility rates in Mexico. A serial drama (soap opera) was developed to contrast the positive experiences of a small family with the marital conflicts and financial stress experienced by a large family. A number of episodes explicitly depicted how a woman could use family planning and overcome resistance from her husband, all in the context of an engrossing family drama. Evidence for effectiveness is provided by Sabido (1981, cited in Bandura, 2002), who states that new contraceptive users increased 32% in the year during which the drama was first broadcast, and the birth rate fell by 34% over a 5-year period in the viewing area for the dramas.

Values are also important determinants of environmental behavior. As described in Chapter 2, Stern et al.'s (1999) Value–Belief–Norm model describes the impact of personal values in determining a personal norm, or felt obligation, to act in environmentally protective ways. Values such as openness to change and concern for others are related to a variety of sustainable behaviors, including recycling, environmentally conscious purchasing, and political activism (Karp, 1996). It is not easy, or necessarily desirable, to change someone's values. However, understanding the connection between values and behavior can be useful in encouraging behavior change by targeting the values that people already hold.

People have strong emotional responses to the environment, which may include love and admiration as well as fear and disgust. Research suggests that *emotion* is a particularly important predictor of sustainable behavior. Berenguer (2007), for example, was able to increase emotions associated with empathy (e.g. sympathy, compassion, warmth) by encouraging students to “try to imagine how [a bird or tree] feels.” This empathic response, in turn, was related to a greater willingness to allocate funds to an environmental protection organization and to a stronger perceived obligation to help nature. Elisabeth Kals and her colleagues have found that both positive feelings of love for nature, and negative emotions such as indignation about the pollution behavior of others, relate to the willingness to commit to behaviors such as installing water-saving devices in the household. These negative emotions were directed toward others and not toward nature. Nonetheless, negative emotions toward nature do not seem to inhibit willingness to act to protect it, and in fact may indicate a certain kind of interest in it (Kals & Ittner, 2003). Kals' research on the importance of emotions becomes even more

significant in light of her finding that environmental education was able to increase an emotional response to nature, suggesting that emotions can be a useful route for encouraging sustainable behavior.

One emotion to treat with some caution is fear. Although doomsday scenarios of environmental devastation might seem to encourage pro-environmental behavior, research on fear appeals shows that they can backfire. Fear-inducing strategies have been used widely for behaviors such as drinking and driving, delinquency, and health behaviors, and studies have typically found such strategies to be ineffective. The reason is that the messages often focus only on the severity of the negative consequence of the behavior. People also need to believe that there is a high probability of the fearsome consequences actually occurring before they act preventatively (Gardner & Stern, 2002). Thus credible information on the probability of the negative consequence needs to be verified and communicated. In addition, when people are too fearful, particularly when they think there is little they can do about the threat, they are likely to respond with denial (see discussion of protection-motivation theory in Chapter 2).

A moderate amount of fear can be a useful motivating factor if people are simultaneously shown something they can do to reduce the threat. Hine and Gifford (1991) found that a moderate amount of fear about pollution, induced via the presentation of vivid slides, increased the donation of money to an environmental organization compared to a group that did not see the slides. Meijinders et al. (2001) found a similar effect in a Dutch sample: participants who saw a moderately fear-inducing video about the effects of carbon dioxide were more influenced by an argument about the importance of buying energy-efficient light bulbs than were participants who merely saw an informational video. A perception of environmental risk, accompanied by information about actions that can be taken to avert the risk, can be an effective motivation for action. Based on surveys of a representative sample of 1225 US adults, O'Connor et al. (1999) found that risk perceptions had an independent effect on environmental behaviors, separate from their relationship to general environmental beliefs and knowledge.

There is no point acting when one believes one's actions will have no effect. *Self-efficacy* pertains to a person's perception that she or he is able to successfully complete an action. Bandura (1977) suggested that this belief is an important determiner of one's ability, and that it also increases motivation for the task. Ajzen's (1991) Theory of Planned Behavior includes perceived behavioral control, or perceived efficacy, as a direct predictor of both behavioral intention and behavior. In Hines et al.'s (1987) review, perceived efficacy was a stronger factor than knowledge or attitudes in predicting behavior ($r = 0.36$). Research has shown that the belief that recycling is effective is associated with recycling (De Young, 1986) and that the belief that one can have an effect on environmental problems is a predictor of political action on behalf of the environment (Sia et al., 1985/1986). Some people have greater confidence in their own effectiveness than others. But perceived efficacy can also be manipulated. The popular book, *Fifty simple things you can do to save the earth* (Earthworks Group, 1989), was designed to reassure the mass public that they could take effective action (see also Fig. 9.3). Providing people with knowledge about behavioral choices can also serve to increase their perception that they have some control in bringing about a sustainable environment (Geller, 1995; Eigner & Schmuck, 2002).



Fig. 9.3 Encouraging a perception of self-efficacy. (Photo courtesy of Susan Clayton.)

Related to the perception that one *can* do something to address environmental problems is the perception that one *should* do something. One of the barriers in encouraging individuals to address societal problems is the diffusion of responsibility – the sense that someone else will do something, “it’s not my issue.” In order to act, people need to feel a personal responsibility. A classic series of studies by Bibb Latane and John Darley (e.g. 1970) showed that even a perceived need for help may not result in helping if a large number of people are available to help and there is no clear reason why one person rather than another should take action. In several studies of German citizens, Kals found that an internal *attribution of responsibility* to protect nature is a significant predictor of willingness to act in pro-environmental ways. In a sample of 445 Swiss adults, feeling personally responsible for addressing pollution was associated with pro-environmental behavior (Kaiser & Shimoda, 1999). Hines et al. (1987) found a correlation ($r = 0.33$) between perceived personal responsibility toward the environment and behavior; and, as noted earlier, Stern et al. (1999) found a personal norm to be a direct determinant of behavior. Conversely, a sense of anonymity or depersonalization may reduce sustainable behavior.

Trying to increase someone’s sense of personal responsibility is tricky. One strategy involves asking people to make a commitment to act in pro-environmental ways. Having promised to behave sustainably, people should then feel a responsibility to

fulfill that commitment. In their review, Dwyer et al. (1993) found that a commitment to act does increase the likelihood of acting; Hines et al. (1987) found a correlation of 0.49 between verbal commitment and behavior. Commitments are more effective when they are written rather than verbal and public rather than private, and they must be voluntary rather than forced.

An internal factor that can be triggered by external factors is described by Festinger's (1957) theory of *cognitive dissonance*. According to this influential theory, holding two psychologically inconsistent states generates an unpleasant feeling of dissonance, and people will work to eliminate it or reduce it. Inconsistencies can exist between two beliefs, or between beliefs, attitudes, or behaviors. Examples would be advocating for reductions in energy use while driving a gas-guzzler, or believing that climate change is a threat while opposing measures to address it. There are many ways to avoid or reduce dissonance without changing behavior, for example by discrediting information that is discrepant with beliefs or behaviors (e.g. denying climate change), by re-evaluating the importance of an attitude or behavior (e.g. one's individual climate impact is too small to worry about), or by justifying one's behavior in other ways (e.g. arguing that inefficient cars are safer). Dissonance can also make changing behavior difficult because a new behavior may be inconsistent with existing beliefs about why someone follows their usual routine. But dissonance may motivate behavior change in a direction that is more consistent with one's attitudes. This is the route that many environmental advocates want to foster by alerting people to the disjuncture between their pro-environmental attitudes and their anti-environmental behavior.

Cognitive dissonance may also be used to bring about attitude change. If behavior is changed first, the attitude may change to become consistent with the behavior. In a study by Werner and colleagues (1995), people who participated in a curbside recycling program developed more positive attitudes after 4 months than did those who did not participate, despite the fact that there were no apparent attitudinal differences between the groups before the program was implemented. Presumably, dissonance encouraged the attitudes to shift in order to be more consistent with the behavior. A small incentive may be more effective at inducing dissonance. As noted above, for a behavior change to last, a person must attribute his or her behavior change to the self; a large incentive is so clearly responsible for counter-attitudinal behavior that the person experiences little or no dissonance. Greater dissonance is also generated when a public action or statement is contrary to one's private thoughts, for example when a commitment is written and displayed. If the new action or belief goes contrary to one's reference group (perhaps one's family), who give reasons for not joining, then there is an even stronger force to internalize the choice as one's own.

It should be noted, however, that people vary in their sensitivity to inconsistency both within and especially between cultures. Of significance for international conservation, people in cultures that foster interdependent selves, such as many Asian cultures, rather than independent selves, such as Western cultures, place less importance on cross-situational consistency, and on consistency between attitude and behavior (Kim, 2002). Because an interdependent self is much more situated in one's roles, relationships, and positions, whereas an independent self's identity rests on internal attributes (Markus & Kitayama, 1991, 1998), inconsistencies are less likely to matter to

the former. From the interdependent self's view, maintaining good relationships is more important than always behaving in a way that expresses one's attitudes and values. There has been little study of this kind of cultural difference, however, in the application of cognitive dissonance theory to environmental behavior change.

Behavior is complicated and a large number of factors affect the tendency to engage in sustainable behavior. It should be clear, though, that many of these factors are interdependent. Knowledge and values affect attitudes, and the reverse is also true: once attitudes are changed, a person may then seek more knowledge to support his or her position. Perceived efficacy affects perceived responsibility. Emotions can be causes and effects: perceived responsibility may lead to guilt; a value for nature is associated with love. Even external and internal factors are not independent. As described above, using incentives to motivate a behavior may undermine intrinsic motivations to act. Conversely, successful attempts at behavior change may change attitudes in a positive way, through self-perception. An effective attempt to foster sustainable behavior will integrate multiple factors. We review several of the most commonly discussed models.

Models for changing behavior

Applied behavioral analysis (ABA), an approach to promoting sustainable behavior that has been championed by Scott Geller (e.g. 1989, 2002), includes three basic principles: (i) it is focused on an observable behavior; (ii) it looks at external rather than internal factors to improve performance; and (iii) it utilizes principles of behavioral reinforcement. The process has been described with the acronym DO IT: *define* the target behavior (attending to the effectiveness as well as the feasibility of the proposed behavioral change), *observe* the occurrence of the behavior under ordinary circumstances (and note existing barriers and reinforcements that affect the occurrence of the behavior), *intervene* to modify the behavior (using tools such as prompts, rewards, and feedback to respond to factors identified), and *test* the effectiveness of the intervention.

The ABA model focuses attention on external factors not because the internal factors are irrelevant, but because they are not amenable to direct intervention. Geller is clear about the need to consider internal motivations. In a 1995 article titled "Actively caring for the environment: An integration of behaviorism and humanism," he attends to some of the dispositional predictors of pro-environmental behavior, such as self-efficacy and a sense of belonging, and describes how these variables can be maximized through environmental contingencies. Self-efficacy, for example, can be increased if tasks are broken down into discrete smaller steps and people are given frequent positive feedback about their success in meeting short-term goals (Geller, 1995). Only if people "actively care," according to Geller, will they do enough to protect the environment. Both action without care, and care without action, will be insufficient.

Doug McKenzie-Mohr advocates an approach that he calls *Community-Based Social Marketing* (CBSM). This involves four steps: identifying barriers and benefits to an activity, developing a strategy for change, piloting the strategy, and evaluating the strategy (McKenzie-Mohr & Smith, 1999). Identifying barriers and benefits involves a close look at behavioral affordances. The strategy for change includes an emphasis on

commitment, prompts, norms, incentives, and communication. CBSM is similar to ABA in its focus on manipulating external factors as well as in its emphasis on collecting information before the intervention and on assessing its effectiveness afterwards. CBSM, however, does more to focus on the social context within which the intervention occurs. Social support for behavior, including supportive norms, will increase the likelihood that a behavioral intervention will work. McKenzie-Mohr's website (www.cbsm.com) includes a wide range of information as well as descriptions of successful case studies based on CBSM principles.

A third approach is based on the *Elaboration Likelihood Model of Persuasion* (Petty & Cacioppo, 1981; Petty et al., 1995), which suggests that persuasive messages may work one of two ways: by activating superficial associations, or by provoking deeper cognitive reflection. Werner (2003) developed a model of the deep elaboration type that stresses specific social factors omitted by ABA or CBSM. Her psychological–social–environmental transactional model includes these key elements (Werner, 2003):

- Embed desired change in individuals' social groups.
- Use persuasive messages about behaviors embedded in the actual physical environments that individuals occupy and the behavior streams or scripts they already use.
- Use messages that strongly convey attitudes so that they will be “scrutinized . . . accessible and likely to guide behavior” (Werner, 2003, p. 37).
- Recognize that change is a dynamic process in which information is effective at different stages, and that the same information may be relevant in new ways at different times.
- Encourage long-term change, including institutional supports.

Any attempt to evoke behavioral change in a real social setting must be tailored to the specifics of that setting. Incentives (e.g. lower utility bills, enhanced sense of community) that matter to some groups will not matter to others (those who do not pay the utility bills, those who are not long-term residents). Some persuasive messages will work for people who have not thought about the issue, while others are better for a more informed audience. An analysis of the target behavior and target group is necessary before planning an applied intervention (Box 9.1).

Collective behavior

Individuals are the ones who decide to change their behavior, but change must occur at a broader level to have a significant impact on the environment. Only by joining together can individuals elect political officials with pro-environmental positions, enact policies to protect habitats from development, or devote societal resources to the development of greener technologies. A conceptualization of environmentalism at the group, rather than the individual, level leads to the consideration of the behaviors Stern et al. (1999) identified as pro-environmental policy support, active citizenship, and committed activism. Policy support means an acceptance of environmental policies, whose goals may require some sacrifice; active citizenship includes low-risk actions like writing letters, joining environmental organizations, signing petitions, and staying

Box 9.1 The Stages of Change approach

When considering a general shift in behavioral style rather than more specific behavioral changes, some useful information may be gleaned from clinical and health psychologists. Therapists often work with individuals who know that certain behavioral patterns would be preferable, but resist adopting these habits: for example, people trying to quit smoking, exercise more, or reduce their use of alcohol. James Prochaska and Carlo DiClemente (2005) devised the Stages of Change model to help understand how individuals might come to terms with the need to change their behavior, and what techniques might be most effective for individuals at different stages (Table 9.1). As individuals face the reality that current patterns of behavior are environmentally unsustainable, they may move through the stages shown in Table 9.1 in deciding how to modify their own habits. One can imagine how the different internal and external factors discussed above – knowledge, reinforcements, social norms – might be more or less effective depending on an individual's stage of change.

Table 9.1 Stages of Change model (Prochaska & DiClemente, 2005). (Adapted from http://www.cellinteractive.com/ucla/physician_ed/stages_change.html.)

Stage of change	Characteristics	Techniques
Pre-contemplation	Not considering change	Encourage self-exploration Explain and personalize risks
Contemplation	Ambivalent about change	Encourage consideration of pros and cons of behavior change Identify and promote positive outcome expectations
Preparation	Planning to act within a month	Encourage small steps Ensure individual has needed behavioral skills
Action	Practicing new behavior	Focus on social support Bolster self-efficacy
Maintenance	Continued commitment to sustaining new behavior	Reinforce internal rewards
Remission	Resumption of old behaviors	Evaluate trigger for relapse

informed; and activism means political activity such as extensive involvement in movement organizations, participation in demonstrations, and collective boycotts. Research that has examined citizenship actions tends to find the more active forms are affected by the same variables as individual behaviors, but depend on knowledge and skill in action strategies, and may be more strongly linked to identity.

Group membership may provide a bridge between individual action and societal impact. Olli et al. (2001) surveyed over 3000 members of Norwegian environmental organizations and the general public about their environmental attitudes and behaviors, finding that belonging to a group had an impact on behavior beyond that accounted for by attitudinal differences. Certainly one's reference groups will carry their own

social norms, which may differ from the broader societal norms. Staats et al. (2004) describe an effective way to incorporate social networks into programs to promote pro-environmental behavior. One hundred and fifty Dutch citizens met in small groups over a period of 8 months to discuss possible pro-environmental behaviors and to share tips. They were given periodic feedback about their effectiveness in saving energy both as individuals and as groups. Of 38 target behaviors, 20 showed improvements between the start of the program and the final data collection, 2 years later. This was not true for a control group who did not participate in the groups. Staats et al. speculate that the effect of the groups was to make people more mindful about otherwise habitual behaviors. The groups also provided social support for behavior change attempts as well as practical information.

Wiesenfeld and Sanchez (2002) describe three types of community participation: a public hearing, at which community members can voice their opinions; stakeholder negotiation, in which the interests of community members are considered in establishing some environmental position or policy; and participatory planning, in which community members are fundamentally involved in designing and implementing an environmental program. Reviewing several examples of community participation in Latin America, Wiesenfeld and Sanchez identified important fringe benefits: the community tends to experience a heightened sense of group identity as well as an increased sense of empowerment. This strengthened identity, in turn, can motivate further actions to protect the local environment. Pol (2002) went so far as to suggest that sustainability is not possible in a community that does not have a social identity.

Eigner and Schmuck (2002) describe the beginnings of an ambitious project to change the energy use of an entire German village by convincing inhabitants to convert to biomass for their heating and energy uses. Many of the suggestions for promoting the success of the project relate to the spread of social information: involving prominent sponsors, making personal contact, using existing social networks to spread information, involving the media, emphasizing the “personal conviction and authenticity” of spokespersons, and making an active effort to avoid associating the project with existing group divisions (such as political groups). Attending to the social network also involves recognizing that not all positions in that network are equally influential. Some individuals are more effective than others in prompting others to copy their actions. Those trying to mobilize community-level change should recognize the importance of involving individuals in prominent positions, who are looked up to as sources of information, and/or who come into contact with a greater number of their fellow citizens than the average person.

Changing the ideology of consumerism

Many of the approaches to behavior change we have discussed emphasize highly targeted behaviors and incremental individual steps. To effectively reduce environmental impact, however, we need broad changes in lifestyle, particularly regarding consumption. Such shifts might draw from altruistic motivations, such as a feeling of obligation to future generations. But they might also derive from reassessing how existing values and life priorities are met. Does consumption make us happy?

In 1974, Easterlin published a study suggesting that this was not the case. Easterlin found that people in countries as diverse in income as Nigeria, the Philippines, Yugoslavia, Japan, Israel, and West Germany tended to report medium levels of happiness. Americans were a good deal happier than the norm, on average, but so were people from low income Cuba. This finding was so surprising that it is referred to as the “Easterlin paradox.” Psychologist Michael Argyle (1987) explained it by saying that people judge their happiness by comparing themselves with others on the attainment of whatever values are held in high esteem in their society. Since most people in most places see a range of others both above and below themselves, they will rank themselves near the middle, regardless of their level of attainment relative to other countries. Americans in 1974 probably had learned to link status to material consumption, and were aware of their relative affluence compared to residents of other countries, accounting for their higher self-rating. In Cuba, different values, such as commitment to the collective, may have been more important, and Cubans’ happiness was based on their perceived relative advantage on these values.

More recent data from countries spanning a range of per capita domestic production show increasing support for a link between affluence and happiness (Leonhardt, 2008). Many countries now use Western-style material consumption as the value by which they judge happiness. It is unfortunate that happiness has been paired so effectively with consumption, for studies of what actually does lead to life satisfaction, across societies, do not rank material consumption very high (Kasser, 2002). Significantly more important to happiness are: quality of marital and family life, friendships, and other important social relationships; meaningful work; and leisure to develop one’s talents (Argyle, 1987). Although people naturally understand this, advertisers are adept at suggesting that buying the appropriate products will bring social and personal fulfillment. People might, however, be able to recognize and reorder their actions to achieve happiness in their choices. A small but substantial movement in this direction in Western countries takes various approaches. One is to try to challenge the advertising system that manufactures needs (see, for example, the Media Foundation’s popular Adbusters campaign, <http://www.adbusters.org/home/>). Another is to try to reduce material desires while also helping people more directly fulfill their truer values. Organizations pioneering this route include the Center for a New American Dream (<http://www.newdream.org/>) and those promoting voluntary simplicity, such as the Northwest Earth Institute (<http://www.nwei.org/>). These early, apparently countercurrent, efforts may lead to wider change because they provide a “social proof” of alternatives and they widen the range of options upon which cultural selection may operate.

Conclusion

Changing behavioral affordances is effective and durable. Incentives are effective but tend not to generalize, and behavior often returns to baseline when the incentives are removed. Punishments may be effective but may also cause resentment and creative attempts to subvert the attempted behavioral control. Prompts and feedback are effective but people tend to habituate to prompts and the feedback needs to be maintained,

perhaps incorporated as an intrinsic part of the behavioral context. Eliciting commitments tends to be an effective and lasting way to change behavior, perhaps because it serves to transfer the motivation from an external source (pleasing others) to an internal one (living up to one's promises). This, in turn, can lead people to discover or generate additional internal benefits, such as the feeling of satisfaction from fulfilling personal norms.

To achieve the kind of large-scale behavioral changes that are demanded by environmental challenges, both internal and external factors are important: people must move beyond specific behaviors to a more general way of thinking about consumption and about their impact on the environment. As more people act on their support for pro-environmental behavior, they will help to create social norms and societal infrastructure that will facilitate further progress.

Community psychology and international biodiversity conservation

- International biodiversity conservation
- Common pool resources and models of governance
 - New conceptions of the commons
 - Social capital and its limitations
- Psychology, culture, and local knowledge
- Accounting for the costs and benefits of conservation
 - Psychological costs of displacing populations for conservation
- Conservation and all-too-human psychology
 - Psychological biases and emotion
 - Conservation and conflict
- Conclusion

Community, as the most immediate social grouping larger than family or friends, constitutes an important context for conservation. “Community” has positive, even romantic, connotations for many people. We tend to think of community as a small spatial unit, homogeneous, and with common visions. The reality is more complex. Communities need not be based on shared location; they can be interest based, values based, or professional; global or face to face, distant or virtual. Communities always have multiple interests and actors, and links with other entities at different scales. German sociologist Tönnies (1887/1957) distinguished two concepts of community. *Gemeinschaft*, which emphasizes traditional norms, deep history, personality, tradition, close-knit relationships, and religious bonds, encourages putting a higher value on the group’s interest than one’s own. *Gesellschaft* is pervaded by modernity, rationality, and science, and is made up of specialized roles that are coordinated via markets and bureaucracies; the actual occupants of those roles are unimportant. In either case, communities are composed of people who differ by status, power, social prestige, intentions, and worldview. They may or may not be harmonious, and their relations to large-scale institutions may be positive or negative (Agrawal & Gibson, 2001).

This chapter blends two aims. One is to describe key dynamics involved in community psychology and community-based conservation. The other is to feature conservation of inhabited landscapes, parks and protected areas, and biodiversity. Pretty (2003) estimates that in all countries, between the early 1990s and 2002, 455,000–520,000 new

community-based groups dedicated to local natural resource management were formed, involving 8–15 million households. In many ways, the human dimensions of these efforts are the same whether they occur in the developing world or in industrialized countries, but in other ways there are distinctive differences. In recent years, conservation innovations emerging from community-rich developing world contexts have begun to be transferred back to the industrialized world. This is an urgent frontier for the use of psychological tools, and this chapter will consider the relevance of psychological research to these applied settings. As is true throughout this book, we see human–nature issues as being human–human issues, or human–nature–human: the negative environmental effects we suffer are the result of human actions, often mediated by groups, institutions, conflict, and the welfare of others. Poverty, human rights status, and power are ultimately inseparable from the human relationship to nature. This chapter confronts the challenging intersection of human communities and perhaps the most fragile, precious, and irreplaceable environmental value: biodiversity.

International biodiversity conservation

Conservation of biodiversity has become an international enterprise, undertaken by researchers, non-governmental organizations (NGOs), governments from the local to international level, businesses, and philanthropists. Our concern here is with programs that, in the process of directly protecting species and ecosystems, necessarily work with residents in or near areas of high conservation priority. Local people may depend directly on natural systems for their food, water, and materials, as well as for goods they trade in raw or manufactured form. They may also be employees of small or large industries with local facilities. When tourism is present, local people are involved. Such populations directly impact, and are impacted by, local ecosystems.

Official land conservation efforts originated with the establishment of national parks, preserves, and forests in the late 1800s and early 1900s in the United States and Europe. Generally, such parks were formed by legislating boundaries around areas of unusual aesthetic value, excluding people from pursuing traditional uses, and declaring recreation and preservation of the land and biota as the main purposes. This became the model for parks in other countries. Thus, when former colonies became independent, they often imposed governmental control on large areas of public land. Conservation became international with the establishment of institutions such as:

- The International Union for the Conservation of Nature (IUCN, also known as the World Conservation Union and established in 1948), which reports on species' status and coordinates teams of experts working on species survival.
- The Convention on International Trade in Endangered Species (CITES, brought into force in 1975), whose purpose is to convene nations and make rules to stem trade in endangered species.
- The United Nations Educational, Scientific, and Cultural Organization (UNESCO) Man and Biosphere program of reserves, under which parks are recognized as having international conservation significance.

- Several large NGOs that focused on preserving habitats and species, such as the Wildlife Conservation Society, the World Wildlife Fund, Conservation International, and the Nature Conservancy.

At the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, the Convention on Biodiversity was advanced, a treaty signed by 189 countries currently (not including the United States). UNCED emphasized the need to integrate human welfare and conservation, and sparked a surge of small but well-networked community-based NGOs worldwide. Contemporaneously with such institutions came the emergence of conservation biology as a research community focused on preserving land and species in a context of multiple threats. Conservation biologists deployed conceptual models such as island biogeography and population biology into tools such as gap analysis for designing preserves in fragmented landscapes. Augmented by increasingly accurate geographical information system (GIS) databases of species distribution, and remote sensing (satellite) data on vegetation and land use, organizations focused on priority areas such as “ecoregions” or “biodiversity hotspots.”

Biodiversity exists on multiple levels. It is not evenly distributed across the globe, and there are different patterns of species rarity. Conservation biologists often cannot say precisely what the effects of a given species’ loss would be because of unknown interdependencies. Despite these gaps in knowledge, the threats of species extinction and loss of habitat are so acute that the main goal of conservation biology seldom is merely an inventory of species. Conservation biology is a “crisis discipline” (Soule, 1985), tracking a changing target with a far less than optimal amount of resources.

From the outset, conservation biologists have recognized that biological science does not hold all the answers to conservation. The social sciences, though often far less well funded or involved in conservation than biology, have investigated the human dimensions of conservation (see, for example, the resources offered by the Social Science Working Group of the Society for Conservation Biology, <http://www.conbio.org/WorkingGroups/SSWG/>). The need for the social sciences has become even more obvious as some of the early apparent successes of conservation have revealed shortcomings.

Common pool resources and models of governance

Social science and psychology have made contributions to conservation in evaluating the different ways that common pool resources or commons are managed. Common pool resources, distinct from open access resources, are collectively owned or managed in some fashion. We will examine three major models of conservation governance applicable to the commons, each with quite different community and psychological dimensions. These three models can all be seen as alternative responses to Garrett Hardin’s (1968) model of the “tragedy of the commons.” As described in Chapter 2, Hardin described the commons dilemma as resulting from a situation where resources are shared by a community, using a commonly owned English village pastureland as his historical model. Hardin suggested that because each herder would expect to receive a full unit of benefit from grazing an additional animal, but the costs would be spread

across the community in the form of slightly heavier grazing, a rational cost–benefit analysis would lead the herder to graze more animals. If other herders apply the same logic, the result is an overgrazed pasture that is unable to support any cattle, and many impoverished herders who no longer have use of those common resources. Hardin applied this model to the problem of overpopulation, suggesting that individuals see their own benefits from procreation outweighing their share of the collective costs.

In using this model, Hardin reflected assumptions about human nature that have been predominant in Western political-economic thought. He was skeptical about people's ability to restrain their self-interested desires and avoid "discounting" (valuing at a lower rate) the negative consequences to others and long-term consequences to themselves. Hardin considered various possible solutions. Should appeals to conscience be used? No, because in the long run this would lead to the extinction of whatever traits give rise to conscience, since those restraining themselves would be outcompeted. A second solution was privatization: sole owners will theoretically internalize total costs as well as benefits. But Hardin opted for a third: "mutual coercion, mutually agreed upon" or central governance as the least undesirable option. He did not see other viable alternatives.

Hardin's influential essay appears to apply to a wide range of environmental problems. Many of these are actually open access problems, in which a resource is degraded by the extractive or polluting contributions of many isolated actors. When the incentives felt by these actors lead them to act in an individually rational but collectively irrational way, the incentives are "perverse" and we have a "social trap" situation. Because central control is consonant with the way many bureaucracies work, and since parks and species are regarded as parts of our common heritage, it is not surprising that governmental authorities stepped in to manage them.

The historical precedent of the preservation of park-like landscapes entailing the exclusion of people appears to be consistent with the *central governance* method of protection. But when control of these areas was taken from local populations, people did not simply stay out. For example, in Nepal, centuries of governance by an elite led to a model of state ownership and management of forestlands. But people collected firewood and other materials needed for subsistence from government forest conservation areas illegally. Little had been done to gain people's investment in conservation. Regulation and enforcement depended on compliance, which in turn depended on the expectation of reward, or fear of punishment, rather than internalization of a norm or value. As we have seen, excessive control can induce psychological reactance (Brehm, 1966) or acting to the contrary of the superimposed rule. The Nepalese system failed not only because of an impossible enforcement task, but because of psychological responses to the attempts at governmental control and a lack of individual support for the conservation goal.

In other examples, protection of wildlife has caused the displacement and impoverishment of people by excluding them from traditional resources. Fencing seems to embody the *privatization* model of management. In South Africa's 7000+ square-mile Kruger National Park, a fence was erected in 1960 on the western border to keep wildlife in and cattle, along with human foragers and hunters, out. (Its removal began in the 1990s.) Here, the owner of the park was a governmental entity. But there are also many

private wildlife or game preserves (indeed, some adjacent to Kruger), and outright land acquisition is a major strategy favored by some conservationists. Like central governance, however, it requires costly and effective boundary enforcement and/or sufficient isolation from human incursion.

New conceptions of the commons

The above examples from developing countries illustrate some of the challenges that led conservationists to recognize and embrace the significance of human dimensions. We offer a more effective analytical framework to help, based on inputs from both practical and theoretical sides. On the practical side, impetus came from local groups. For example, in 1993, following the democracy movement in Nepal, forest management was decentralized and delegated partially to local forest user groups (Lachapelle et al., 2004); we will consider this more carefully below. The design of integrated conservation and development projects (ICDPs) that attempt to advance both economic welfare and wildlife values represents another innovation.

On the theoretical side, our understanding of how communities of people manage commonly owned resources has changed considerably since Hardin. It turns out that Hardin's key example, the English common pasture system, was historically inaccurate and understated the actual sustainability of this ancient system. More importantly, anthropologists and political scientists have identified and studied many examples of sustainable resource management systems around the world. Psychologists have contributed research on the emergence of cooperative or selfish behavior under various conditions (e.g. Suleiman et al., 2004). This body of research does not so much invalidate Hardin's analysis as to help delimit the settings in which it is likely to be accurate. It lets us define variables that affect the likelihood that defined groups of people will be able to manage a common resource without depleting it. As suggested in the title of a National Research Council volume (Ostrom et al., 2002), there are more genres than tragedy in the *Drama of the commons*. And thus no single management approach can be a "panacea" that fits all cases, as emphasized in a recent special issue of the *Proceedings of the National Academy of Sciences* (2007, vol. 104, no. 39).

Marine protected areas (MPAs) illustrate the application of this evolving body of knowledge. In coastal East Africa, for example, free-for-all fishing had expanded with population growth and fishing equipment investments to encompass the entire coastal zone, threatening an exceptionally productive and biologically diverse system of global significance. But research by the World Wildlife Fund in the cases of Quirimbas National Park in Mozambique, Mafia Island Marine Reserve in Tanzania, and most recently the Primerias and Segundas Reserves, identified variables that could provide some leverage for change. Of critical significance is the biological fact that a good proportion of these fish species have a moderate level of mobility. While they are not so mobile that they can migrate out of the area entirely, they do spread out as their population density increases. Thus, if a medium-sized area is designated off-limits to fishing, it can act like a natural nursery to regenerate populations that then move to surrounding fishing-permitted areas. On the social side, the fishery resource itself was amenable to the



Fig. 10.1 Community participation in conservation: village meeting in Tanzania. (Photo © Jason Rubens/WWF-Canon.)

establishment of community-based protection (Fig. 10.1). The resource was perceptibly threatened; fishers had seen the declining catch levels themselves. And, positively, when the MPAs began boosting populations, fishers noticed larger fish and more plentiful catches.

Although the East African coastline is vast, it was possible to delineate a smaller area for protection, with boundaries that were identifiable by fishers. The intensity of use could thus be managed, and fishers' behavior could be informally observed by other community members. If the resource features were different – if the fishery were vast, hard to define, highly mobile, difficult to predict, if degradation was not perceptible, or if behavior in it were hard to observe – community management might be very difficult. Notably, some global-scale resources and behaviors affecting them resemble the latter situation.

Other factors relate to the social dynamics of the community. Too large a community of fishers would be unlikely to have the strong, enduring, and dense networks of relationships that are important for a group to evolve its own group norms and institutions. When more formal rules are needed, people are more likely to follow them if they have participated in their creation and can collectively modify them, than if they are imposed by an unresponsive authority. In coastal East Africa, group norms include injunctions against fishing in the MPA. With strong social networks and participation, communities form systems that protect everyone who cooperates in the management of the resource. These systems are likely to include mild penalties for violators, the effect of which is not to exclude the violator, but to mildly and temporarily ostracize

them. Chronic violators are likely to be the recipients of “informal justice.” Such vigilantism could undermine the system if it is applied arbitrarily. But community management systems may exist in parallel with formal institutions of justice such as regional or national laws, enforcement, and courts. The latter systems provide more neutral systems of arbitration, as well as essential backups when the community cannot effectively exclude outsiders, such as foreign, large-volume fishing vessels, from using the resource. In such cases, centralized authority and local control may work positively together. Similarly, outside scientists found they had to find productive compromises with the research agenda and interests of local scientists and other community members (H. Fox, personal communication).

When fishers perceive that free riders will not be able to take advantage of them if they cooperate with management strategies and that the norms have been developed from within the group, the psychology of the situation may change from one of compliance to one of *internalization* of the group’s interest. Participatory governance helps internalization because it increases commitment to the rules and a sense of ownership. Social psychology studies have shown that, given the choice, people prefer social reciprocity (communal or equitable sharing) and social trust. For reciprocity and trust to prevail in the face of market-oriented, competitive, individualistic societies requires institutions (rules, communication patterns, norms) that protect those showing cooperative, trustworthy behaviors. In practice, conservationists interact with overlapping and multilayered communities. Community-based solutions are not a panacea either; what works best will depend on the configuration of social, governance, and resource factors. But the larger lesson here is that “conscience” can work; control from above is not the only option.

Social capital and its limitations

Some of the key social variables in successful commons management are captured in the concept of “social capital.” A synonym might be “social cohesion,” or the extent and types of bonds and shared norms among people in a community. It has been linked to a variety of community indicators including life expectancy, resilience, and the strength of civil society and democratic institutions (Putnam, 2000; Pretty, 2003). Several types of social capital have been identified, including:

- *Bonding social capital*, or the emotional connections and supportiveness that develop most often between people who share traits, values, or relationships.
- *Bridging social capital*, or the linkages among people and groups that did not choose to be together but nonetheless are. Examples include civil society institutions that bring together people with different backgrounds and interests around common concerns.
- *Linking social capital*, or the ability of groups to influence or gain resources from external agencies or authorities.

Social capital is fostered when people perceive that others have similar salient values (Cvetkovich & Winter, 2003); clearly, bridging social capital will thus be the most difficult type to build, and is also often the limiting ingredient. Social trust may be

important because it enables internalization of norms, increased cooperation, and reduced “transaction costs.” These allow for reciprocity and in turn for long-term obligations among community members (Pretty, 2003). Trust has been shown to increase cooperation in experimental studies of the commons dilemma (e.g. Messick et al., 1983).

Although attempts to build social capital have been numerous it has not been clear that they have lived up to their promise. Lachapelle et al. (2004) found that the inability of the Nepalese forest user groups to effectively manage their resources, despite being officially empowered and networked, resulted from lack of power. This lack was expressed in three primary ways: a sense of vulnerability or lack of private resources that individuals controlled; a sense of inferiority deriving from issues of caste, gender, and illiteracy which programs had not addressed; and a lack of transparency or sharing of information. Underlying these perceptions was the continued power and control of elites. Together they undermined the basis for trust, weakened social capital, and made individuals dependent on their private (and unequal) resources.

A similar scenario unfolded on the densely populated lands in Kabale, in southwestern Uganda; these cultivated lands surround the Bwindi Impenetrable National Park, a home of the mountain gorilla and many other endangered species of great international interest. As in Nepal, this area had undergone a strong shift to decentralize natural resource management. There were, however, frequent conflicts among residents, and between residents and the administration of the national park. An analysis by Sanginga et al. (2007) suggested that social capital was not effective in managing conflicts with powerful external stakeholders, including the park and the NGOs operating in the area. Such conflicts were dealt with, on both sides, by coercion or violence – aimed either at residents, or at the park itself, as when residents set fires intending to destroy it. In-group bonding social capital may have exacerbated the conflicts, bridging social capital was formalistic and weak, and linking capital was lacking.

Context matters. The principles and issues of community-based conservation do not differ between developed versus developing countries so long as there are on-the-ground resource-dependent communities, but specific issue may vary: bushmeat, medicinals, and primary forest conversion are more common direct threats in developing countries. More fundamentally, the developing world context may be characterized by poverty, chronic disempowerment, lack of a conservation ethic, and histories of intense conflict or colonialism. Power differences between local communities and first world governments or conservation groups that promote conservation too easily lead to imperialism, or apparent imperialism, in conservation. Today there is debate and pressure for new approaches that can be more consistently successful.

In summary, we have learned that many factors influence the sustainability of community conservation management and temper the pessimism that Hardin introduced 40 years ago with a nuanced sense of the variables involved. It should be noted that there are some conditions where people are not likely to self-organize successful common pool resource institutions. Ostrom and colleagues (1994, p. 328) summarize these as:

- I Where individuals have no expectation of mutual trust and no means of building trust through communication and continued interaction (for example, when outsiders cannot be effectively engaged).

- 2 Where mistrust is already rampant and communication and interaction do not reduce the level of distrust.
- 3 Where many if not all individuals are willing to extend reciprocity to others but lack authority to create their own self-governing institutions, for example when they lack formal power.

External authority may help in the creation and enforcement of contracts, but it should not be assumed that difficulties will disappear when a larger government imposes solutions, because of the known psychological pitfalls of compliance-based solutions. When wide territories are concerned, neither community-based self-governance nor central control solutions offer simple or comprehensive solutions. Both levels need to be coordinated.

Psychology, culture, and local knowledge

Communities often differ in terms of their cultures, which include their social institutions, technologies, and worldviews. Psychology and culture interact in terms of beliefs, symbolic codes, identities, emotion, and more, but little of this has been applied to conservation. Anthropology has been the predominant voice for cultural considerations and preservation in conservation projects. Posey (1999), for example, discussed the cultural and spiritual values of biodiversity, and Berkes (1999) and others have studied traditional ecological knowledge. Psychology, however, may also enhance the ability of interdisciplinary conservation research and practice teams to adapt to local cultures.

The operation of psychological variables in community-based resource management has been carefully examined in the research program of psychologist Doug Medin, in collaboration with cognitive anthropologists Scott Atran and Norbert Ross (Medin & Atran, 2004; Atran et al., 2005). In an extended field research project in the lowlands of Petén, Guatemala, they have examined the forest management practices and beliefs of three different cultural groups. All practice agroforestry, the use of forests for both products of the forest, via hunting and gathering, and slash-and-burn agriculture. This is not a common pool resource situation because members of each group work individual forest plots that they may rent from the local municipality. But this commonality of practice and ecologies highlights the influence of the three groups' psychological, social, and cultural differences. One group, referred to as Itza' Maya, is native to this area; another group, the Ladinos, are immigrants to the area and are of mixed native/Spanish-influence race. Finally, the Q'eqchi' Maya have immigrated from their nearby highland ancestral grounds to the lowland.

Atran et al. (2005) mapped the linkages between individuals and found striking differences between the groups in terms of density of social ties (Fig. 10.2). The Itza' are the most socially atomized. They also have the fewest common institutions, and they do not coordinate their agroforestry activities with each other. The Q'eqchi', on the other hand, are very tightly knit socially, and the Ladinos represent an intermediate level of social linkages. For the Itza', only one link would have to be removed to isolate at least one informant, whereas four would be necessary in the case of the Q'eqchi', and

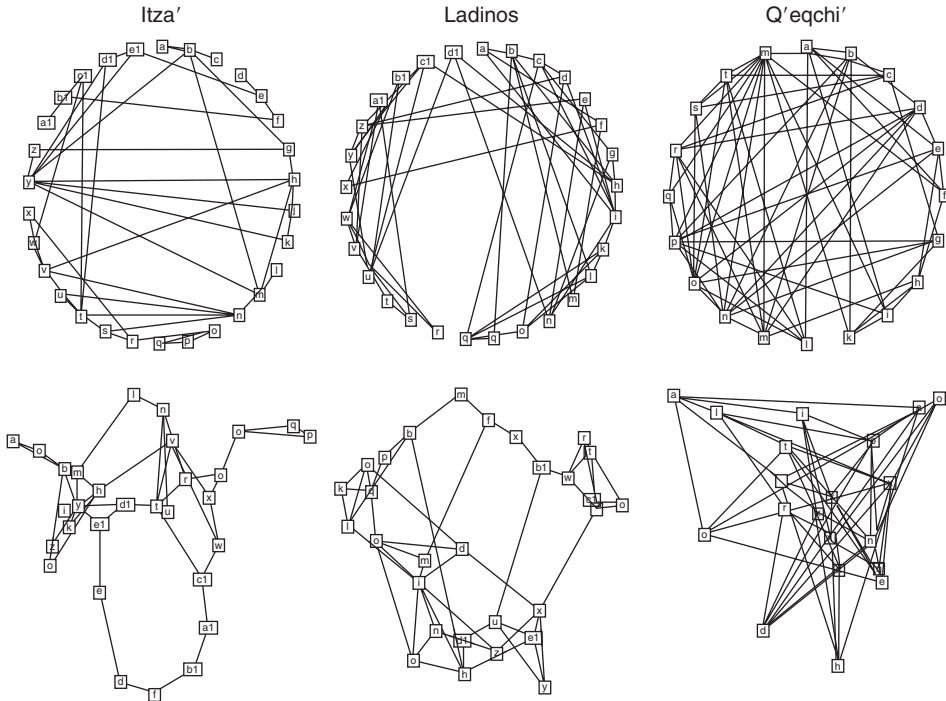


Fig. 10.2 Social networks in different cultural groups, represented schematically (top) and literally (bottom). (From Atran et al., 2005, with permission.)

two for the Ladinos. The Q'eqchi', moreover, have the highest percentage of people that speak only their native tongue, have communal and ceremonial institutions (including sacred ties to the highlands), work their plots with their neighbors, and have some sanctions limiting things like access to copal trees.

Based on this picture of the groups' social capital, trust, and institutions we would expect the Q'eqchi' to have the most sustainable practices, and the Itza' the least, with the Ladinos intermediate. This expectation can be tested because the researchers collected careful data on the informants' land (whether it was cropped, fallow, or in the forest; the soil quality, species diversity, and tree count and coverage; this was also corroborated by remote sensing data). Each group's average forest clearance rate (area cleared divided by the years each plot is cultivated) was calculated. Surprisingly, the researchers found that the Q'eqchi' are clearing their forest plots at a rate five times that of the Itza', whose rate is potentially sustainable. The Ladinos are clearing their forests at about twice the rate of the Itza'.

Atran et al. (2005) looked carefully at the interaction of psychology and culture to understand this apparent anomaly. They examined the mental models or "folk ecologies" of each individual. Their Itza' informants identified on average four times as many plant–animal interactions as did the Q'eqchi'. There were also consistent differences in the inferences that informants made based on their models. All groups generalized according to folk taxonomic similarity (for example, they reasoned that another

monkey in the same folk category as the spider monkey would share its dependence on ramon fruits), and they generalized according to folk ecological similarity (for example, that kinkajous would depend on chicle fruit in the same way that spider monkeys depend on ramon fruit). But culture affected the patterns of inference. The Itza', for example, observed symmetrical helping relationships between many pairs of plants and animals, and tended to generalize this to cases they did not know about directly, whereas the other groups figured that plants helped animals, and were asymmetrically hurt by them. Thus, ecological thinking is shaped at a basic level by the mind's tendency to create categories of like things, and then by a model of simple ecological interactions. Individuals readily assimilate new experiences to these models so that fairly elaborate ecological beliefs may be built on minimal experience.

Interestingly, the distribution of ecological beliefs and agroforestry practices within and between the three cultural groups shows that linkages between culture and psychological beliefs are not deterministic but resemble transmission in the epidemiological sense: ideas pass like disease germs among populations. To illustrate, consider who was consulted by members of each group if they had questions about hunting or agroforestry. Itza' individuals asked other Itza' who were regarded as the most expert. These people were also the most central in the social importance network shown in Fig. 10.2. Ladinos who were regarded by other Ladinos as forestry experts were well connected socially, but sought *their* information from the expert Itza'. Tellingly, networks mapping Q'eqchi' social importance had the lowest overlap with maps of forestry experts. The Q'eqchi' directed questions to a Washington-based NGO or a Guatemalan governmental agency, or other Q'eqchi' men. This transmission model may help explain why the Ladino forest-clearing rate was only twice as destructive as the Itza': there was information flow from the more expert Itza' to this group of newcomers. The Q'eqchi' perceive sacred ties only to their native highlands, and feel that no supernatural sanctions apply to their actions in the lowlands. Whereas all the groups believe in forest spirits, only Itza' men believe that the spirits could protect the forests. Their model of these spirits showed the closest correspondence to their model of the ecological importance of plants and animals (interestingly, NGO staff's ratings corresponded better with the market value of the species than with ecological roles).

Atran and colleagues (2005) note the implications of these spiritual beliefs for models of resource management. Although social scientists would regard forest spirits as socially constructed entities analogous to institutions, there is no social institution that metes out consequences when the spirits' wishes are violated. Instead, restraint of behavior is practiced privately by Itza' individuals based on the belief that the resource is responsive and can act. In essence, individual Itza' agroforesters mentally negotiate the costs and benefits of resource use with spiritual social constructs whose actions are discerned and construed by folk ecological models.

Accounting for the costs and benefits of conservation

Sometimes community-based solutions fail because the exploitative pressures on a resource are too great. In other cases the biological resources, while impacted by local

activities, are not directly part of the local economy, and so local people may have little motivation to protect them. In such situations, it may work better to work a quid pro quo, getting conservation at some price. But what monetary price should be placed on conservation and what form of compensation to the community in exchange for reduced pressure on the resource is appropriate? After reviewing current practice, we will discuss the psychology of this kind of exchange.

Putting dollar values on nature has become an important specialty in ecology and economics. Conceptually, there is a strong case that ecosystems (natural or modified) provide “ecosystem services” which people benefit from. Ecosystem services have been grouped into four categories: production of goods (foods, fiber, medicines); provision of life-support processes (such as providing clean air and water, global gas balances, pollination, etc.); life-fulfilling processes (appealing to aesthetic, cultural, and scientific values); and the preservation of future options (related to presently unrecognized values) (Daily et al., 2000). Communities that gain their sustenance directly from nature are not blind to the value of ecosystem services (Posey, 1999). This could be the case when people depend on a certain part of the system, or understand its importance for a part they do depend on, and when these dependencies are observable or have been encoded in the form of cultural beliefs, ceremonies, or rituals, such as we saw in the case of the Itza’.

But there are many cases where there is no such dependence, it is not observable, or an outside group benefits from the ecosystem service. For example, many ecosystem services arise from processes that are widely distributed in the landscape, such as continuity of forest cover affecting water quality in the watershed used by a distant municipality. Or the many and widely dispersed species composing a tropical rainforest’s biotic richness may be valued for medicinal, craft, food, and other needs.

Local people who do value their local biodiversity frequently try to protect it, particularly if it is linked to their livelihoods. Conservation psychologists may contribute by helping detect less material values of nature such as pride of place, ancestral home, giver of sustenance, legacy, escape, solace and restoration, and spiritual source. This is not a definitive list, but a hint at implicit values, culturally coded in different ways that sensitive qualitative research may detect. There may, however, be obstacles to people acting on such values individually, and identifying them is a critical task for applied behavioral analysis (see Chapter 9). For example, poverty in combination with poor soil may drive people to continually clear more land. One response to this obstacle is to breed new varieties of food plant adapted to local soils.

An evolving set of strategies is emerging to address situations where direct benefits from ecological services are not a feasible route to motivate protective behavior by local actors. One such strategy tries to establish linkages between biodiversity and non-economic, self-interested needs of the community, such as health. These linkages are then the basis for a trade-off between the community, conservationists, and donors (Margoluis et al., 2001). Sometimes linkages are high, as when protecting a watershed also provides clean water. When the intrinsic linkages are low, projects may create an operational linkage. The Biodiversity Support Project identified four types of operational linkage. In the “barter” strategy, health enhancements are made in compensation for conservation work by community members. In the “entry point” approach, health needs are addressed first as a way to build trust and increase community decision-making

capacity, and later conservation projects use these as a foundation. The “bridge” strategy makes use of a strong conceptual linkage between health and conservation even if the connection is not already perceived by the community: conservation staff pursue health and conservation goals simultaneously, and focus on education to help members understand the truly linked nature of the activities. Finally, the “symbiotic” strategy works when both staff and community members perceive a conceptual link between health and biodiversity, and organizing around the health issue attains both goals (Margoluis et al., 2001, pp. 24–5). These kinds of strategies might work for other things besides health that are valued by the community, such as education (see next section).

Another strategy estimates the dollar values of “public goods” for which no market-based values exist, such as ecological services. For example, if a forest is set aside, income from forestry may be foregone, but the value of its services can be calculated to show the benefits of conservation. These might include estimating how much it would cost to replace the value of fresh water provided by rivers, plus the monetary value first world populations would be willing to pay to avoid the loss of rare species. These estimates would be derived by contingent valuation surveys, the “shadow prices,” or replacement values. Alternative valuation methods are young and still debated among economists. Once a sum is arrived at, the local community might be compensated this amount in exchange for their agreement to avoid exploiting the forest in ways that would harm these values. The compensation could be translated into community needs, typically a health center, small capital loans, or an ecotourism partnership. In essence this approach recognizes that conservation imposes costs, and these costs should be covered. Such “payment” methods may not accomplish internalization.

From the psychological perspective, more needs to be accounted for than just the monetary values of nature. As conservationists have increasingly realized, we need to acknowledge a wide range of costs and benefits of conservation, and how they are distributed across people. Psychology brings a particular awareness of the span of human values, based on social and psychological as well as material well-being. The typology of values proposed by Shalom Schwartz (1994; see Chapter 2), for example, includes ten major value categories: power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, conformity, and security. These derive from universal needs of the person as a biological organism, the requirements of social interaction, and the effective functioning of groups. Subsumed in these are values such as social justice (within universalism), freedom (self-direction), honesty and forgiveness (benevolence), humility (tradition), and obedience (conformity). Such a scheme has the advantage of directing our attention to a full range of what is important to people everywhere. We can then ask how conservation projects may positively and negatively impact these values, as they are locally conceptualized (Hunter & Brehm, 2004). In a more qualitative vein, psychology can help elicit, articulate, elaborate, and find indicators for diverse values that may be non-monetary and unvoiced and unanticipated by any general scheme or even native language concepts (see discussion in Chapter 3). Putting such values on the table may be critical to ensuring key interests are represented.

A psychological approach means not only mapping a wide set of values, but determining the objects to which they are applied and the frameworks people use

in reasoning about them. Values are not all evaluated by the same model across cultures, as shown by Fiske and Tetlock (1997). They identified four incommensurable models of sociality: communal sharing, equality matching, authority ranking, and market pricing. Although trade-offs are proposed across these categories, the trade-off may be unacceptable. For example, if a given species has a particular totemic (communal or authority-related) value, it may not be permissible to trade it on market terms. Both experimental (Clayton, 2000b) and field (Syme & Fenton, 1993) research suggests that there are many cases in which people reject the allocation of environmental resources on a market basis. Or if certain resources are communally shared, monetary compensation for impacts on them may not be regarded as appropriate. Self-direction values may be especially important in post-colonial situations, ruling out the negotiation of other values according to authority-based frameworks.

Fiske and Tetlock's work assumes *pluralism*, where people identify with different value systems. Trade-offs may be easier if people's identities, instead, are more *cosmopolitan*; cosmopolitanism denotes multiple selves and narratives, enabling people to identify with a wider range of others, be more open to change, and embrace experimental and inclusive solutions (Earle & Cvetkovich, 1997). Application of either model means advanced fieldwork to understand local value systems; thus conservation programs could lessen the chance of egregious faux pas. Every human group has a structure of values, and understanding its total shape should be a prerequisite for conservation work.

Psychological costs of displacing populations for conservation

One of the most extreme cases where the costs of conservation have not been comprehensively considered is when people are displaced from land or lose access to resources they formerly had when land is set aside for nature. (Displacement may also happen when people are forced into "eco-migrations" due to deteriorating local environments.) The groups benefiting from such projects, which may include foreign organizations and their supporters who are not present to witness the effects, are those whose values are most immediately served. Those bearing the costs are often poor or indigenous groups. On the "receiving end" such cases resemble colonial or large-scale development schemes of the past or present. The construction of dams or mines displaces thousands of villagers; plantations remove forests for a single commercial crop. As in these cases, preserves are often endorsed by national or regional governments, and sponsored by multilateral lending institutions such as the International Monetary Fund or the World Bank. Despite policies designed to prevent these negative local impacts, they do occur.

The risks of projects (whether in the name of development or conservation) that involve resettling a population include landlessness, joblessness, homelessness, marginalization, food insecurity, increased morbidity and mortality, loss of access to common property and services, and social disarticulation (Cernea, 2000). While these entail physical risks, there are also psychological dimensions. Marginalization,

for example, involves the loss of land, common properties, and jobs; Cernea describes the consequences:

Economic marginalization is often accompanied by social and psychological marginalization, expressed in a drop in social status, in resettlers' loss of confidence in society and in themselves, a feeling of injustice, and deepened vulnerability. The coerciveness of displacement and the victimization of resettlers tend to depreciate resettlers' self-image, and they are often perceived by host communities as a socially degrading stigma ... Psychological marginalization and its consequences ... are typically overlooked in resettlement planning. Yet, cultural and behavioral impairments, anxiety and decline in self-esteem, have been widely reported from many areas.

Cernea, 2000, pp. 18–19, emphasis in original

The net effect of resettlement, social disarticulation, has clear psychological implications:

Forced displacement tears apart the existing social fabric. It disperses and fragments communities, dismantles patterns of social organization and interpersonal ties; kinship groups become scattered as well. Life-sustaining informal networks of reciprocal help, local voluntary associations, and self-organized mutual service are disrupted. This is a net loss of valuable “social capital,” that compounds the loss of natural, physical, and human capital ... The social capital lost through social disarticulation is typically unperceived and uncompensated by the programs causing it, and this real loss has long-term consequence.

Cernea, 2000, p. 22

Such events threaten values from Schwartz's typology including self-direction, achievement, tradition, security, and power. If these values were weighted in ways that reflect their true importance in psychological health and functioning, and were then included in the initial stages of project planning, the outcomes might be much better.

The negative consequences of social disarticulation clearly work against community-based conservation. What would work in favor of it? DeCaro and Stokes (2008) describe the psychological theory of self-determination to suggest the characteristics of Autonomy Supportive Environments (ASEs). An ASE fosters intrinsic and internalized motivations which are aligned with a person's core interests and identity. These forms of motivation are especially important when economic incentives are not effective in promoting conservation. The characteristics of an ASE that DeCaro and Stokes identify are:

- 1 Empathic understanding, where interpersonal interactions attempt to appreciate the meaning underlying another's attitudes and behaviors. Empathy (aided by cognitive perspective-taking) ensures accurate information, communicates respect for other stakeholders, and ensures that their best interests are represented.
- 2 Provision of choice, where individuals' freedom to solve problems for themselves is supported by ensuring that options are generated responsively (not handed down from above).

- 3 Transparent administration, including of any regulations. This means providing direct access to decision-makers, and making the rationales, necessity, and value of rules clear.
- 4 Non-controlling communication and feedback. Managers should avoid a dictatorial style and instead emphasize the voluntary nature of participation. The communicative style must convey approachability and ideals that are worth buying into.

A successful ASE provides individual and group self-determination, but is not necessarily at odds with conservation organizations or agencies having a central role. Rather, it provides foundations for collaboration and for the integration of different groups' agendas.

Conservation and all-too-human psychology

Two final themes drive home the point that conservationists must deal with people in all our species' complexity and contrariness. There is a wide body of psychological research both on conflict and on apparently irrational biases in our thinking, both areas of great relevance to community-based conservation.

Psychological biases and emotion

In applied conservation settings, a practitioner must rely on all the psychological savvy he or she can muster. As discussed in Chapter 2, people seldom act like the rational decision-makers we would like to believe ourselves to be, or that our economic theory says we are. Psychology has a lot to contribute about what "makes people tick" (Ariely, 2008) that should make conservationists question the current heavy reliance on economic theory and tools. Even with all the elevation made possible by education, we are still (in Nietzsche's phrase) "human, all too human." On-the-ground conservationists would do well to develop a built-in, shockproof awareness of their own psychological biases, as an antidote, as well as for insight into others' biases.

Human affect has received much attention from psychologists. An understanding of the contemporary functional account of the emotions is a durable contribution to conservation. Although our folk theories say that emotion is a crude and untrustworthy guide to choices, psychology's functional theory of emotion holds that in fact emotional responses are often very adaptive. Emotions must be flexible, responsive, performance enhancing, and not stereotypic to serve an organism's "core relational goals" in dynamic social settings (Lazarus, 1991). Emotions provide: (i) an initial assessment of the proper manner in which to respond; (ii) a quick recruitment of resources needed to respond; and (iii) a means of influencing others (Thompson, 1993). Emotional and empathic know-how, while teachable, are not uniformly distributed. Psychology can help make our mental "blind spots" and motivational dynamics less of a liability in conservation work. This could be made available through training or the recruitment of trained psychologists to help foresee issues and back up frontline staff with support and insight. A similar model might be useful for conflict.

Conservation and conflict

Conflict is nearly a constant in human affairs. Natural objects enter the picture as both the means of conflict as well as the ends (e.g. a fight over resources). Degraded ecologies and crowding are stressors that may predispose conflict. When conflict occurs, wildlife and ecosystems as well as other humans are frequently victims. When conflict becomes armed and violent, environmental managers need ways to decrease the likelihood of further conflict and minimize the harm it causes (Shambaugh et al., 2001).

There are many kinds of conflicts involving humans and wildlife, such as perceptions that wildlife conflicts with people's own livelihoods or even lives (Distefano, n.d.). Such a conflict may have multiple layers. Although the immediate dispute may concern conflicts between ranchers and wolves over range animals, or between tigers and forest workers near a preserve in South Asia, an individual incident is surrounded by the social manifestations of attempts to manage the conflict. These may include the history of park or species preservation policies, the inclusion or exclusion of the local community, and the relations of program staff to locals. Finally, such conflicts may be underlain by still wider and longer-standing disputes that hinge on identity or past cultural traumas, such as ethnic divisions and colonial or dictatorial histories. It is obviously advantageous to avoid letting conflict become so entrenched, or letting conservation needs get associated with such longstanding problems.

Psychology is one of the core disciplines that contributes to the broad set of knowledge and skills in conflict and peace studies, and it has been deployed creatively in conflict resolution programs. As addressed in other chapters, group identities are important in maintaining and exacerbating conflict, and moral disengagement or exclusion characterize chronic conflict. It is important not to ignore real or perceived power differences in wealth, political support, privilege, social category, access to institutions and authorities, and other resources. But it is also crucial to help parties develop empathy. Empathy is a threatening prospect when one has defined oneself as good and the enemy as bad, but the defenses against this can be addressed (Neu & Volkan, 1999).

Peace-making and peace-keeping are also important concepts. Psychologist Gordon Allport (1954) outlined principles for helping people of different ethnic backgrounds avoid conflict. These include: fostering cooperation, promoting equal status among participants, and focusing group effort at solving common problems. Studies of emotion regulation, trust, distrust, neutrality, and cultural approaches to peace-making (Lederach, 1997; www.beyondintractability.org) are matters where psychology can contribute further to the creative use of conflict in conservation. Establishing conservation "peace parks" may help resolve some territorial disputes (Ali, 2007).

Conclusion

Biological and ecological knowledge alone cannot ensure successful conservation programs. Psychology and other social sciences are contributing to a growing body of knowledge about how communities can most effectively self-organize and be assisted

to save biodiversity, and what kinds of programs are helpful in tying key community values and beliefs to institutions that favor biodiversity. It is useful whenever possible to work with spiritual or other biophilic tendencies in a community, or to build universal value structures, but this cannot be relied upon in most cases (Chan et al., 2007). Thus, much of the time conservation success will depend on the adequacy of practitioners' understanding of multifaceted human dimensions, and on their know-how for working with them. Psychology can help by offering insight into human cognition, value systems, costs and benefits, psychological biases, and conflict, all of which can inform conservation practice at every level from boardroom, to program planning, to field office, to on-the-ground encounters. To work in community-based conservation, one must approach the task as a learner first of all.



Environmental education

- Environmental education
 - The need for environmental education
- Examples of contemporary environmental education
 - Educating for sustainable development
 - Classroom-based environmental education
 - Place-based education
 - Programs highlighting biodiversity
- Psychological foundations of environmental education
 - Cognitive development and environmental knowledge
 - Affective factors
 - Action, participation, and problem-solving
- Lessons for effective practice
- Conclusion

Because modern societies devote massive resources to both formal and informal educational systems, environmental education (EE) has the potential to affect a wide range of individuals and provides an important opportunity to promote human–environment harmony. Education is part of the socialization process: schools transmit knowledge as well as the ideals and skills necessary for citizenship. Education also aims to develop individuals’ capacities as an end in itself. Today both traditional agendas of education – socialization and the fulfillment of individual potential – include the natural environment. Relevant to socialization, society is midway into a major transformation that will, if successful, change the ways all our major institutions account for our interdependence with nature. Institutions are socially constructed by the beliefs, values, and actions of the individuals making them up. Thus all people need to be ready to participate through the way they make many everyday as well as life-course decisions. Relevant to individual potential, people everywhere derive material, psychological, and spiritual benefits from nature. Experience in and learning about nature help us realize our own humanity to the fullest. Socialization and fulfillment are intertwined. Arguably, the natural world is part of the “common patrimony” that we are obliged to pass down to succeeding generations in good condition (Weiss, 1989). To deny others the opportunity to experience and learn about nature can be regarded as denying them

part of their heritage as human beings. Thus, furthering environmental education is a part of the agenda for conservation psychology.

This chapter will examine what environmental education is, considering mainstream definitions and goals. Our emphasis will be mostly on children and youth, rather than adult audiences and community contexts, which were covered in Chapter 10. We will review evidence on the support for and need for EE, and develop four examples of recent trends to illustrate the diversity of present practice of the profession. Following this, we will discuss the psychological theories and specialized findings that help form the foundations of EE. Finally we will briefly consider the efficacy of EE and factors that affect this, drawing on some of the excellent reviews available.

Education is a field whose definition and goals lie outside psychology proper. As a case in point, while some of our discussion acknowledges behavior (broadly construed) as a product of EE, whether or not behavior change per se *should* be the goal is contentious in EE philosophy. For example, Dreyfus and Wals (1999) criticize the citizenship model for regarding education merely as a tool for environmental well-being. They argue instead for an emancipatory view of education, wherein learners construct understandings, critique underlying assumptions and worldviews, expose and alter distortions of power, and transform the world around them. In a similar vein, Courtney-Hall and Rogers (2002) identify several dissonances when environmental educators and researchers focus on modeling behavioral outcomes. As noted earlier by Robottom and Hart (1995), when EE research and practice borrow thinking and language from behavior modification, its “deterministic character contradicts one of the foremost aims of environmental education – or any education – the development of critical independent thinking” (p. 7). We acknowledge these tensions, and do not dispute that the task of guiding educational thought is a fundamentally ethical and critical enterprise. But as social scientists, we endorse the importance of research to test whether intended effects are actualized, and to provide systematic ways of understanding the psychology of the learner.

Environmental education

Environmental education evolved in its modern form in the 1970s, but was preceded by several movements such as nature study and conservation education, dating to the turn of the 20th century, and subsequent developments (Disinger, 1983). Today it is practiced in highly diverse settings, and is a well-developed profession around the world. Formal school systems – from pre-kindergarten to graduate level – employ a wide range of methods, from traditional courses, instructional units, supplemental materials, and field trips to community investigations (Volk & MacBeth, 1998). There is also a large informal sector, which includes nature centers, environmental learning centers, residential camps, zoos and aquaria, park interpretive programs, outdoor learning, extension programs, community projects, citizen science projects, service learning, professional development, industry-based training, peer groups around a kitchen table, and more. These informal settings might include teachers using more or

less structured curricula, or the learning might best be characterized as learner directed or “free choice learning.” This latter term also applies to the voluntary use of informative media such as the fine and performing arts, radio, television, digital technologies, movies, fliers, posters, newspapers, magazines, and (last but not least) books. A shift in emphasis from “education” to “social learning” would also include the many types of social interaction by which people form and exchange ideas (Wals, 2007). Most fundamentally, individuals educate themselves by reflecting on their own observations and actively seeking new kinds of experience from which to learn across their lifespan.

This chapter will focus on forms of education intended to produce long-term “inner” changes in learners. Whereas other sections of this book pertain to people’s existing responses to nature, or to effecting more immediate behaviors, EE focuses on people’s abilities to increase their understanding greatly over the long run, thus also affecting their worldviews, attitudes, and behaviors, as well as the horizons they perceive for their own lives. As discussed in Chapter 9, Petty and Cacioppo (1981) suggest that people process messages differently depending on whether they think carefully about them or not. If they do not, they base their response on superficial aspects such as the phrasing of the message and characteristics of the messenger. If they do think carefully, however, they pay attention to the quality of the arguments. Education intends to provide the challenges and supports that enable this kind of deeper reflection.

The intended outcomes of EE (as for education generally) are multifaceted, as is its history (for a timeline of EE-related events in the USA, see <http://eelink.net/perspectives-timeline.html>). In 1975, an international United Nations Educational, Scientific, and Cultural Organization (UNESCO) workshop produced what is referred to as the Belgrade Charter for Environmental Education. A succinct statement of its aims, which still defines the mainstream of the field, is:

The goal of environmental education is to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones.

Environmental educators use concepts such as “environmental citizenship” or “ecological literacy” (Orr, 1991) to capture the cognitive, affective, and behavioral aspects of this goal. The cognitive components include: awareness that environmental problems exist; knowledge of ecological systems that connect human actions and consequences across space and time; knowledge of one’s locality or “place” and its human and cultural components; and knowledge of action strategies. Affect includes motivation to change, such as feeling negative emotions upon learning of ecological destruction, a sense of empathy with nature, or understanding how environmental deterioration will affect one’s health or that of one’s family. It includes emotional attachment to place as well as certain attitudes about oneself, such as “self-efficacy” or feeling one can make a difference, and commitment to continue one’s efforts. Behavioral aspects include private sphere behaviors such as green consumerism, pro-environmental policy support, citizenship behaviors, activism, and land management choices; they also include the

use of political or interpersonal influence skills for collective action. The generation of a large number of environmentally educated people leads to a positive feedback loop: the recognition that together people can make a difference even though it seems that individually one can do very little. Thus wide-scale EE may address the many cumulative small causes of environmental degradation by countering a perception of helplessness.

One model of environmental citizenship that combines the elements above is that of Hungerford and Volk (1990). Like others in the field, Hungerford and colleagues conceive of EE as going beyond mere awareness and personal conduct or habits to focus on literacy, including in-depth knowledge and the ability to act collectively. This model is based on the component objectives of EE as laid out in the Belgrade Charter and the subsequent 1977 Tbilisi Declaration: Awareness, Sensitivity, Attitudes, Skills, and Participation. However, it departs from traditional simplistic assumptions that if people are given information (i.e. about environmental problems), then they will in turn be more aware and more motivated, and will act more responsibly. Research does not support this view. Instead it recognizes a distinction between information and knowledge, the latter having been integrated into the person's wider framework of concepts and orientations.

Hungerford and Volk found three types of variables in the literature, which they termed "entry-level," "ownership," and "empowerment," and hypothesized that they are linked in a roughly linear fashion, eventuating in citizenship behaviors.

- 1 Entry-level variables are those that appear to predict responsible citizenship behavior. "Environmental sensitivity" or "an empathic perspective on the environment" has been found to make the strongest contribution to behavior. "Knowledge of ecology" is a prerequisite to wise environmental decision-making.
- 2 Ownership variables contribute to the sense that environmental issues matter personally. Here, knowledge of specific *issues* – the differing values and interests of social actors in a controversy, not just ecological problems per se – is crucial.
- 3 Empowerment variables include those practical skills and traits of a person that enhance self-efficacy (cf. Chapter 9), giving him or her the feeling that they can make a difference. Primary are knowledge of and skill in using political action strategies, a strong predictor of environmental behavior.

This model identifies ownership and empowerment as critical to the development of appropriate attitudes and behavior; knowledge alone is not enough. Reinforcement over time is also needed. We will consider applications of this model below.

The need for environmental education

Large numbers of Americans consider EE to be important. Coyle (2005) reports that when surveyed in 1997, 95% of adults and 96% of parents supported EE in the schools. A subsequent 2001 survey bolstered the findings, with 75% of adults saying EE is as important as math or English. Parents expected EE to prepare children to understand environmental problems when they grow up (87% expected this effect moderately or "a great deal"), encourage volunteer community service work (86%),

and contribute to a “young person’s thoughtfulness, consideration, and character in the form of respect for people and places around them” (85%) (NEETF & Roper Starch Worldwide, 2001, reported in Coyle, 2005, p. 66). These three effects could be named the “citizenship,” “community,” and “character” arguments for EE, reflecting aspects of the traditional agendas of education. EE should not stop with schooling: 86% of respondents agreed government should support EE programs, and 80% feel private companies should train employees to solve environmental problems (Coyle, 2005). Taken together these levels of support suggest a society that puts a high priority on EE.

A more sobering view comes from examining the types and levels of EE provided by teachers in the USA. A 2000 study found that 61% of teachers include it in their teaching, but that most of this is in the weak form called “infusion” in which environmental content is used within existing subject matters, usually science (McCrea & deBettencourt, 2000). The amount of time devoted to EE is modest. Only four states include EE training in teacher preparation (Coyle, 2005), and only 10% of teachers have had specific training in EE teaching techniques (Ruskey et al., 2001). In lieu of adequate training, teachers are less likely to offer special courses on the environment, or provide EE that is sufficient in scope and well sequenced across grades, or use the environment as a more extensive integrating context for learning – three approaches that are likely to yield the best results.

As described in Chapter 2, Coyle’s (2005) data also show that Americans are poorly informed about environmental issues, although they believe they are fairly well informed. Education does help: people with a college degree were more likely to answer correctly on complex items such as biodiversity, nuclear waste, and the benefits of wetlands. The NEETF/Roper Starch Worldwide studies also illustrate an interesting gender gap. Only 15% of men versus 6% of women got 11 or 12 questions correct (out of 12); 43% of men versus 21% of women “passed” with at least 9 of 12 answers correct. On the energy study and in research by other sources, similar gaps have been found (Coyle, 2005). The gender difference is not explained by level of education, but might be related to involvement in science and technology: in focus groups of environmental science graduate students, men and women performed the same.

A more telling difference is found between generations: Americans aged 35–54 years (in 1997 and 2001 studies) scored higher than those aged 18–34 years. This is surprising because the latter group would presumably have benefited from increased EE offered in schools during their youth, a factor largely absent in the education of older respondents. Historical cohort may make a difference here: the older group includes “baby boomers” who may have been shaped by the high level of public concern accorded to environmental issues when they were in their youth. The results also suggest that environmental learning may be a life-long activity, influenced by the media. Indeed, Coyle (2005) suggests that vivid media images of pollution, persuasive consumer campaigns that outlast their purpose (such as the warning not to use aerosol cans because they contain chlorofluorocarbons (CFCs), outdated with the CFC ban in 1978), highly visible unresolved public disputes, and “time-honored heroic efforts” such as famine relief leave an enduring stamp on people’s minds that affects how they evaluate new information, often preventing the updating of knowledge.

The “disconnects” noted above between perceived and actual environmental knowledge and between support for EE and its implementation, as well as the unintentional effects of powerful media, suggest that in-depth EE may be crucial for better environmental literacy.

Examples of contemporary environmental education

Several trends illustrate the variety in approaches to EE.

Educating for sustainable development

Education for sustainable development (ESD) has gained currency, especially outside North America, in the years after the UN Rio Conference on Environment and Development. On March 1, 2005, the United Nations launched the “UN decade of education for sustainable development.” According to McKeown, “ESD carries with it a vision for a more socially tolerant, just and equitable society in which business, industry, government, and citizens practice environmental stewardship, leave smaller ecological footprints, and are involved in community-based decision making” (2005, p.1). ESD calls for life-long learning, community approaches, social and ecological justice, social niche targeting, and democratic mindedness as part of its agenda. Implementing sustainability often entails difficult trade-offs; nonetheless, the language of sustainability is presently attractive to many, and it avoids the pitfall of posing environment and economy as mutually exclusive. According to an analysis by Jaimie Cloud (President of the Sustainability Education Center), ESD and EE are not equivalent, but overlap. Overlaps between the core content of ESD and the core content of EE include: ecological literacy, systems thinking, sense of place, multiple perspectives, and responsibilities of citizenship. Habits of mind shared by both areas include: intergenerational responsibility, protecting the commons, and looking to the future to predict the implications and consequences of current practices, policies, and technologies (cited in McKeown, 2005).

Education for sustainability takes many forms, often using existing communities as sites for social learning. In general these approaches have a focus on the socially transformative power of what Putnam (2000) calls “bridging” social capital, whereby substantial ties are built between people who would not associate out of choice. Some examples might include:

- Cross-sector collaborative efforts (education, health, and business) to mobilize support for EE across a state or region (e.g. Washington State’s E3 Initiative, <http://www.e3washington.org/about-e3-washington>).
- Working with adults who are re-evaluating the dominance of consumption in their lives compared to values they have discovered mean more to them (see Center for a New American Dream, <http://www.newdream.org/>).
- Working with business and traditionally conservative communities by working within trusted social networks. For example, California Governor Arnold Schwarzenegger’s

business constituencies know he is “on their side.” Thus he can recruit them into his ambitious state-level climate change activities (Breslau, 2007).

- Multi-stakeholder planning or decision-making efforts that bring together diverse social groups under wider umbrella values to resolve resource use conflicts and realize the potential of social learning (Brunner et al., 2002; Wals, 2007).
- Working within religious communities, re-examining of the role of nature in particular faith traditions and establishing new “covenants” between the community and nature (see Chapter 3). More broadly this approach has been called “values-based” communication (Biodiversity Project, <http://www.biodiversityproject.org/>). A special issue of the *Canadian Journal of Environmental Education* (vol. 11, 2006) recently addressed the intersection of religion and EE.
- Embracing trends toward urbanization and sociocultural diversity in cities, realizing these are future majority constituencies that lack ties to nature and resources (see UNESCO’s Growing up in Cities project), by stressing things like nearby nature, social justice, partnerships with urban institutions, and developing leadership through wilderness expeditions for underserved youth populations.

Despite its plusses and social momentum, ESD may be criticized for being too malleable and contested a conception to mean anything. In most depictions, ESD does not share the emphasis of EE on “environmental sensitivity” or its stress on thorough ecological knowledge. Few ESD materials appear to be deeply informed by the knowledge base of educational research. As a social movement, it is attracting many newcomers, who sometimes proceed with great inspiration but shallow foundations. In some cases, however, innovations of genuine worth enhance environmental health along with social justice and economic welfare; this cannot be assailed. Conservation psychologists and other researchers can contribute by helping sort the real successes from the rhetoric.

Classroom-based environmental education

The classroom-based approach has seen significant innovations and improvements in the last few years. The North American Association for Environmental Education (NAAEE) has led efforts to raise standards and increase communication across the field. This was in part a response to a movement in the 1990s to discredit and reduce EE by accusing it of using one-sided information and scare tactics, a case that has proven to be largely anecdotal and selective (see *Canadian Journal of Environmental Education* vol. 3, no. 1, 1998). Nonetheless NAAEE and others have produced a Guidelines for Excellence series that has defined professional standards for the field (<http://www.naaee.org/programs-and-initiatives/guidelines-for-excellence/>). The K-12 guidelines include: *Questioning and analysis skills*; *Knowledge of environmental processes and systems*; *Skills for understanding and addressing environmental issues*; and *Personal and civic responsibility*.

Another school-based model that has been widely adopted in recent years is using “environment as an integrating context” (EIC) for learning. This effort, led by the State Education and Environment Roundtable (SEER, <http://www.seer.org/>), has closely tied the use of local communities and natural environments to the education reform agenda.

Its major themes are educational best practices like constructivism; experiential, cooperative, and independent learning; action and problem-based education; interdisciplinary and collaborative teaching; and learner-centered pedagogies. These imply substantial departures from teaching-as-usual, and to produce success SEER supports demonstration networks with ties to departments of education, environmental educators, and resource partners in 16 states. Other similar efforts exist. These programs are justified on the basis of both educational and environmental benefits, as demonstrated by increased academic achievement measures, strong environmental learning, and increased student motivation (Lieberman & Hoody, 1998). A recent master's thesis compared 77 matched pairs of schools, where one member of the pair had implemented EE systematically for at least 3 years (Bartosh, 2003). Bartosh found superior performance in at least one academic area at 73 of the environmental schools, as well as more experiential pedagogies in use.

Place-based education

This is an umbrella term used by several different efforts, many of them somewhat similar to the EIC model above. What distinguishes them, however, is a focus on students learning to know and feel attached to their locale or place in the world. The goal is not to push academic skills, but to cement the child's relation to a fundamental natural inheritance. Places are characterized by their social and cultural features as much as by nature: it is a concept that reunites people fundamentally with nature, rather than regarding pure nature as a place where humans should not be allowed, or humans as a species that does not belong in nature (Gruenwald, 2003). Place-based EE takes time to acquaint children with natural history – other species, the elements, the landscape, and the human dwellers – and to encourage familiarity with them, by putting the children in first-hand contact as well as by teaching.

Some approaches simply aim to give children more opportunities to choose their own activities in nature. This includes the design of more natural playspaces where students undertake unstructured activities (Moore & Cooper Marcus, 2008). German “Waldkindergarten,” literally forest-kindergartens (Millitz, 2004; Keller, 2006), have no buildings, but take young children into the fields and woods daily. The children's spontaneous activities are supplemented by regularized group activities and storytelling. Other varieties of place-based EE occur at EE centers or nature centers that go beyond traditional ecological role playing games, didactic instruction, or teaching of the names of organisms, to integrate the child's understanding through multiple kinds of experiences: local community elders, different users of the place, the science and the arts depicting the place, the growing of food, and their own action potentials there, combine to give the children a sense of ownership in that place.

Robert Louv's (2005) book, *The last child in the woods*, emphasized what children lose when they have insufficient exposure to their local natural environments. From the standpoint of EE, Louv's work misses the connection to citizenship and action. On the other hand, place-based approaches may do most to increase the affective and motivational variable of “environmental sensitivity,” a job at which issue-based and

classroom-based pedagogies are weak. Place may also have implications for educational evaluation: Gruenewald (2003) argues that “place-conscious education” should make education *accountable to place* as well as to academic goals.

Programs highlighting biodiversity

A focus on the biodiversity crisis emerged in the 1990s and, partly following on from the 1992 UN Convention on Biodiversity, many efforts have been undertaken to address the challenges. Statutory protection of species or habitats may be ineffective when local enforcement and social support are inadequate, as in many developing countries. Education may provide a promising alternative, although immediate effects on conservation targets (e.g. reduction in habitat or species population losses) have been difficult to prove (Fein et al., 1999, 2001) and may not always be the appropriate metric. Norris and Jacobson (1998) analyzed 56 reports of tropical conservation education programs published between 1975 and 1990 in order to determine the rate of program success and to evaluate the impact of factors such as location, sponsors, duration, publication, and evaluation methods. They found that only 45% of programs were “successful” – defined as meeting 50% or more of their objectives. Key to success was formative and summative evaluation used for program improvement, suggesting the importance of incorporating ongoing institutional learning and consequent program adjustments into program design and funding.

Two additional routes to better results for biodiversity are stressed by Wals (1999), who advocates an approach to education that centralizes human development over ideology or narrow training, and is built on expert teachers’ reflections on best practices. Based on interviews with such teachers, Wals lists these process “anchors”: total immersion; diversity of learning styles; active participation; a focus on expressing values and becoming aware of others’ values; balancing the local and distant aspects of the issue; a case-study approach, stressing the social context as both a means and an end; and learning for action. The active and socially engaged elements of this list reflect the fact that biodiversity conservation is a social issue. Thus, the stress is on creating contexts where learning can take place, and fostering group and individual choice and self-determination. That said, Wals (1999) also emphasizes multileveled content knowledge of biodiversity, from ecology to values and to the politics of nature, and suggests how these can be built through quality learning processes.

Some biodiversity education efforts target acute threats to biodiversity loss, rather than working on longer routes related to consumption, policy, and citizenship. We examined these in the context of community-based efforts in Chapter 10. These efforts are most successful when preceded by biological, social, and psychological analyses that reveal particular opportunities or leverage points where the kinds of experiences offered by educators are likely to be effective. Rather than depersonalized and isolated information transfer, these experiences might include: targeted first-hand contact with experts, intervention via social networks, and a full scope of ecological information delivered in a well-sequenced fashion; experiences that stimulate reflection on values; analysis of the cultural and economic contexts; and a synchronized use of other behavior change strategies.

An innovative approach to biodiversity education is found in the conservation education curricula created by Sarah Bexell for both Atlanta Zoo and the Giant Panda Breeding Research Base in Chendu, China as part of her dissertation work. Bexell (2006) created a model of “multiple points of contact” with animals, including the careful observation of individual animals, discussion of the functions of behaviors as well as the possible subjective meanings of them, learning about animals’ needs and caring for animals, appropriate pets, discussions with scientists, and exposure to selected conservation issues upon which the institutions could take action. These activities fostered much greater empathy and perspective-taking than is usually experienced toward animals in Chinese society, and remarkably greater expressions of care generalizing to other animals. The successes of this project may depend on profound cultural changes in Chinese society as a new middle class that is not involved in farming emerges, perhaps moving beyond the historical dismissal of animals as sentient beings and allowing a suppressed ability to care for living animals to blossom in response to the curricular intervention.

Psychological foundations of environmental education

Although we think of education as a process of imparting knowledge, its success also depends on the psychological processes and readiness of those being educated. In this section we will present concepts and evidence from psychology organized according to the key facets of EE theories. These include: cognitive development theories, with special attention to knowledge of biology and ecology; affective and motivational factors, particularly connection to nature and feelings about the self’s ability to achieve effects in the world; and actual environmental behavior, action-taking, participation, and problem-solving.

Cognitive development and environmental knowledge

One of the primary psychological foundations of education is the study of cognition, referring both to the ideas or concepts people hold about their world and themselves, and to the processes that describe how people think with those concepts. Where these ideas or conceptual structures come from is debated in psychology, but almost certainly both innate predispositions and learning and experience make contributions.

There are regularities in how children (and many adults, even to some extent across cultures) think about living things. In Chapter 5 we discussed the “folk biological system” (FBS); here we consider its early stages as a starting point for children’s conceptions of nature. Children divide living things into “natural kinds” according to the assumption that some unchanging essence defines each kind. They think of the relatedness between different kinds (such as species of dog), and about reproduction, based on these natural kind categories. Their concepts about living things are distinct from those they apply to artifacts and non-living things (Coley, 1995; Inagaki & Hatano, 1996). Young children know that spontaneous growth (increase in size) and healing

distinguish living from non-living things (Rosengren et al., 1991; Backscheider et al., 1993), and they understand that living things cause their own actions, grow, feed, age, and die (Massey & Gelman, 1988; Gelman & Wellman, 1991; Inagaki & Hatano, 1996). This “naïve biology” emerges early, by age 5, and is robust. It is likely underlain by some native cognitive module, but it is also dependent on experience.

Some have argued that young children tend to base their explanations of living processes on behavioral similarity to people, and this is replaced in later years by physiological and biological concepts (Carey, 1985; Inagaki & Hatano, 1987; Hatano & Inagaki 1997). Ross and colleagues (2003), however, compared urban majority-culture children (similar to the populations used in most previous studies, including Carey’s), with rural children of the same culture, and with rural Menominee (Native American) children. Their results showed that only the urban children tended to import a human model into thinking about animal behavior, whereas even the youngest rural majority-culture children reasoned in biological terms. All ages of the Menominee used biological and ecological concepts in thinking about animal behavior, demonstrating the importance of experience and culture in giving substance to the naturalist intelligence.

The implications of this growing body of research are that children will reliably categorize living things together (and differently from other kinds of things), will notice differences related to genus- or species-level features (though this may be dependent on the transmission of cultural knowledge and be limited to “important” organisms), and will probably resist the notion that biological kinds change over time, as posited by evolution. Understanding the latter concept, as well as more sophisticated notions of ecology, requires that some of the naïve notions of the early folk biological system be directly confronted with contrary evidence.

Some research has centered on growth in children’s understanding of scientific ecological concepts. Leach et al. (1995, 1996a, 1996b) studied explanations of systems and community ecology concepts across the age range of 5–16 years. They found that younger children, especially, spoke in terms of individual organisms, did not conceptualize ecosystems as interdependent groups of organisms, and thought of animals as dependent on humans to meet their needs. After age 9, such use of anthropomorphic reasoning to explain the relative abundance of organisms at different trophic levels (producers, consumers, etc.) was rare, and between ages 7 and 16 “interdependent” reasoning increased and intentional causal concepts decreased. Some children showed a sophisticated knowledge of natural phenomena, but even among the oldest students and after instruction, descriptive and teleological reasoning exceeded population-based interdependence reasoning.

Incomplete or incorrect ideas about food web relations, energy in ecosystems, carrying capacity, niche specificity, population dynamics, and connections of ecological concepts to everyday experience are found among children (Brody & Koch, 1989; Furuness, 1992; Munson, 1994). Similarly limited and one-way models of ecological relations were found even among 11-year-olds who completed a month-long unit that involved constructing and manipulating mini-ecosystems (Hogan, 2000). Nearly two-thirds of the students noted the effects of a pollutant only when it directly contacted an organism, indicating limited knowledge and reasoning about ecological transport. The research reviewed here on ecological understanding highlights the

difficulty many children have in acquiring complex scientific concepts. Children may import ideas from the domain of human action, or from simpler mechanical causal models.

It should not surprise us that ecology is hard to grasp. It is a complex science in its own right that builds on all the basic natural sciences, from physics and geology to organismal and molecular biology. Ecological processes occur on space and time scales too large or slow (e.g. geochemical cycles), too distant (far away ecosystem destruction), too subtle (changes in gas balances), too microscopic or dilute (the presence and effects of toxic materials), and too varied (not all interconnections are equally important) for people to perceive (Anderson, 2001; Trope & Lieberman, 2003). It is hard to maintain, however, that people can make informed value decisions without ecological and environmental knowledge. People need an extensive ecological education to be fully literate. Nonetheless, educational efforts can make the indirect direct by working within people's experience of local ecological interdependence (Thomashow, 2002), by employing story and metaphor (Bardwell, 1991; Kearney, 1994), and by using vivid affective imagery and language (Leiserowitz, 2003; Myers, 2006), along with more substantial curricular approaches. The importance of ecological and more generally environmental knowledge in environmental behavior is both a basic tenet of EE as well as a consistently supported research finding (Rickinson, 2001; Meinhold & Malkus, 2005).

Besides formal learning, informal experience in nature may be important in constructing ecological knowledge, as suggested by the research on Menominee children's biological concepts by Ross et al. (2003). Kahn (2002) has suggested that as our environment becomes degraded across historical time, successive generations have a poorer "baseline" of nature experience. Without realizing it, we then underestimate the full extent of degradation as we witness its continuation. He terms this "environmental generational amnesia." For instance, he found that children from Houston understood the concept of water pollution, but did not feel that their local waterway was polluted (which it certainly was). This suggests that experience of relatively intact nature may be necessary for making accurate judgments about one's own environment. It is also notable that some of the greatest ecologists of the 20th century spent large amounts of time outdoors in their youth.

Affective factors

Research in EE has tended to support the idea that direct experience in nature is important, particularly for the affective and motivational components of environmental citizenship. Early work by Sia et al. (1985/1986) found that "environmental sensitivity," measured simply in terms of participation in outdoor activities such as camping, influenced environmental citizenship but was not strengthened by classroom issue-investigation curricula (Ramsey, 1993). We need to understand more broadly the affective dimensions of environmental education, and their sources. Research on "significant life experiences" with nature as a foundation of EE started with an early study by Tanner (1980); we discussed more recent studies in Chapter 4. Kals and Ittner (2003) summarized evidence from several studies by American and German researchers suggesting

that experiences with or in nature can have a strong effect on attitude and behavior (e.g. Finger, 1994). As mentioned in Chapter 9, Kals found that EE could increase emotional response to nature. Myers and Saunders (2002) argue that affect, particularly attachment to non-human animals, may provide a central developmental route to caring about larger levels of biological organization such as habitats, species, and ecological communities. Because animals are frequently used in educational settings, particularly in the early grades, the prevalence and dynamics of this pathway deserve further exploration.

Another affective component of EE relates to the child's developing sense of being someone who can effect change, either alone or with others. Educational programs should be alert to their potential impact on children's perceived control. Sobel (1996) criticized EE for promoting what he calls "ecophobia," which loosely means anxieties caused when children are confronted too young with distant environmental catastrophes (or alternatively it may mean simple fear of nature due to unfamiliarity); he proposed a standard of "no tragedies before fourth grade" (Sobel, 1996, p. 27). Although little evidence is available, the claim is that information focused on problems beyond young children's own experience and competence disempowers, leading them to believe they are helpless to avert environmental catastrophe. A relevant psychological research area is "learned helplessness" (see Chapter 12). As this research would suggest, however, much depends on how a problem is presented and how people are helped to deal with it.

In fact, even children can be efficacious. King (1995) reports on impressive environmental activists as young as second grade, who, with coaching and support, understand the collective nature of the needed solutions and work at that level. Further, socialization is not all adult-to-child transmission; children may also influence adults, peers and cross-age mates (Kuczynski et al., 1999). Education programs that want to reach parents through their children may want to target ages at which children make key school transitions and parents are thus invested in supporting the new environment. Also, projects that require parental assistance have a higher chance of affecting parents.

Action, participation, and problem-solving

Available evidence, based on self-report studies, suggests that children do in fact engage in pro-environmental behavior. The behaviors studied are almost entirely private sphere, such as recycling, energy use, and consumer activity. Rickinson (2001) summarized available studies that revealed, for example, that about 50% of large samples of teenagers from Australia and the Netherlands were described as environmentally friendly. But substantial proportions of teenagers in these and other surveys described environmentally detrimental behaviors. Australian students reported that the most supportive groups were others who also did the behaviors (59% reported this), followed by families (46%). Cited as sources of antagonism or indifference were close friends (40%) and teachers (32%) (Connell et al., 1998). Encouragingly, school could also be a positive factor. Specifically, students at schools with an environmental educator (but not merely an EE policy or principal support) reported more pro-environmental

behaviors (Morris & Schagen, 1996), as did students at schools where student environmental knowledge was high (Kuhlemeier et al., 1999). Disadvantaged students who reported learning a lot about the environment in school reported buying more recycled products and reducing waste (Roper Starch Worldwide, 1994).

Hart (1997) brought together the strands of research that show how children become capable participants. Hart distinguishes between illegitimate forms of “participation” for children, including manipulation, tokenism, and decoration, and increasingly more genuine forms that include informing children, consulting with them, and sharing initiation, decisions, and leadership (Fig. 11.1). The foundations for genuine participation include the development of the social self, which makes possible cooperation with peers and adults. One of the key tasks of development is for children to learn to distinguish between their own and others’ perspectives, moving from empathy with close friends to an understanding of the group or societal perspective. This provides the basis for self-reflection, awareness of their own values, consciousness of a possible discrepancy between their inner and outer selves as they become oriented around peer culture, and effort to forge an identity that is more consistent with their personal beliefs and values. This social awareness needs rich and diverse contexts in which to develop. Many important gains come only when children are allowed and helped to work together toward shared ends, both with each other and with adults.

Citizenship usually requires tenacity balanced with the ability to understand and consider other points of view and interests. The conditions that foster these abilities include role models and mentors, collaborative decisions in everyday life, participation in organizations, discussion, achieving success, supportive and trusting social networks, education, action skill development, and a sense of personal significance such as comes from taking initiative or ownership of a project (Chawla & Cushing, 2007). The key recommendation from a range of studies is that children be “engage[ed] in public issues at the local level, where they can see democratic processes in action and the effects of their contributions” (Chawla & Cushing, 2007, p. 444). Many examples are now readily available: in 2007 the on-line journal *Children, Youth and Environments* (<http://www.colorado.edu/journals/cye/>) published several dozen reports on youth participation projects spanning the settled continents.

In addition to the social skills needed to work cooperatively, environmental citizenship requires the ability to think critically and to engage in creative problem-solving. Environmental problems are what have been called ill-structured problems (Simon, 1973): they have fuzzy boundaries, complexly interconnected components, unspecified parameters, missing information, conflicting societal values, and no single solution. Research on environmental problem-solving suggests that, as in other areas of skill, there are substantial differences between the solution attempts of novices and experts. Novice environmental problem-solvers are likely to spend less time exploring the dimensions of the problem, are less knowledgeable about the concepts and systems relevant to the problem, and are less likely to address multiple dimensions of the problem (Tudor, 1989). Although few will become experts, EE could help novices develop their abilities to think about all the dimensions of problems, as well as to collaboratively explore alternatives and solutions. Myers and Beringer (in press) present evidence that college courses that use in-depth, place-based, issue analysis case-study

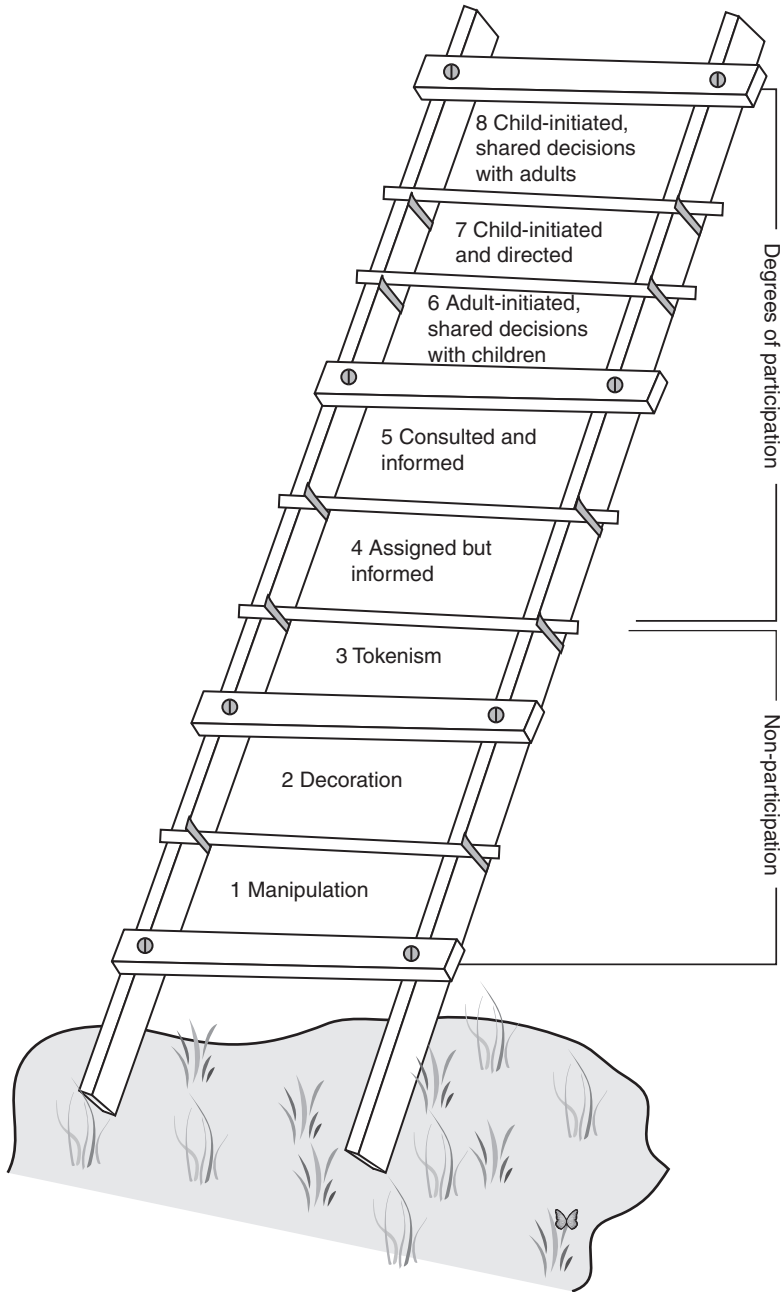


Fig. 11.1 Ladder of children's participation. (From Hart, 1992.)

methods, or provide apprenticeship in action research, may be effective in developing intellectual competencies and identity traits suited to such problems. On the secondary classroom level, the issue investigation and action training (IIAT) approach of Hungerford and colleagues has been shown to develop environmental citizenship skills

(Ramsey, 1993). Environmental citizenship requires a complex synthesis of scientific ecological literacy, social knowledge and skills, personal evaluation, and action skills on several levels.

Beyond the years of formal education lies adulthood. While it is true that adults appear more set in their ways, and their possible changes are constrained by their economic and other roles, there are nonetheless continuing patterns of growth throughout life. In general adults' thinking is more contextualized; adults know their familiar settings and domains of expertise in-depth. Adults may also think more dialectically, considering many different points of view, including within the self. Labouvie-Vief and Diehl (2000) suggest an integrative tendency in adult development, where rational thought and the emotions grow into a functioning whole.

Partly for the above reasons, adults as learners are quite different than children. They typically enter educational programs with self-direction and a high level of motivation to learn. They usually have their own purposes, and want to know how what they will learn will benefit them, or how they can use it. Adults bring their life experiences to the classroom and need to relate what is learned to their own set of meanings. Their experiences are a major resource for each other, and many prefer to work in groups, and use the instructor as a facilitator rather than an authority. They expect a share of the decision-making, and their life circumstances may mean they are less flexible; the learning experience must fit within routines. While adult learners are independent they also often want clear structure and expectations, efficient use of time, and a clearly knowledgeable instructor (Smith & Pourchot, 2000).

Lessons for effective practice

Environmental education's goals include fostering individual and collective self-determination, as well as enhancing environmental knowledge, attitudes, and behavior. EE researchers have not only examined the effectiveness of EE through hundreds of scientific and program evaluation studies, they have also synthesized the myriad studies and applied the results. The results refute critics who have claimed that EE is not effective (e.g. Cone & Hayes 1980). Here we will briefly summarize some of the overall findings.

Leeming et al. (1993) reviewed 34 studies, of which 20 reported positive or mixed results, but many had weak methodologies. Nonetheless, the studies offered some evidence about more effective techniques. Of several studies that found strong effects on behavior, all either trained subjects in the behaviors (e.g. citizenship behaviors) or involved them in the behaviors. Effects were found across a range of ages and duration of programs. Of 14 studies that targeted only attitudes, only three found strong positive effects on behavior. Leeming et al. admonished researchers to employ stronger designs and measures.

In a meta-analysis of 18 studies, Zelezny (1999) found that classroom-based programs improved reported environmental behavior more effectively than those targeting adults, with methods such as labels, brochures, videos, feedback, and information. Programs including active involvement of participants, programs of at least 10 hours'

duration, and programs targeting participants of 18 or younger were all more likely to show a substantial effect on behavior.

Rickinson (2001) found that both classroom- and outdoor-based EE programs can change young people's attitudes and knowledge. This review showed a bias toward examining innovative programs rather than typical ones, and less than optimal study designs. Nonetheless, both short-term and longer-term (at re-test times of 1 month to 6 years) gains in knowledge and attitude were well documented. One study did show a decrease 6 weeks after the program to below pre-program levels of the perceptions of participants (female high schoolers) of the seriousness of environmental problems (Uzzell et al., 1995). On the other hand, one of the studies with the strongest designs (Bogner, 1998) showed significant gains 1 month after an outdoor-based EE program on environmental knowledge, attitudes, and willingness to plan and take action – but this effect was only achieved by participation in a 5-day and not a 1-day version of the program. Knowledge, attitudes, and behavior may not all be affected to the same degree. For example some IAT instruction did not affect environmental sensitivity (Ramsey, 1993), but did significantly affect all the other variables of the Hungerford and Volk (1990) environmental citizenship model.

Like Zelezny (1999), Rickinson (2001) found that duration was a significant predictor of program effectiveness. Other important factors were location, with residential (outdoor) settings showing greater effects on attitudes, and the incorporation of preparatory and follow-up work. In addition, Rickinson speculated that community involvement and sharing knowledge with the family may strengthen effects, and that residential settings may work against long-term effects if the separation from the everyday world is accentuated.

More recent work suggests subtleties in the impacts of various program factors. In a study of seventh-grade learning associated with 2–3-day-long stays at a residential EE center, Smith-Sebasto and Cavern (2006) showed that adding pre- and post-trip classroom activities produced higher levels on a scale measuring positive environmental attitudes compared to residential-only experiences, or those with only pre- or post-experiences. On a finer level, however, some possible program gains, such as comfort levels outside, were not realized, perhaps reflecting skills that are difficult to help children gain in single, short stays.

In another synthesis of research on outdoor learning, Rickinson et al. (2004) affirmed the same three points for success listed above, and added a fourth: careful design of learning activities and assessment. Among the components of design were familiar routines and structure. There was disagreement about the amount of structure (such as worksheets) that best contributes to environmental learning, but structure should be aligned with learning objectives. Program planners should take participant variables into account (Richerson et al., 2004, pp. 49–50):

- Age: primary school students were more enthusiastic both before and after their experiences than were secondary students.
- Prior experience: for example, if students are used to highly structured lessons, they will find more open-ended investigation tasks difficult.

- Fears and phobias: these may pose a barrier to enjoying the outdoors, and require advance preparation to mitigate.
- Learning styles and preferences.
- Physical disabilities and special education needs.
- Gender: some studies have found gender differences in some variables that influence the success of the programs, such as perceived fitness level and the importance of social relatedness and acceptance.
- Ethnic and cultural identity.

Conclusion

A familiar bumper sticker says “If you think education is expensive, try ignorance!” In fact, world expenditures on education are the largest category of public spending, outpacing even militaries. Unfortunately, we continue to court ignorance regarding our place in nature, the many irreplaceable benefits it provides, and the promising solutions that are available already or can be developed through human ingenuity and collective resolve. While EE has a strong proven track record and is highly practical, it has not been implemented on a comprehensive and high-quality scale.

Education is a high investment strategy for healing humanity’s troubled relations with the earth. But it is also a high yield strategy, not only addressing sustainability but also personally enriching the lives and capabilities of all it touches.

The psychology of hope

- Human response to threatening circumstances
- Optimism and pessimism
 - Self-regulation
 - Explanatory style
 - Cognitive strategies
- An alternative to a focus on outcomes: Creating meaning

The challenges to conservation are great. Like many others, we face the sometimes deeply personal questions of whether to have hope, and why to continue trying. In this chapter we want to reflect on these questions using some of the resources of psychology. No stranger to human difficulties and challenges, psychology offers insight not only from therapeutic efforts to help people grow past disabling problems, but also from research into the foundations of human flourishing, resilience, and empowerment. One of psychology's key contributions to conservation can be to help emphasize and build on human potential. This chapter will review research describing our species' diverse ways of moving forward. It is important as we confront these challenges to understand the sources of human adaptability and the psychology of perseverance in the face of difficult times.

Psychology, even along with all the other areas of study and practice, will not allow us to find all the answers, apply them, and solve our problems. As a science, psychology aims to describe human tendencies rather than control them. Each individual confronts the question of how to navigate the uncertain path toward sustainable human ecologies. Psychology cannot create a sustainable society, but it can provide some insight and enlightenment that may improve our attempts to do so.

Human response to threatening circumstances

In Chapter 2 we discussed Lazarus's theory of response to stress, which notes that people may cope in a problem-focused fashion by changing aspects of the situation, or in an emotion-focused way by using self-protective techniques such as avoidance, denial, wishful thinking, fatalism, and desensitization to decrease the discomfort of the stress. For many people in the world today, environmental degradation is an acute and

chronic source of stress, which – usually combined with other stressors such as poverty, marginal health and nutrition, and lack of education – may create vicious cycles of disempowerment and fatalism, though some respond with remarkable fortitude and initiative. For other people, probably including the readers of this book, the stress comes through our *knowledge and beliefs* about environmental losses as well as direct experiences of important values that are threatened. That is, educated groups experience a cognitively mediated stress, but one that is sufficiently uncomfortable to provoke defensiveness. How we construe these stresses and our capacities for responding adaptively to them matters very much. If those of us who are less directly affected by environmental threats, but who typically have greater resources, rely solely on emotional coping, then there is little hope of solving the problems we face.

The adaptive capacities of humans vary among persons and situations, and each may have an associated set of liabilities. There is a long list of human weaknesses, neuroses, egocentrisms, psychological biases, self-deceptions, blind spots, vulnerabilities, and dysfunctional cultural pathways we may be on, or, as Orr (1991) put it, varieties of “human cussedness.” Describing them could bring value if there are specific lessons about how they can be avoided or ameliorated. This book has attempted to review some ideas, based on psychological research, along such lines. Psychology also offers many insights into “how people work,” all of which should be applied to “getting psychology right for sustainability.”

To recapitulate some themes of adaptiveness that have been touched on in earlier chapters, humans have many psychological resources at our disposal. As a highly generalist species adapted to social groups and intergenerational learning, we do not rely only on trial and error learning, but learn from others in many ways from modeling to direct instruction. Modern research on education shows how to best utilize these propensities, including our remarkable general as well as specialized intelligences. Our “docility” is also, fortunately, balanced by the potential for thinking critically and taking innovative action, a potential that is both innate and open to cultivation. Although not all have been mentioned in this book, environmental professionals and scholars from across the spectrum have already amassed (as a result of learning and sharing) an impressive tool chest of scientific findings, policy innovations, new technologies, novel institutions, inspiring ethical visions, and practical know-how for dealing with our environmental challenges. When these strengths are applied in an “adaptive management” or “social learning” framework, then the spiral leads upwards. David Suzuki and Holly Dressel’s (2002) book, *Good news for a change: How everyday people are helping the planet* offers many success stories as testimony and antidote.

Also part of our biological inheritance are the abilities to understand others both spontaneously and deliberately, and to reflect on the self and others. Coupled with general preferences for fairness and reciprocity, these traits mean we are distinguished as a moral species, capable of acting altruistically out of inclination as well as from deliberate principle. Building on these bases for morality is part of every culture’s socialization process. Our communities, built upon these foundations, are remarkable resources for adaptability, and social science is showing us how the health of communities, even those in conflict, can be fostered further. Tales of collective triumph and learning are told by Paul Loeb (1999) in *Soul of a citizen: Living with conviction in a*

cynical time and Arjen Wals (2007) in *Social learning towards a more sustainable world*. Bardwell (1991) has pointed out the effectiveness of knowing and sharing such narratives. Although there is not yet much evidence, there is hope that shared concern for and enjoyment of the natural environment, perhaps through mechanisms such as peace parks, may help to build a sense of community, even among groups that have been in conflict (Conca & Dabelko, 2002; Ali, 2007).

We have also seen that in many ways we are psychologically connected to the larger living world. This may occur in ways that we are not even conscious of (such as mental health benefits gained from time in nature, or an unlabeled but strong sense of place), in ways that are employed everyday without explicit names (such as our ability for biological classification, or our interest in other living things and joy in interacting with them), or in ways that we are quite conscious of (such as when we have some form of environmental identity that has significance for our social interactions). Some human traits or experiences relating to nature may be developmentally fragile, depending on conditions that we do not yet fully understand and which may not be widespread. It seems likely that nature is more important in promoting positive human functioning than we even know, as research on this topic is still young.

Optimism and pessimism

The question of optimism and pessimism is not new to the era of global ecological overload. Life throughout pre-history and history has provided most people with sufficient challenges to raise it as a fundamental question of existence. Is the universe basically favorable, indifferent, or hostile to humanity's future? The answer depends in part on the basis of our prognoses about the future. In medieval Europe, questions of humans' place were settled by a deity whose intentions writ the fate of everyone and were deciphered through the dogma of the Church. The modern spirit, however, has advanced science and reason as tools not only for knowing the future but for actively affecting it. Descartes championed a heretical optimism of using reason to figure out how things work, and thereby better the human condition (Domino & Conway, 2001).

Psychology is a product of that modern quest started by Descartes, and today its approach to optimism and pessimism is descriptive, theoretical, and empirical. There are at least three ways that optimism and pessimism have been conceptualized in recent psychology: (i) as a result of one's dispositional self-regulation; (ii) as a consequence of the explanatory model people use; and (iii) as aspects of the cognitive strategies people employ in different circumstances. Because environmentalists often engage in speculation, based on their own experiences, about whether their tactics evoke hope and action or despair and inaction, it is worth reviewing these approaches and how they apply.

Self-regulation

The dispositional self-regulation approach is based in a model of motivation that says people organize their behavior around the pursuit of goals (Carver & Scheier, 2001). In order to pursue their goals (which may be conscious or unconscious), people

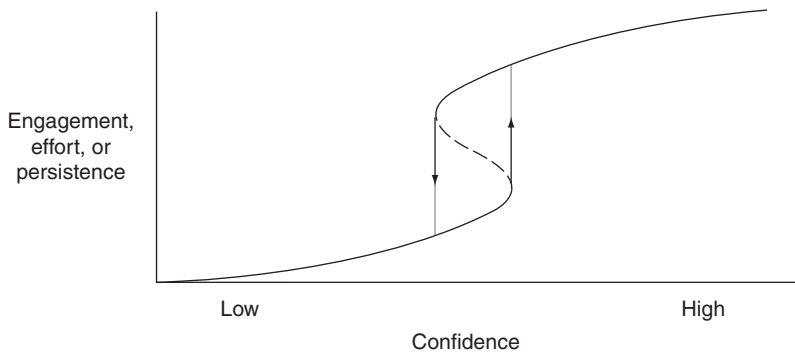


Fig. 12.1 Discontinuous relations between engagement and confidence. (From Carver & Scheier, 2001.)

mentally represent the goal in some way (a “reference value”), and compare this to the input coming from in from their environment. If there is a discrepancy, then the person may act (internally or externally) to reduce the discrepancy. Sometimes the goal is to avoid some state, so if input indicates the person is approaching it, he or she will probably undertake avoidance actions to maintain a more desired state. If the goal is positive, a discrepancy will motivate goal-pursuit behavior. A person who experiences difficulties in his or her goal activity may stop and deliberate about the likelihood of success, thinking about conditions, prior experience, etc. This deliberation results in an *expectancy* of success in terms of self-confidence, or self-doubt, at being able to achieve the goal. Confident expectancies predict further efforts, whereas doubtful ones predict disengagement or giving up. These results may apply to very specific goals, or broad ones – in the latter case leading to generalized optimism and pessimism about a whole activity or even about one’s life.

Carver and Scheier (2001) suggest that an important variable is the importance of the goal in the person’s hierarchy of goals. The more important the goal, the more dramatic may be the results on behavior; this may explain why one person will continue trying despite lessening results, while another at the same point would give up. Figure 12.1 depicts a model in which the amount of effort a person exerts is shown to be discontinuous at some point, depending on their initial confidence and experience as they try to persist. Suppose a person of low confidence about a task increases his or her effort and consequently his or her confidence builds (visualized as moving from left to right from the left end of the curve). But at some point, success requires a great push; unfortunately the person of relatively low confidence is unlikely to make this jump. Approaching the discontinuity from the right side of the figure, a highly confident person encountering difficulty may drop his or her efforts slightly but continues trying at a high level of engagement, but finally gives up after extensive attempts (i.e. shows gradually lower confidence and then an abrupt drop in engagement).

How does this apply to conservation psychology? If people have consistent doubts about the possibility of success in some area, it will be very difficult to get them to keep trying, whereas others with more confidence will not give up even when difficulties are

encountered. Expectancies inform confidence/doubts, which in turn have dramatic effects on behavior. The formation of expectancies and the level of confidence are thus key. Effort should increase if expectancies of success are increased and if individuals with low confidence can be given extra assistance throughout the initiation of new behaviors. Significantly, the importance of the goal also matters. If pro-environmental action is not a priority, little action may happen. Ironically, however, the model also cautions against making the goal *too* important, because that is where abrupt discontinuities in the confidence required are perceived. In the self-regulation perspective, then, a lot depends on individual traits and on finding a match between expectancies of success (confidence) and effort.

Explanatory style

One important strand in psychological research related to optimism is based on pessimism, or more accurately “learned helplessness.” In early research, dogs who were experimental subjects were given unpleasant shocks to their feet while contained in enclosures from which they could not escape or even leap up. After a period of learning, the lids were removed so that the dogs could leap out to avoid the shock. But those who had been helpless to escape at first were far less likely to leap out compared to dogs that had not undergone the conditioning. The conditioned dogs had learned that attempts to avoid the shock were futile. The phenomenon has been found in many other settings and organisms as well.

Seligman and colleagues (Abramson et al., 1978) later revised the theory to incorporate a cognitive dimension: how we try to explain the events that happen to us, especially the negative ones. Explanatory styles vary in terms of whether they emphasize factors that are: (i) internal versus external; (ii) stable versus unstable; and (iii) global versus specific. If a negative experience is explained as due to factors that are internal, stable, and global (e.g. “I’m such an idiot”), this would connote pessimism, and would tend to reduce efforts to change one’s own behavior to avoid the experience in future. An optimistic explanation would, instead, focus on external factors that are perceived as specific and changeable (e.g. “I was misinformed”). Interestingly, the opposite configuration occurs when explaining a positive outcome: pessimists explain good events as a result of situational factors that are temporary and specific – it was just lucky things came out right that time! Optimists look at good events as resulting from their own enduring global traits (Gillham et al., 2001).

Optimistic explanatory style is associated with academic achievement, job productivity, fewer doctor visits, higher self-reported health, athletic performance, marital satisfaction, and even political victory: in nine of ten elections between 1948 and 1984, the party candidacy acceptance speeches of candidates who later lost the presidential contest were scored as more pessimistic and focused on negative events (Zullo & Seligman, 1990). Empirical studies show a strong association between pessimistic style and depressive symptoms; there is also some evidence that pessimistic explanations, especially for negative events, may be a risk factor (causative) for depression (Gillham et al., 2001). Hopelessness theory (Abramson et al., 1989) predicts depression and lack of

motivation when causes of negative events are seen as stable and global, when negative or catastrophic consequences are expected, and when negative self-descriptions are used.

The implications of this theory of optimism and pessimism for environmental affairs are provocative. Consider the variables in hopelessness theory. Often catastrophic consequences are predicted for the environment. Environmentalists have frequently, and with apparent justification, attributed degradation to global and stable factors, such as long-lasting institutions with global reach (such as multinational corporations), or human nature that is predominantly greedy and short-sighted. This theory offers a framework for understanding how such environmentalist ideologies may be inadvertently disempowering and paralyzing. The answer is not to try to turn every problem into “ten small steps you can do today.” Certainly clear individual steps help, but people also need to understand, visualize (e.g. via anecdotes offered by Suzuki & Dressel, 2002, mentioned earlier), and use their collective resources to solve problems via policy and education that reaches to deeper roots.

Explanatory style theory, like the dispositional theory, points to individual factors. But this approach grew out of the learning theory paradigm: both the circumstances to which one becomes conditioned as well as the attributions one makes affect explanatory style. Thus, this theory points to intervention factors that might ameliorate pessimism. Zimmerman, for example, developed a theory of learned helpfulness, which is “a process of learning and utilizing problem-solving skills and the achievement of perceived or actual control” (1990, p. 72). Zimmerman argued that *perceived control* is made up of several components, including: self-efficacy (cognitive component), motivation to control (affective), and locus of control (personality) (see discussion in Chapter 11). Zimmerman described the conjunction of these as “psychological empowerment,” and found that it was directly affected by the amount of participation in neighborhood or campus volunteer organizations, in both a community sample and a student sample. Participation and empowerment were negatively correlated with alienation, in both samples.

The experience of being directly involved in making incremental positive steps is highlighted by Weick (1984). Kaplan (1990) also points to the positive motivational power of finding one’s contributions are needed, and frames progress in a psychologically realistic fashion of “muddling,” as an antidote to impatient expectations. The adaptive management process in general (Lee, 1993) also depends on decomposing complex problems into components, and tracking successes. An experience of effective participation, even if only partially successful, can train people to be optimists rather than pessimists.

Cognitive strategies

Psychologist Julie Norem (2001a, 2001b) noticed that the repeated emphasis on the positive power of positive thinking did not fit all people. In collaboration with colleagues, she developed a quite different approach to optimism and pessimism based on the notion that people may use different cognitive strategies in different situations, and that what she calls “defensive pessimism” can sometimes be highly adaptive. Defensive

pessimism is shown by someone who anticipates an upcoming event in a “worst case scenario” fashion, but rather than being paralyzed by the resulting anxiety, actively works to foresee and prevent the various factors that could cause problems. On the other end of her scale are “strategic optimists,” who avoid thinking about what might go wrong, instead relying on a general confidence to carry them through and avoid rather than harness anxiety.

These strategies are cognitive styles rather than dispositional traits; individuals vary in how much they use them according to the situation. In one experiment, defensive pessimists who were told they should expect to do well on a test, thus short-circuiting their adaptive strategy, in fact did more poorly than an equivalent group that was not reassured. In general, strategic optimists and defensive pessimists do comparably well on a range of challenges. But the liabilities of these strategies are different. Defensive pessimists do poorly if overtaken by a positive mood, whereas strategic optimists do poorly when they are required to think about their performances beforehand. Defensive pessimists also are less likely to be satisfied with their achievements (Norem, 2001a).

The message of the cognitive strategy approach for conservation may simply be to drive home how different people adapt differently (and successfully) to similar challenges. Given its similarity to precautionary principle-based thinking, many readers with strong environmental concerns may recognize themselves in the portrait of defensive pessimists. Even so, it is likely that they use this strategy only in some domains. In areas of greater confidence, they may rely more on present-focused improvisation as do strategic optimists. It is worth noting that one strategy’s key (reflection, for pessimists) is the other’s undoing. Thus, there is a danger in assuming that a single style will work for everyone. Anxiety is an uncomfortable state for most people. Defensive pessimists have learned to harness it, but others may want to steer clear. Norem (2001a, p. 96) suggests:

This research shows that there are multiple paths that people may navigate toward their goals and that sometimes their goals reflect differences in starting points ... World outlooks are not “one size fits all” because people do not all live in the same world. Psychologists and educators do a disservice to people they are trying to help if they ignore individual differences in temperament, history and circumstances that make particular strategies more or less appropriate for specific individuals.

An alternative to a focus on outcomes: Creating meaning

There is a difference between hope and optimism. According to Vaclav Havel, for example, “Hope is definitely not the same thing as optimism. It is not the conviction that something will turn out well, but the certainty that something makes sense regardless of how it turns out” (1990, p. 181). For Havel, hope resides in the faith that things have meaning. Although emotional optimism and behavioral perseverance can be characterized with an accumulation of facts and data, and tied to beliefs about probable outcomes, human experience also includes the less quantifiable search for fulfillment and

meaning. We have described several ways in which the natural world facilitates this search, by providing opportunities for connectedness, empowerment, and even transcendence. In the face of the deterministic biogeophysical processes embodied in climate change, pollution, and loss of biodiversity, people may feel that human initiatives are constrained and even pointless. Can the environment still provide a source of hope?

The work of the existentialist psychologist Viktor Frankl delineates a way to see possibilities within the hard facts of human life, to see chances for fulfillment rather than fatalism. Frankl developed a therapy he called “logotherapy,” which is based on three principles: “the freedom of will, the will to meaning, and the meaning of life” (1969, p. 16). Freedom of will, he noted, does not mean *indeterminism*; humans are always enmeshed in many determining facts and conditions of their lives. Rather, it means “freedom to take a stand on whatever conditions might confront” a person. We can always choose our attitude toward whatever happens, even if we cannot affect what happens.

Frankl, asked if he believed humans are subject to determinisms, replied that he did:

But I added that along with being a professor in two fields [neurology and psychology] . . . I am a survivor of four camps (that is, concentration camps), and as such I also bear witness to the unexpected extent to which man is, and always remains, capable of resisting and braving even the worst conditions. To detach oneself from the worst conditions is a uniquely human capability.

Frankl, 1969, pp. 16–17

As he intimates, Frankl speaks with more than theoretical authority when it comes to insight gained about suffering, which he considered to be inevitable in life.

Humans are capable of transforming suffering into something elevating. Perhaps a mature vision of “positive psychology” can acknowledge the inevitability of suffering and mortality, yet nonetheless find perseverance and value (Wong, 2001). Frankl forged such a vision, arguing that both heroism and humor express the ability for a self-detachment that allows us to choose our attitude toward our situation *and* ourselves. He regarded this capacity as opening a new dimension of human life beyond psychology or biology. To avoid the religious connotations of “spirituality,” he called it the “noetic” realm. The will to meaning occurs in this realm, as do choice, creativity, authenticity, and value. Our ability to reflect on the self, to feel conscious of the self, to “take a stand toward our own somatic and psychic conditions and determinants” means that “a person is free to shape his own character, and man is responsible for what he may have made out of himself . . . the capacity to take such a stand is what makes us human beings” (Frankl, 1969, p. 17).

To quote Frankl further:

Let me take up two phenomena which are perhaps the most human ones, love and conscience. These two are the most striking manifestations of another uniquely human capacity, the capacity for self-transcendence. Man transcends himself either toward another human being or toward meaning. Love, I would say, is that capacity which enables him to grasp the other human being in his very uniqueness. Conscience is that capacity which empowers him to seize the meaning of a

situation in its very uniqueness, and in the final analysis meaning is something unique.

Frankl, 1969, pp. 18–19

We are always capable of detaching from our immediate reaction to a situation and attempting to discern what it demands of us. It is easy, however, to avoid this demand for responsibility because many people live in an “existential vacuum” of apathy, inertia, and boredom. Indeed, life does not present its meaning to us. Rather we must discern and create it, through self-transcendence where we reach out beyond ourselves. Frankl’s theory provides us with a way of recognizing not only that there is the potential for finding meaning in an apparently hopeless situation that we might wish to ignore, but that the requirements of finding meaning in any life, under any circumstances, are no different.

This insight may free us from certain motivational dead ends that often go with the territory of environmental concern. One pitfall awaits those who work for the realization of lofty ideals, such as peace, low environmental impacts, and so on. Their actions inevitably fall short of the ideals for which they advocate. In response, they may give up trying out of discomfort with the internally or externally pointed out inconsistency. Indeed, setting expectations that are too high can be a form of self-handicapping – an insidious way of putting obstacles in the way of one’s own achievements. Or, in the case of causing impacts, one can so minimize one’s actions to be consistent that one has no influence on others. Another risk is that of self-righteousness, which further undercuts the positive social power of examples and emergent norms. But high ideals, according to Frankl, should never be used to negate possible actions. High ideals are ultimate meanings: something to navigate by, rather than to realize.

Another cul-de-sac concerns being results driven. There is nothing wrong with striving to make a difference. But sometimes the fear that we can never make enough of a difference – ecosystems will perish anyway – prevents us from making the attempt. The answer is to detach ourselves from our own such striving/frustration reactions, and to look at what conscience calls us to do. In doing *that* we will realize the only meaning possible, that of acting consistently with our values.

Perhaps the most enduring motivation for persevering toward a more just, healthy, and ecologically sustainable world, despite whether we may be optimists or pessimists, lies in just this: that we can best realize meaning in our one and only lives by answering the demand the world’s condition is placing on us (Frankl, 1969).

Glossary

Adaptive management A learning-oriented approach to management of social and natural systems, with an emphasis on deliberative engagement of stakeholders, explicit goals, monitoring and data collection, and iterative attempts to track and meet or modify goals and management choices.

Affordance The capacity of some setting to provide something an individual needs or that supports a behavior pattern; a match between perceived need and physical reality.

Anthropocentrism A value-based perspective that prioritizes the well-being of humans.

Applied behavioral analysis An approach to promoting sustainable behavior promoted by Scott Geller that includes three basic principles: it is focused on an observable behavior; it looks at external rather than internal factors to improve performance; and it utilizes principles of behavioral reinforcement.

Attention restoration theory The theory that the capacity for focused (“voluntary”) attention gets depleted and may be restored by attending (“involuntarily”) to fascinating stimuli for a period of time.

Attitude An evaluative reaction to an object or behavior that is based on beliefs about that object or behavior and which is associated with behavior toward the attitude object.

Autonomy supportive environment Derived from self-determination theory, an environment that helps individuals and groups act in ways consistent with their identity and values. Fostered by factors including empathic understanding, choice, transparency, and non-controlling communicative style.

Availability heuristic The tendency for events and outcomes to appear more probable when they come to mind more easily.

Behavior setting A place with physical and social features that channel behavior into somewhat predictable patterns; a place where a typical set of behaviors usually occur.

Biocentrism A value-based perspective that prioritizes the well-being of nature.

Biophilia Positive emotion toward, interest in, or a wish to affiliate with living things.

Biophobia Negative emotion toward, fear of, or apprehension about living things.

Classroom-based environmental education A traditional approach that stresses the acquisition of knowledge and skills relevant to addressing environmental problems, along with the development of a sense of civic responsibility.

Clinical psychology A core psychological subdiscipline focusing on the study of mental health and well-being as well as abnormal behavior.

Cognitive dissonance A theory suggesting that holding two psychologically inconsistent states generates an unpleasant feeling of dissonance, and that people will work to eliminate it or reduce it. Thus when people act in a way that is inconsistent with their attitudes, they may find it easier to change their attitudes than to live with the dissonance.

Cognitive psychology A core psychological subdiscipline focusing on mental representations and information processing.

Collective identity A self-concept based on one's status as a member of a social group, such as a family, community, or country. A strong collective identity tends to predict greater concern for the welfare of the collective in contrast to individual self-interest.

Commensal relationships Relationships in which one party benefits and the other is neither significantly helped nor harmed.

Common pool resources Resources that are collectively owned or managed in some fashion, leading to the possibility of a "tragedy of the commons," or a more or less successful system of community management, depending on social, institutional, and resource factors.

Commons dilemma Described by Hardin, the commons dilemma is an example of a social trap that describes the tendency of individuals to overexploit a commonly shared resource.

Community-Based Social Marketing An approach to changing behavior advocated by McKenzie-Mohr, which focuses on the social context as well as the immediate barriers and benefits to a particular behavior.

Consequentialism The ethical theory that the rightness of an action is determined by its consequences (i.e. costs or benefits) rather than by the principle(s) that guided it, or the qualities or intention of the actor.

Curtailed behaviors Behaviors that involve a reduction of consumption; they may be perceived as involving sacrifice.

Deep ecology A philosophical position that encourages a sense of identity that transcends the individual and encompasses the ecosystem, striving for a sense of similarity or shared community with the rest of nature.

Defensive pessimism A cognitive strategy based on expecting the worst and then preparing for it.

Defensive thinking Reasoning that is biased by the attempt to maintain a positive affective state.

Deontological ethics One of a family of approaches to ethics centered on duties or obligations and which typically refers all judgments back to one fundamental universalizable principle.

Depth psychology Psychological theory concerned with the relations between the unconscious and conscious mind, or patterns and dynamics of motivation and mind, broadly construed.

Developmental psychology A core psychological subdiscipline focusing on the impacts of early experience and changes as an organism matures.

Dispositional self-regulation A model of motivation that says people organize their behavior around the pursuit of goals, based on expectations for success that are a product of current conditions and previous experiences.

Docility The tendency to learn or modify one's behavior, by interaction, vicarious observation, as well as instruction.

Dominionistic values Valuing experiences with nature based on controlling or dominating natural forces.

Easterlin paradox Refers to the paradoxical finding that happiness does not appear to increase with wealth at the national level. More recent research gives more support to the idea that there is a meaningful relationship between happiness and wealth, although factors like social support are more important predictors of happiness.

Ecological psychology Theory and research about how individual experience (particularly perception) is constituted by intimate and often biologically entrenched relations to constant environmental patterns.

Ecopscychology A family of approaches to understanding humanity's ecological crisis as rooted in the mismatch between humans' unconscious connection to nature and modern life; psychotherapy based on a link between mental and ecological well-being.

Educating for sustainable development A life-long, community-based approach to learning that aims to produce citizens who actively work toward a society that is both ecologically and socially sustainable.

Efficiency behaviors Behaviors that accomplish the same goals but more efficiently, using fewer resources.

Egocentrism A value-based perspective that prioritizes one's own well-being.

Elaboration Likelihood Model Developed by Petty and Cacioppo; suggests that persuasive messages may work either by activating superficial associations, or by provoking deeper cognitive reflection.

Environmental citizenship A goal of environmental education: to produce people who actively engage with environmental problems, possessing not only the knowledge but also the motivation and commitment to work toward solutions.

Environmental generational amnesia The gradual loss of knowledge about what should compose a healthy ecosystem, as each new generation experiences a new level of environmental degradation as the "baseline."

Environmental identity An identity of oneself as connected to or interdependent with nature. Environmental identity comprises factors like the extent to which a person tends to interact with elements of the natural world, the personal importance of nature, and positive experiences and emotions associated with nature.

Environmental Identity (EID) scale A self-administered written scale developed by Clayton to measure an individual's level of environmental identity.

Environmental psychology A specialty within psychology that studies the reciprocal influences of people and their environments, characterized by both systematic theory and a concern for practical application.

Ethics The principles and values of a person or group; also, the philosophical study of what principles, virtues, and values *should* guide personal action or social policy.

Explanatory style Events can be explained as due to factors that are internal or external, stable or unstable, and global or specific. Explanatory style refers to an individual's tendency to use particular types of explanations.

Extreme environments Environments that threaten survival in the absence of adequate preparation or protection.

Flow A mental state in which a person feels fully engaged in an activity, challenged but able to meet the demands of the task. Characterized by reduced self-awareness and a sense of freedom; may include an altered sense of time. Flow is a highly positive experience.

Folk biological system Concepts about living things that are held, often intuitively or "naïvely," by an individual or group, which show certain developmental and cross-cultural regularities as well as variations.

Foot-in-the-door effect The tendency for small actions in support of a cause to lead to further actions for the same cause.

Free-choice learning Learning that takes place in a relatively unstructured setting in a manner, and at a pace, determined by the learner's use of the available information.

Gene-culture evolution The reciprocal influences of natural selection and cultural/psychological selection transmission in shaping group and individual behaviors.

Heuristic A short-cut in mental reasoning that may lead to erroneous judgments.

Horticultural therapy A therapy involving gardening or exposure to plants with the goal of improving human well-being.

Humanistic values Values for nature that are based on creating emotional bonds, similar to those that might be formed with humans.

Identity A framework for organizing information about a person. Information can include personal attributes, social roles and relationships, or group memberships. An identity may be self-ascribed or imposed by others.

Implicit Association Test A reaction-time-based measure that assesses the extent to which concepts are closely connected in a person's network of cognitive associations; has been used to measure the extent to which people feel connected to nature.

Learned helplessness The absence of behavior designed to escape aversive events or experiences, based on previous unsuccessful attempts to escape those experiences.

Logotherapy Viktor Frankl's therapy based on the principles of the freedom of will, the will to meaning, and the meaning of life.

Loss aversion The tendency to respond more strongly to a possible loss than to a possible gain.

Moral exclusion The philosophical, psychological, or practical denial of the moral standing of some entity or group.

Morality A person's inner sense of right and wrong, and how she or he should behave.

Mutualistic relationships Relationships in which both parties benefit, although it may be in different ways.

Negativistic values Responses to nature that are based on fear, dread, or aversion.

New Environmental Paradigm A scale developed by Dunlap and Van Liere to measure a worldview that stresses the fragility of nature and the need for limits on human interventions into nature.

Parasitic relationships Relationships in which one party benefits at the cost of the other.

Physiological psychology A core psychological subdiscipline focusing on the physiological and neural processes that underlie behavior.

Place attachment Emotional attachment to a place, which may include the extent to which one is dependent on that place to fulfill one's goals.

Place-based education Education that focuses on teaching students about the natural history and cultural dimensions of their own personal locale, with the goal of encouraging a sense of attachment and relationship to place.

Place identity The component of identity that is associated with a particular locale.

Pragmatic ethics An approach to ethics centered on the ability of language and thought about social and other values to be improved by the conscious use of experience and experimentation together with community dialog.

Prescriptive norms A social or personal belief delineating obligatory principles, traits, or actions.

Proscriptive norms A social or personal belief delineating forbidden or sanctioned principles, traits, or actions.

Prospect Landscape qualities that allow a view outward for an action-relevant distance.

Protection-motivation theory A theory developed by Lazarus that describes the role of threat appraisal in coping.

Reactance Resistance to obvious attempts at behavioral control, usually by doing the reverse of the behavior that is desired.

Refuge Landscape qualities that allow for hiding from others' view or from natural forces.

Reinforcement contingencies The positive or negative consequences of behavior for the actor.

Restorative environment An environment whose qualities support involuntary attention, usually by being fascinating, extensive in space, offering moderate levels of complexity and coherence, and being compatible with a person's goals.

Risk perception A subjective assessment of a possible threat.

Scope of justice A term denoting the realm of entities (i.e. which humans?, which non-humans?) that are taken into consideration in deliberations about justice or the extension of other moral principles; related to whether an entity is "morally considerable" or has "moral standing."

Self-efficacy A person's perception that she or he is able to successfully complete an action. A feeling of self-efficacy predicts a greater likelihood of acting in support of one's values.

Self-handicapping Placing obstacles in the way of one's own success, so that failure can be blamed on those obstacles rather than on one's own shortcomings.

Social capital The extent and types of bonds and shared norms among people in a community. Several types have been identified, including bonding social capital, or the emotional connections and supportiveness that develop between similar people; bridging social capital, or the linkages among people and groups that are dissimilar but have been brought together; and linking social capital, or the ability of groups to influence or gain resources from external agencies or authorities.

Social psychology A core psychological subdiscipline focusing on social interaction and social influence.

Social trap A situation in which the pursuit of short-term gains by individuals leads to a long-term or collective loss by the group to which the individuals belong.

Stages of Change A model described by Prochaska and DiClemente that identifies the characteristics associated with different stages of readiness for behavior change, and the techniques likely to be successful at each stage.

Temporal discounting The tendency for delayed outcomes to have less significance or impact on decision-making.

Theory of Planned Behavior Developed by Ajzen to describe the relationship between attitudes, social norms, perceived control, and behavioral intention.

Transcendent experiences Experiences that seem to transcend mundane, day-to-day living and which may be perceived as having a spiritual component or as inducing a sense of humility. Often seem to occur in settings of natural grandeur.

Utilitarianism A variety of consequentialism that defines “good” as the generation of pleasure or the avoidance of pain; the basis for modern economic theory and 19th/20th century resource conservationism, in the form of managing resources to produce the greatest good for the greatest number for the greatest time.

Value–Belief–Norm model Developed by Stern to describe the connection between values and behavior.

Values General, stable, strongly held judgments or preferences for end states or ways of acting that serve as goals that apply across different contexts.

Virtue ethics An approach to ethics emphasizing cultivation of inner character traits that define a good person, and the avoidance of vices; action is good if it expresses the virtue regardless of the consequences.

Worldview An integrated set of beliefs about what is real, what is knowable, what is valuable, and what it means to be human, typically learned as part of cultural socialization.

References

- AAAS (American Association for the Advancement of Science) (2004). *Survey report on marine issues*. Available at http://www.aaas.org/news/releases/2004/aaas_survey_report.pdf.
- Aaronsen, B.S. (1967). Mystic and schizophreniform states and the experience of depth. *Journal for the Scientific Study of Religion* **6**, 256–252.
- Abadia, R., Day, B., Knowlton, N., McCosker, J., Baron, N., Katoppo, A. & Hough, H. (2004). Defying ocean's end through the power of communication. In L. Glover & S. Earle (eds), *Defying ocean's end: An agenda for action* (pp. 183–196). Washington, DC: Island Press.
- Abramson, L.Y., Alloy, L.B. & Metalsky, G.I. (1989). Hopelessness depression: A theory-based subtype of depression. *Psychological Review* **96**, 358–372.
- Abramson, L.Y., Seligman, M. & Teasdale, J.D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology* **87**, 49–74.
- Adeola, F.O. (2000). Endangered community, enduring people: Toxic contamination, health, and adaptive responses in a local context. *Environment and Behavior* **32**, 209–249.
- Adeola, F.O. (2007). Nativity and environmental risk perception: An empirical study of native-born and foreign-born residents of the USA. *Human Ecology Review* **14**, 13–25.
- Adler, A. (1956). *The individual psychology of Alfred Adler* (H. Ansbacher & R. Ansbacher, eds). New York: Basic Books.
- Agrawal, A. & Gibson, C.C. (2001). *Communities and the environment: Ethnicity, gender, and the state in community-based conservation*. New Brunswick, NJ: Rutgers University Press.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes* **50**, 179–211.
- Alger, J.M. & Alger, S.F. (1997). Beyond Mead: Symbolic interaction between humans and felines. *Society and Animals* **5**(1), 65–81.
- Ali, S.H. (ed.) (2007). *Peace parks: Conservation and conflict resolution*. Cambridge, MA: MIT Press.
- Allport, G. (1954). *The nature of prejudice*. Cambridge, MA: Addison-Wesley.
- Alon, N. & Omer, H. (2006). *The psychology of demonization*. Hillsdale, NJ: Lawrence Erlbaum.
- AMVA (American Veterinary Medical Association) (2008). *U.S. pet ownership*. Available at <http://www.avma.org/reference/marketstats/ownership.asp> (accessed March 20, 2008).
- Anderson, C.A. (2001). Heat and violence. *Current Directions in Psychological Science* **10**(1), 33–38.
- Anderson, J.L. (2001). Stone-age minds at work in the 21st century science: How cognitive psychology can inform conservation biology. *Conservation Biology in Practice* **2**, 18–25.
- Anderson, W., Reid, P. & Jennings, G.L. (1992). Pet ownership and risk factors for cardiovascular disease. *Medical Journal of Australia* **157**, 298–301.
- Antonioli, C. & Reveley, M.A. (2005). Randomized controlled trial of animal facilitated therapy with dolphins in the treatment of depression. *British Medical Journal* **331**, 1231–1234.
- Aplet, G.H. (2006). Evolution of wilderness fire policy. *International Journal of Wilderness* **12**(1), 9–13.

- Aplet, G.H., Wilbert, M. & Morton, P. (2005). Wilderness attributes and the state of the National Wilderness Preservation System. In H.K. Cordell, J.C. Bergstrom & J.M. Bowker (eds), *The multiple values of wilderness* (pp. 91–111). State College, PA: Venture Publishing.
- Appleton, J. (1975). *Experience of landscape*. New York: Wiley.
- APPMA (American Pet Products Manufacturers Association) (2008). *Industry statistics and trends*. Available at: http://www.appma.org/press_industrytrends.asp (accessed March 20, 2008).
- Argyle, M. (1987). *The psychology of happiness*. New York: Methuen.
- Ariely, D. (2008). *Predictably irrational: The hidden forces that shape our decisions*. New York: Harper Collins.
- Aristotle (1973). *De anima* (J.A. Smith, trans.). In Mckeon, R. (ed.) *Introduction to Aristotle* (pp. 153–245). Chicago: University of Chicago Press.
- Arluke, A. (2006). *Just a dog: Understanding animal cruelty and ourselves*. Philadelphia: Temple University Press.
- Aron, A., Aron, E.N. & Smollan, D. (1992). Inclusion of Other in the Self Scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology* **63**(4), 596–612.
- Atran, S. (1998). Folkbiology and the anthropology of science: Cognitive universals and cultural particulars. *Behavioral and Brain Sciences* **21**, 547–609.
- Atran, S., Medin, D.L. & Ross, N.O. (2005). The cultural mind: Environmental decision making and cultural modeling within and across populations. *Psychological Review* **112**, 744–776.
- Austin, M. & Kaplan, R. (2003). Identity, involvement, and expertise in the inner city: Some benefits of tree-planting projects. In S. Clayton & S. Opatow (eds), *Identity and the natural environment* (pp. 205–226). Cambridge, MA: MIT Press.
- AZA (Association of Zoos and Aquariums) (2008). *Visitation*. Available at <http://www.aza.org/Newsroom/CurrentStatistics/>.
- Backscheider, A., Shatz, M. & Gelman, S. (1993). Preschoolers' ability to distinguish living kinds as a function of regrowth. *Child Development* **64**, 1242–1257.
- Ballantyne, R. & Packer, J. (2005). Promoting environmentally sustainable attitudes and behaviour through free-choice learning experiences: What is the state of the game? *Environmental Education Research* **11**, 281–295.
- Ballantyne, R., Packer, J., Hughes, K. & Dierking, L. (2007). Conservation learning in wildlife tourism settings: Lessons from research in zoos and aquariums. *Environmental Education Research* **13**(3), 367–383.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review* **84**, 191–215.
- Bandura, A. (1990). Selective activation and disengagement of moral control. *Journal of Social Issues* **46**(1), 27–46.
- Bandura, A. (1999). Moral disengagement in the perpetration of inhumanities. *Personality and Social Psychology Review* **3**(3), 193–209.
- Bandura, A. (2002). Environmental sustainability by sociocognitive deceleration of population growth. In P. Schmuck & P.W. Schultz (eds), *Psychology of sustainable development* (pp. 209–238). Boston: Kluwer.
- Banks, M.R. & Banks, W.A. (2005). The effects of group and individual animal-assisted therapy on loneliness in residents of long-term care facilities. *Anthrozoös* **18**(4), 396–408.
- Bardwell, L. (1991). Success stories: Imagery by example. *Journal of Environmental Education* **23**(1): 5–10.
- Barker, R.G. (1968). *Ecological psychology*. Stanford, CA: Stanford University Press.
- Barker, S., Rasmussen, K. & Best, A. (2003). Effect of aquariums on electroconvulsive therapy patients. *Anthrozoös* **16**(3), 229–240.
- Barkow, J.H., Cosmides, L. & Tooby, J. (1992). *The adapted mind: Evolutionary psychology and the generation of culture*. New York: Oxford University Press.

- Bartosh, O. (2003). *Environmental education: Improving student achievement*. Unpublished Masters thesis, Evergreen State College, Olympia, Washington.
- Bator, R. & Cialdini, R. (2000). The application of persuasion theory to the development of effective proenvironmental public service announcements. *Journal of Social Issues* **56**, 527–542.
- Batson, C.D. (1991). Empathic joy and the empathy–altruism hypothesis. *Journal of Personality and Social Psychology* **61**, 413–426.
- Baun, M.M., Bergstrom, N., Langston, N. & Thoma, L. (1984). Physiological effects of human/companion animal bonding. *Nursing Research* **33**, 126–129.
- Beardsworth, A. & Bryman, A. (2001). The wild animal in late modernity: The case of the Disneyization of zoos. *Tourist Studies* **1**, 83–104.
- Beck, A.H. & Katcher, A.H. (1996). *Between pets and people: The importance of animal companionship*, 2nd edn. West Lafayette, IN: Purdue University Press.
- Belden, Russonello and Stewart & American Viewpoint (1999). *Communicating about oceans: Results of a national survey, conducted for the Ocean Project*. Available at http://www.theoceanproject.org/images/doc/final_report.pdf (accessed March 26, 2008).
- Belk, R. (1992). Attachment to possessions. In I. Altman & S. Low (eds), *Place attachment* (pp. 37–55). New York: Plenum Press.
- Berenguer, J. (2007). The effect of empathy in proenvironmental attitudes and behaviors. *Environment and Behavior* **39**, 269–283.
- Beringer, A. (1994). *The moral ideals of care and respect: A hermeneutic inquiry into adolescents' environmental ethics and moral functioning*. Frankfurt, Germany: Peter Lang.
- Beringer, A. (2000a). Being moved by nature: Adventure therapy and spinal cord injury rehabilitation. In Richards, K. & Smith, B. (eds) *Proceedings of the 2nd International Adventure Therapy Conference, Augsburg, Germany, March 20–24*. Augsburg, Germany: ZIEL GmbH.
- Beringer, A. (2000b). In search of the sacred: A conceptual analysis of spirituality. *Journal of Experiential Education* **23**(3), 157–165.
- Beringer, A. (2003). A conservation psychology with heart. *Human Ecology Review* **10**(2), 150–153.
- Beringer, A. (2004). Toward an ecological paradigm in adventure programming. *Journal of Experiential Education* **27**(1), 51–66.
- Berkes, F. (1999). *Sacred ecology: Traditional ecological knowledge and resource management*. Philadelphia, PA: Taylor Francis.
- Berlyne, D.E. (1960). *Conflict, arousal and curiosity*. New York: McGraw-Hill.
- Bexell, S. (2005). *Effect of a wildlife conservation camp experience in China on student knowledge of animals, care, propensity for environmental stewardship, and compassionate behavior toward animals*. Unpublished doctoral dissertation, Georgia State University, Athens, GA.
- Biodiversity Project & Belden, Russonello and Stewart (2002a). *Americans and biodiversity: New perspectives in 2002*. Madison, WI: Biodiversity Project.
- Biodiversity Project & Belden, Russonello and Stewart (2002b). *Americans and biodiversity: New perspectives. A cluster analysis of findings from a national survey*. Madison, WI: Biodiversity Project.
- Bitgood, S., Patterson, D. & Benefield, A. (1988). Exhibit design and visitor behavior: Empirical relationships. *Environment and Behavior* **20**(4), 474–491.
- Bixler, R. & Floyd, M. (1997). Nature is scary, disgusting, and uncomfortable. *Environment and Behavior* **5**(2), 202–247.
- Bixler, R., Floyd, M. & Hammitt, W.E. (2002). Environmental socialization: Quantitative tests of the childhood play hypothesis. *Environment and Behavior* **34**(6), 795–818.
- Bjerke, T., Østdahl, T. & Kleiven, J. (2003). Attitudes and activities related to urban wildlife: Pet owners and non-owners. *Anthrozoös* **16**(3), 252–262.
- Blonder, L.X., Smith, C.D., Davis, C.E., Kesler/West, M.L., Garrity, T.F., Avison, M.J. & Andersen, A.H. (2004). Regional brain response to faces of humans and dogs. *Cognitive Brain Research* **20**(3), 384–394.

- Bobilya, A.J., McAvoy, L.H. & Kalich, K.R. (2005). Lessons from the field: Participant perceptions of a multi-day wilderness solo. In C.E. Knapp & T.E. Smith (eds), *Exploring the power of solo, silence and solitude* (pp. 103–119). Boulder, CO: Association for Experiential Education.
- Bodamer, M.D. & Sankovic, J.M. (2000). “We’re all cousins!” A sampling of public comments at a zoo, reflecting people’s sibling relationship with chimpanzees. *Zoo Biology* **18**(5), 443–448.
- Bodur, M. & Sarigöllü, E. (2005). Environmental sensitivity in a developing country. *Environment and Behavior* **37**(4), 487–510.
- Bogner, F.X. (1998). The influence of short-term outdoor ecology education on long-term variables of environmental perspective. *Journal of Environmental Education* **29**(4): 17–29.
- Böhm, G. (2003). Emotional reactions to environmental risks. *Journal of Environmental Psychology* **23**(2), 199–212.
- Bonaiuto, M., Breakwell, G.M. & Cano, I. (1996). Identity processes and environmental threat. *Journal of Community and Applied Social Psychology* **6**(3), 157–175.
- Bonnes, M. & Bonaiuto, M. (2002). Environmental psychology: From spatial–physical environment to sustainable development. In R. Bechtel & A. Churchman (eds), *Handbook of environmental psychology* (pp. 28–54). New York: Wiley.
- Bonnes, M., Uzzell, D., Carrus, G. & Kelay, T. (2007). Inhabitants’ and experts’ assessments of environmental quality for urban sustainability. *Journal of Social Issues* **63**, 59–78.
- Bord, R.J., O’Connor, R.E. & Fisher, A. (2000). In what sense does the public need to understand global climate change? *Public Understanding of Science* **9**(3), 205–218.
- Borden, R.J. (1985). Personality and ecological concern. In D. Gray with R. Borden & R. Weigel, *Ecological beliefs and behaviors: Assessment and change* (pp. 87–122). Westport, CT: Greenwood Press.
- Borden, R.J. (1986). Ecology and identity. In *Proceedings of the Ecosystems and New Energetics Conference* (pp. 25–41). Munich, Germany: Man and Space.
- Bowker, J.M., Harvard III, J.E., Bergstrom, J.C., Cordell, H.K., English, D.B.K. & Loomis, J.B. (2005). The net economic value of wilderness. In H.K. Cordell, J.C. Bergstrom & J.M. Bowker (eds), *The multiple values of wilderness* (pp. 161–180). State College, PA: Venture Publishing.
- Boyd, R. & Richerson, P.J. (1985). *Culture and the evolutionary process*. Chicago: University of Chicago Press.
- Brady, D. & Palmeri, C. (2007). The pet economy. *Business Week* August 6. Available at http://www.businessweek.com/magazine/content/07_32/b4045001.htm (accessed March 20, 2008).
- Bragg, E.A. (1996). Towards ecological self: Deep ecology meets constructionist self-theory. *Journal of Environmental Psychology* **16**, 93–108.
- Brandt, K. (2004). A language of their own: An interactionist approach to human–horse communication. *Society and Animals* **12**(4), 299–316.
- Brechin, S.R. & Kempton, W. (1994). Global environmentalism: A challenge to the postmaterialism thesis? *Social Science Quarterly* **75**, 245–269.
- Brehm, J. (1966). *A theory of psychological reactance*. New York: Academic Press.
- Breit, H., Döring, T. & Eckensberger, L.H. (2003). Politics, law and citizens’ responsibility. Justice judgments in the everyday reconstructions of environmental conflicts. In H. Breit, A. Engels, T. Moss & M. Troja (eds), *How institutions change: Perspectives on social learning in global and local environmental contexts* (pp. 179–203). Opladen: Leske and Budrich.
- Breslau, K. (2007). The green giant. *Newsweek* April 16. Available at <http://www.newsweek.com/id/35594>.
- Brewer, G. & Stern, P. (2005). *Decision making for the environment: Social and behavioral science research priorities*. Washington, DC: National Academies Press.
- Broder, J. & Connelly, M. (2007). Public says warming is a problem, but remains split on response. *New York Times* April 27, A23.
- Brody, M.J. & Koch, H. (1989). An assessment of 4th, 8th, and 11th grade students’ knowledge related to marine science and natural resource issues. *Journal of Environmental Education* **21**(2): 16–26.

- Brody, S.D., Highfield, W. & Alston, L. (2004). Does location matter? Measuring environmental perceptions of creeks in two San Antonio watersheds. *Environment and Behavior* 36(2), 229–250.
- Brook, A.T. (2003). Identity and environmental behavior. Paper presented at the Annual Meeting of the American Psychological Association, Toronto, Ontario, Canada, August.
- Brook, A.T., Zint, M. & De Young, R. (2003). Landowners' responses to an Endangered Species Act listing and implications for encouraging conservation. *Conservation Biology* 17(6), 1638–1649.
- Brown, G. & Alessa, L. (2005). A GIS-based inductive study of wilderness values. *International Journal of Wilderness* 11(1), 14–18.
- Brown, T.C., Peterson, G.L., Marc Brodersen, R., Ford, V. & Bell, P.A. (2005). The judged seriousness of an environmental loss is a matter of what caused it. *Journal of Environmental Psychology* 25(1), 13–21.
- Brunner, R.D., Colburn, C.H., Cromley, C.M., Klein, R.A. & Olson, E.A. (2002). *Finding common ground*. New Haven: Yale University Press.
- Buchholz, E. & Catton, R. (1999). Adolescent's perceptions of aloneness and loneliness. *Adolescence* 34(133), 203–213.
- Bullard, R.D. (2000). *Dumping in Dixie: Race, class, and environmental quality*. San Francisco: Westview Press.
- Burger, J.M. (1999). The foot-in-the-door compliance procedure: A multiple-process analysis and review. *Personality and Social Psychology Review* 3(4), 303–325.
- Burghardt, G. (1992). Human–bear bonding in research on black bear behavior. In H. Davis & D. Balfour (eds), *The inevitable bond* (pp. 365–382). Cambridge: Cambridge University Press.
- Cafaro, P. (2001). Thoreau, Leopold and Carson: Toward an environmental virtue ethics. *Environmental Ethics* 22, 3–17.
- Cain, A. (1985). Pets as family members. In Sussman, M. (ed.), *Pets and the family* (pp. 5–10). New York: Haworth Press.
- Callicott, J.B. & Nelson, M. (eds) (1998). *The great new wilderness debate*. Athens, GA: University of Georgia Press.
- Cammack, C., Waliczek, T. & Zajicek, J. (2002). The Green Brigade: The psychological effects of a community-based horticultural program on the self-development characteristics of juvenile offenders. *HortTechnology* 12(1), 82–86.
- Cantrill, J.G. (1998). The environmental self and a sense of place: Communication foundations for regional ecosystem management. *Journal of Applied Communication Research* 26, 301–318.
- Cantrill, J.G. & Senecah, S.L. (2001). Using the 'sense of self-in-place' construct in the context of environmental policy-making and landscape planning. *Environmental Science and Policy* 4, 185–203.
- Carey, S. (1985). *Conceptual change in childhood*. Cambridge, MA: MIT Press.
- Carlisle-Frank, P. & Frank, J. (2006). Owners, guardians and owner-guardians: Differing relationships with pets. *Anthrozoös* 19(3), 225–242.
- Carr, B.L. (2005). *Conservation education in zoos and aquariums*. Silver Spring, MD: American Zoo and Aquarium Association. Available at: http://www.izea.net/education/conservationed_aza.htm (accessed March 26, 2008).
- Carrus, G., Bonaiuto, M. & Bonnes, M. (2005). Environmental concern, regional identity, and support for protected areas in Italy. *Environment and Behavior* 37, 237–257.
- Carson, R. (1961). *The sea around us*, revised edition. New York: Oxford University Press. (Original work published 1950.)
- Carver, C. & Scheier, M. (2001). Optimism, pessimism and self-regulation. In E.C. Chang (ed.), *Optimism and pessimism: Implications for theory, research and practice* (pp. 31–51). Washington, DC: American Psychological Association.
- Cernea, M.M. (2000). Impoverishment risks and reconstruction: A model for population displacement and resettlement. In M.M. Cernea & C. McDowell (eds), *Risks and reconstruction: Experiences of resettlers and refugees* (pp. 11–53). Washington, DC: World Bank.
- Chan, K.M.A., Pringle, R.M., Ranganathan, J. et al. (2007). When agendas collide: Human welfare and biological conservation. *Conservation Biology* 21(1), 59–68.

- Chawla, L. (1986). The ecology of environmental memory. *Children's environments quarterly* 3(4): 34–42.
- Chawla, L. (1992). Childhood place attachments. In I. Altman & S. Low (eds), *Human behavior and environment: Advances in Theory and Research, Vol. 12. Place attachment* (pp. 63–88). New York: Plenum Press.
- Chawla, L. (1994). *In the first country of places: Nature, poetry, and childhood memory*. Albany: SUNY Press.
- Chawla, L. (1998a). Significant life experiences revisited: A review of research on sources of environmental sensitivity. *Journal of Environmental Education* 29(3), 11–21.
- Chawla, L. (1998b). Research methods to investigate significant life experiences: review and recommendations. *Environmental Education Research* 4(4), 383–397.
- Chawla, L. (1999). Life paths into effective environmental action. *Journal of Environmental Education* 31(1), 15–26.
- Chawla, L. (2002). Spots of time: Manifold ways of being in nature in childhood. In P. Kahn & S. Kellert (eds), *Children and nature: Psychological, sociocultural and evolutionary investigations* (pp. 199–225). Cambridge, MA: MIT Press.
- Chawla, L. & Cushing, D. (2007). Education for strategic environmental behavior. *Environmental Education Research* 13(4), 437–452.
- Cheek, N. (1973). People at the zoo. *Animal Kingdom* 76, 9–14.
- Chuk-Ling Lai, J. & Tao, J. (2003). Perception of environmental hazards in Hong Kong Chinese. *Risk Analysis* 23(4), 669–684.
- Cialdini, R.B. (2003). Crafting normative messages to protect the environment. *Current Directions in Psychological Science* 12(4), 105–109.
- Clayton, S. (1994). Appeals to justice in the environmental debate. *Journal of Social Issues* 50(3), 13–27.
- Clayton, S. (1996). What is valued in resolving environmental dilemmas: Individual and contextual influences. *Social Justice Research* 9, 171–184.
- Clayton, S. (1998). Preference for macrojustice versus microjustice in environmental decisions. *Environment and Behavior* 30, 162–183.
- Clayton, S. (2000a). Descriptions of an ideal environment. Paper presented at The Social Construction of Nature (L. Kalof, chair), Meeting of the Society for Human Ecology, Jackson Hole, WY, October.
- Clayton, S. (2000b). Models of justice in the environmental debate. *Journal of Social Issues* 56(3), 459–474.
- Clayton, S. (2003). Environmental identity: A conceptual and an operational definition. In S. Clayton & S. Opatow (eds), *Identity and the natural environment* (pp. 45–65). Cambridge, MA: MIT Press.
- Clayton, S. (2007). Domesticated nature: Motivations for gardening and perceptions of environmental impact. *Journal of Environmental Psychology* 27(3), 215–224.
- Clayton, S. (2008). Attending to identities: Ideology, group memberships, and perceptions of justice. In K. Hegtvedt & J. Clay-Warner (eds), *Advances in group processes: Justice* (pp. 287–313). Bingley, UK: Emerald Group.
- Clayton, S. & Brook, A. (2005). Can psychology help save the world? A model for conservation psychology. *Analyses of Social Issues and Public Policy* 5(1), 87–102.
- Clayton, S., Fraser, J. & Saunders, C. (2008). Zoo experiences: Conversations, connections and concern for animals. *Zoo Biology* 27 (in press).
- Clayton, S. & Opatow, S. (2003). Introduction. In S. Clayton & S. Opatow (eds), *Identity and the natural environment* (pp. 1–24). Cambridge, MA: MIT Press.
- Cohen, D., McKenzie, T., Sehgal, A., Williamson, S., Golinelli, D. & Lurie, N. (2007). Contribution of public parks to physical activity. *American Journal of Public Health* 97, 509–514.
- Coleman, J. (2004). *Vicious: Wolves and men in America*. New Haven, CT: Yale University Press.
- Coley, J.D. (1995). Emerging differentiation of folkbiology and folkpsychology: Attributions of biological and psychological properties to living things. *Child Development* 66, 1856–1874.

- Coley, J.D., Solomon, G. & Shafto, P. (2002). The development of folkbiology: A cognitive science perspective on children's understanding of the biological world. In P. Kahn & S. Kellert (eds), *Children and nature: Psychological, sociocultural and evolutionary investigations* (pp. 65–91). Cambridge, MA: MIT Press.
- Conca, K. & Dabelko, G. (2002). *Environmental peacemaking*. Washington, DC: Woodrow Wilson Center Press.
- Cone, J.D. & Hayes, S.C. (1980). *Environmental problems and behavioral solutions*. Monterey, CA: Brooks/Cole.
- Connell, S., Fein, J., Sykes, H. & Yencken, D. (1998). Young people and the environment in Australia: Beliefs, knowledge, commitment and educational implications. *Australian Journal of Environmental Education* **14**, 39–48.
- Cook, E., Hodes, R. & Lang, P. (1986). Preparedness and phobia: Effects of stimulus content on human visceral conditioning. *Journal of Abnormal Psychology* **95**, 195–207.
- Cordell, H.K., Bergstrom, J.C. & Bowker, J.M. (eds) (2005). *The multiple values of wilderness*. State College, PA: Venture Publishing.
- Cosmides, L. & Tooby, J. (1997). *Evolutionary psychology: A primer*. Available at: <http://www.psych.ucsb.edu/research/cep/primer.html> (accessed February 24, 2008).
- Courtney-Hall, P. & Rogers, L. (2002). Gaps in mind: Problems in environmental knowledge-behaviour modelling research. *Environmental Education Research* **8**(3), 283–207.
- Coyle, K. (2005). *Environmental literacy in America*. Washington, DC: National Environmental Education and Training Foundation.
- Crawford, E., Worsham, N. & Swinehart, E. (2006). Benefits derived from companion animals, and the use of the term “attachment.” *Anthrozoös* **19**(2), 98–112.
- Crocker, J.C. (1985). My brother the parrot. In G. Urton (ed.), *Animal myths and metaphors in South America* (pp. 13–47). Salt Lake City, UT: University of Utah Press.
- Crooks, K.R. & Soule, M.E. (1999). Mesopredator release and avifaunal extinctions in a fragmented system. *Nature* **400**, 563–566.
- Crosby, F., Clayton, S., Downing, R. & Iyer, A. (2004). Values and science. *American Psychologist* **59**, 125–126.
- Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. San Francisco: Jossey-Bass.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: HarperCollins.
- Curtin, S. (2006). Swimming with dolphins: A phenomenological exploration of tourist recollections. *International Journal of Tourism Research* **8**(4), 301–315.
- Cvetkovich, G. & Earle, T. (1992). Environmental hazards and the public. *Journal of Social Issues* **48**, 1–20.
- Cvetkovich, G. & Winter, P. (2003). Trust and social representations of the management of threatened and endangered species. *Environment and Behavior* **35**, 286–307.
- Daily, G., Soderqvist, T., Aniyar, S. et al. (2000). The value of nature and the nature of value. *Science* **289**, 395–396.
- D’Andrade, R.G. (1984). Cultural meaning systems. In R. Shweder & R.A. Levine (eds), *Culture theory* (pp. 88–119). Cambridge, UK: Cambridge University Press.
- Daniel, B. (2005). The life significance of a wilderness solo experience. In C.E. Knapp & T.E. Smith (eds), *Exploring the power of solo, silence and solitude* (pp. 85–102). Boulder, CO: Association for Experiential Education.
- Darwin, C. (2004). *The descent of man, and selection in relation to sex*. London: Penguin. (Original work published 1871.)
- Davey, G. (2006). Visitor behavior in zoos: A review. *Anthrozoös* **19**, 143–157.
- Davies, P.S. (2002). The conflict of evolutionary psychology. In V.G. Hardcastle (ed.), *Where biology meets psychology: Philosophical essays* (pp. 67–81). Cambridge, MA: Bradford/MIT Press.
- Davis-Berman, J. & Berman, D.S. (1994). *Wilderness therapy: Foundations, theory and research*. Dubuque, IA: Kendall/Hunt.

- De Vries, S., Verheij, R., Groenevegen, P. & Spreeuwenberg, P. (2003). Natural environments – healthy environments? An exploratory analysis of the relationship between green space and health. *Environment and Planning A* **35**, 1717–1731.
- De Young, R. (1986). Some psychological aspects of recycling: The structure of conservation satisfactions. *Environment and Behavior* **18**(4), 435–449.
- De Young, R. (1993). Changing behavior and making it stick: The conceptualization and management of conservation behavior. *Environment and Behavior* **25**, 485–505.
- De Young, R. (1996). Some psychological aspects of reduced consumption behavior: The role of intrinsic satisfaction and competence motivation. *Environment and Behavior* **28**, 358–409.
- DeCaro, D. & Stokes, M. (2008). Social psychological principles of community-based conservation and conservancy motivation: Attaining goals within an autonomy-supportive environment. *Conservation Biology* (in press).
- DeCremer, D. & Van Vugt, M. (1999). Social identification effects in social dilemmas: A transformation of motives. *European Journal of Social Psychology* **29**, 871–893.
- Degenhardt, L. (2002). Why do people act in sustainable ways? In P. Schmuck & W. Schultz (eds), *Psychology of sustainable development* (pp. 123–148). Boston: Kluwer.
- DeMares, R. (2000). Human peak experience triggered by encounters with Cetaceans. *Anthrozoös* **13**(2): 89–103.
- Deng, J., Walker, G.J. & Swinnerton, G. (2006). A comparison of environmental values and attitudes between Chinese in Canada and Anglo-Canadians. *Environment and Behavior* **38**(1), 22–47.
- Derr, T. (2006). ‘Sometimes the birds sound like fish’: Perspectives on children’s place experiences. In C. Spencer & M. Blades (eds), *Children and their environments* (pp. 108–116). Cambridge, UK: Cambridge University Press.
- Diehm, C. (2007). Identification with nature: What it is and why it matters. *Ethics and the Environment* **12**(2), 1–22.
- Dietz, T., Fitzgerald, A. & Shwom, R. (2005). Environmental values. *Annual Review of Environmental Resources* **30**, 335–372.
- Dijksterhuis, A., Bos, M.W., Nordgren, L.F. & van Baaren, R.B. (2006). On making the right choice: The deliberation-without-attention effect. *Science* **311**, 1005–1007.
- Disinger, J. (1983). *Environmental education’s definitional problem*. Information Bulletin No. 2. ERIC Clearinghouse.
- Dispensa, J. & Brulle, R. (2003). Media’s social construction of environmental issues. *International Journal of Sociology and Social Policy* **23**, 74–105.
- Distefano, E. (n.d.). *Human–wildlife conflict worldwide*. UN/FAO/Sustainable Agriculture and Rural Development. Available at www.fao.org/SARD/common/ecg/1357/en/HWC_final.pdf (accessed March 29, 2008).
- Domino, B. & Conway, D.W. (2001). Optimism and pessimism from a historical perspective. In E.C. Chang (ed.), *Optimism and pessimism: Implications for theory, research and practice* (pp. 13–30). Washington, DC: American Psychological Association.
- Dreyfus, A. & Wals, A. (1999). Biodiversity as a postmodern theme for environmental education. *Canadian Journal of Environmental Education* **4**, 155–175.
- Dreyfus, H. & Dreyfus, S. (1988). *Mind over machine: The power of human intuition and expertise in the era of the computer*. New York: Free Press.
- Driver, B.L., Nash, R. & Haas, G. (1987). Wilderness benefits: A state of knowledge review. In R.C. Lucas (ed.), *Proceedings: National Wilderness Research Conference: Issues, state-of-knowledge, future directions*. General Technical Report No. INT-220 (pp. 294–319). Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Dryzek, J.S. (1997). *The politics of the earth: Environmental discourses*. Oxford: Oxford University Press.
- Dryzek, J.S. (2000). *Deliberative democracy and beyond: Politics, policy and political science*. Cambridge, UK: Cambridge University Press.

- Dunlap, J.J. (1989). Moral reasoning about animal treatment. *Anthrozoös* 2(4), 245–258.
- Dunlap, R.E. & Mertig, A.G. (1996). Global concern for the environment: Is affluence a prerequisite? *Journal of Social Issues* 51, 121–137.
- Dunlap, R.E. & Van Liere, K. (1978). The “new environmental paradigm.” *Journal of Environmental Education* 9, 10–19.
- Dunlap, R.E., Van Liere, K., Mertig, A. & Jones, R. (2000). Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. *Journal of Social Issues* 56, 425–442.
- Dwyer, W.O., Leeming, F.C., Cobern, M.K. et al. (1993). Critical review of behavioral interventions to preserve the environment: Research since 1980. *Environment and Behavior* 25(3), 275–321.
- Earle, T. & Cvetkovich, G. (1997). Culture, cosmopolitanism, and risk management. *Risk Analysis* 17(1), 55–65.
- Earthworks Group (1989). *Fifty simple things you can do to save the earth*. Berkeley, CA: Earthworks Press.
- Easterlin, R.A. (1974). Does economic growth improve the human lot? In P.A. David & M.W. Reder (eds), *Nations and households in economic growth: Essays in honor of Moses Abramovitz* (pp. 89–125). New York: Academic Press.
- Eddy, T.J. (2003). What is a pet? *Anthrozoös* 16(2), 98–105.
- Eddy, T.J., Gallup, G. & Povinelli, D. (1993). Attribution of cognitive states to animals: Anthropomorphism in comparative perspective. *Journal of Social Issues* 49(1), 87–101.
- Edelstein, M. (2002) Contamination: The invisible built environment. In R. Bechtel & A. Churchman (eds), *Handbook of Environmental Psychology* (pp. 559–588). New York: Wiley.
- Eigner, S., & Schmuck, P. (2002). Motivating collective action: Converting to sustainable energy in a German community. In P. Schmuck & P. Schultz. (eds), *Psychology of sustainable development* (pp. 241–256). Boston: Kluwer.
- Eisler, A.D., Eisler, H. & Yoshida, M. (2003). Perception of human ecology: cross-cultural and gender comparisons. *Journal of Environmental Psychology* 23(1), 89–101.
- Erikson, P. (2000). The social significance of pet-keeping among Amazonian Indians. In A. Podberscek, E. Paul & J. Serpell (eds), *Companion animals and us* (pp. 7–26). Cambridge, UK: Cambridge University Press.
- Evans-Pritchard, E.E. (1940). *The Nuer*. Oxford: Oxford University Press.
- Ewert, A. (2001). Playing at the edge: Motivation and risk taking in a high-altitude wilderness-like environment. *Journal of Human Performance in Extreme Environments* 6(1), 12–20.
- Ewert, A. & McAvoy, L. (1999). The effects of wilderness settings on organized groups: A state-of-knowledge paper. In S.F. McCool., D.N. Cole, W.T. Borrie & J. O’Loughlin (eds), *Wilderness science in a time of change*, Vol. 3 (pp. 13–26). Ogden, UT: USDA Forest Service, Rocky Mountain Research Station.
- Falk, J.H. (2005). Free-choice environmental learning: Framing the discussion. *Environmental Education Research* 11(3), 265–280.
- Falk, J.H. & Adelman, L.M. (2003). Investigating the impacts of prior knowledge and interest on aquarium visitor learning. *Journal of Research in Science Teaching* 40(2), 163–176.
- Falk, J.H., Reinhard, E., Vernon, C., Bronnenkant, K., Deans, N. & Heimlich, J. (2007). *Why zoos and aquariums matter: Assessing the impact of a visit*. Silver Spring, MD: Association for Zoos and Aquariums.
- Fave, A.D., Bassi, M. & Massimini, F. (2003). Quality of experience and risk perception in high-altitude rock climbing. *Journal of Applied Sport Psychology* 15(1), 82–98.
- Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.
- Fiedeldey, A. (1994). Wild animals in a wilderness setting: An ecosystemic experience? *Anthrozoös* 7(2), 113–123.
- Fien, J., Scott, W. & Tilbury, D. (1999). *Education and conservation: An evaluation of the contributions of educational programmes to conservation within the WWF Network. Reference volume*. Washington, DC: World Wildlife Fund.

- Fien, J., Scott, W. & Tilbury, D. (2001). Education and conservation: Lessons from an evaluation. *Environmental Education Research* 7(4), 379–395.
- Finger, M. (1994). From knowledge to action? Exploring the relationships between environmental experiences, learning and behavior. *Journal of Social Issues* 50(3), 141–160.
- Fisher, A. (2002). *Radical ecopsychology: Psychology in the service of life*. Albany, NY: SUNY Press.
- Fishkin, J.S. (1991). *Democracy and deliberation: New directions for democratic reform*. New Haven, CT: Yale University Press.
- Fiske, A.P. & Tetlock, P.E. (1997). Taboo trade-offs: Reactions to transactions that transgress the spheres of justice. *Political Psychology* 18(2), 255–297.
- Fjeld, T., Veiersted, B. & Sandvik, L. (1998). The effect of indoor foliage plants on health and discomfort symptoms among office workers. *Indoor and Built Environment* 7, 204–206.
- Fjørtoft, I. (2004). Landscape as playscape: The effects of natural environments on children's play and motor development. *Children, Youth and Environments* 14(2), 21–44.
- Flynn, J., Slovic, P. & Mertz, C. (1994). Gender, race, and perception of environmental health risks. *Risk Analysis* 14, 1101–1108.
- Flyvbjerg, B. (2001). *Making social science matter*. Cambridge, UK: Cambridge University Press.
- Foley, R. (1995). The adaptive legacy of human evolution: A search for the environment of evolutionary adaptation. *Evolutionary Anthropology* 4, 194–203.
- Frankl, V.E. (1969). *The will to meaning: Foundations and applications of logotherapy*. New York: World Publishing Co.
- Fraser, J., Clayton, S., Sickler, J. & Taylor, A. (2009). Belonging at the zoo: Retired volunteers, conservation activism, and collective identity. *Ageing and Society* 29, 1–18.
- Fraser, J., Gruber, S. & Condon, K. (2008). Exposing the tourist value proposition of zoos and aquaria. *Tourism Review International* 11, 279–293.
- Frasz, G.B. (1993). Environmental virtue ethics: A new direction for environmental ethics. *Environmental Ethics* 15, 259–274.
- Frederick, S., Loewenstein, G. & O'Donoghue, T. (2002). Time discounting and time preference: A critical review. *Journal of Economic Literature* 40, 351–401.
- Frederickson, L.M. & Anderson, D.H. (1999). A qualitative exploration of the wilderness experience as a source of spiritual inspiration. *Journal of Environmental Psychology* 19, 21–39.
- Freudenberg, W. & Pastor, S. (1992). NIMBYs and LULUs: Stalking the syndromes. *Journal of Social Issues* 48, 39–61.
- Friedmann, E. & Thomas, S.A. (1995). Pet ownership, social support, and one-year survival after acute myocardial infarction in the Cardiac Arrhythmia Suppressing Trial (CAST). *American Journal of Cardiology* 76, 1213–1217.
- Friedmann, E., Thomas, S.A., Cook, L., Tsai, C.-C. & Picot, S. (2007). A friendly dog as potential moderator of cardiovascular response in speech in older hypertensives. *Anthrozoös* 20(1), 51–63.
- Friedmann, E., Thomas, S.A. & Eddy, T.J. (2000). Companion animals and human health: Physical and cardiovascular influences. In A. Podberscek, E. Paul & J. Serpell (eds), *Companion animals and us* (pp. 125–142). Cambridge, UK: Cambridge University Press.
- Frost, J. (1992). *Play and playscapes*. New York: Delmar Publishers.
- Frost, J.L. & Klein, B. (1979). *Children's play and playgrounds*. London: Allyn and Bacon.
- Frumkin, H. (2001). Beyond toxicity: Human health and the natural environment. *American Journal of Preventative Medicine* 20(3), 234–240.
- Frumkin, H. (2004). White coats, green plants: Clinical epidemiology meets horticulture. *Acta Horticulturae* 639, 15–26.
- Fujii, S. (2006). Environmental concern, attitude toward frugality, and ease of behavior as determinants of pro-environmental behavior intentions. *Journal of Environmental Psychology* 26, 262–268.
- Fuller, R. (1992). American pragmatism reconsidered: William James' ecological ethic. *Environmental Ethics* 14, 159–176.

- Fuller, R., Irvine, K., Devine-Wright, P., Warren, P. & Gaston, K. (2007). Psychological benefits of greenspace increase with biodiversity. *Biology Letters* 3(1), 390–394.
- Fulton, D.C., Manfredi, M.J. & Lipscomb, J. (1996). Wildlife value orientations: A conceptual and measurement approach. *Human Dimensions of Wildlife* 1(2), 24–47.
- Fung, H. (2006). Affect and early moral socialization: Some insights and contributions from indigenous psychological studies in Taiwan. In U. Kim, K. Yang & K. Hwang (eds), *Indigenous and cultural psychology: Understanding people in context*. New York: Springer.
- Furuness, L.B. (1992). *How fifth graders develop an understanding of food webs*. Dissertation abstracts DAI-A 53/11, p. 3860. PhD dissertation, Indiana University, Bloomington, IN.
- Gallup (2007). *Environment*. Available at www.gallup.com/poll/1615/environment.aspx (accessed October 3, 2008).
- Gardner, G. & Stern, P. (2002). *Environmental problems and human behavior*, 2nd edn. Boston: Pearson Custom Publishing.
- Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. New York: Basic Books.
- Gattig, A. & Hendrickx, L. (2007). Judgmental discounting and environmental risk perception. *Journal of Social Issues* 63, 21–39.
- Geary, G.C. (2004). *The origin of mind*. Washington, DC: American Psychological Association.
- Gebhard, U., Nevers, P. & Billmann-Mahecha, E. (2003). Moralizing trees: Anthropomorphism and identity in children's relationships to nature. In S. Clayton & S. Opatow (eds), *Identity and the natural environment: The psychological significance of nature* (pp. 91–111). Cambridge, MA: MIT Press.
- Gebser, J. (1984). *The ever-present origin* (N. Bardstad, trans.). Athens, OH: Ohio University Press. (Original work published 1948.)
- Geller, E.S. (1989). Applied behavior analysis and social marketing: An integration to preserve the environment. *Journal of Social Issues* 45, 17–36.
- Geller, E.S. (1995). Actively caring for the environment: An integration of behaviorism and humanism. *Environment and Behavior* 27, 184–195.
- Geller, E.S. (2002). The challenge of increasing proenvironment behavior. In R. Bechtel & A. Churchman (eds), *Handbook of Environmental Psychology* (pp. 525–540). New York: Wiley.
- Gelman, S.A. & Wellman, H.M. (1991). Insides and essences: Early understandings of the non-obvious. *Cognition* 38, 213–244.
- Gendlin, E.T. (1992). The primacy of the body, not the primacy of perception. *Man and World* 25(3/4), 341–353.
- Gendlin, E.T. (1997). *A process model*. New York: Focusing Institute.
- Gibbons, F.X. (1983). Self-attention and self-report: The “veridicality” hypothesis. *Journal of Personality* 51(3), 517–542.
- Gibson, E.J. (1969). *Principles of perceptual learning and perception*. Cambridge, MA: MIT Press.
- Gibson, E.J. (1982). The concept of affordances in development: A renaissance of functionalism. In W.A. Collins (ed.), *The concept of development: The Minnesota Symposium on Child Development*, 15 (pp. 55–81). Hillsdale, NJ: Lawrence Erlbaum.
- Gibson, E.J. (1997). An ecological psychologist's prolegomena for perceptual development: A functional approach. In C. Dent-Read & P. Zukow-Goldring (eds), *Evolving explanations of development: Ecological approaches to organism–environment systems* (pp. 23–45). Washington, DC: American Psychological Association.
- Gibson, J.J. (1979). *The ecological approach to visual perception*. Boston: Houghton-Mifflin.
- Gidloff-Gunnarsson, A. & Ohrstrom, E. (2007). Noise and well-being in urban residential environments: The potential role of perceived availability to nearby green areas. *Landscape and Urban Planning* 83(2/3), 115–126.
- Gigliotti, C.M. & Jarrott, S.E. (2005). Effects of horticultural therapy on engagement and affect. *Canadian Journal on Aging* 24(4), 367–377.

- Gigliotti, C.M., Jarrott, S.E. & Yorgason, J. (2004). Harvesting health: Effects of three types of horticultural therapy activities for persons with dementia. *Dementia* 3(2), 161–180.
- Gilbey, A., McNicholas, J. & Collis, G. (2007). A longitudinal test of the belief that companion animal ownership can help reduce loneliness. *Anthrozoös* 20(4), 345–353.
- Gillham, J., Shatté, A., Reivich, K. & Seligman, M. (2001). Optimism, pessimism and explanatory style. In E.C. Chang (ed.), *Optimism and pessimism: Implications for theory, research and practice* (pp. 53–75). Washington, DC: American Psychological Association.
- Gilligan, C. (1982). *In a different voice: Psychological theory and women's development*. Cambridge, MA: Harvard University.
- Gilquin, G. & Jacobs, G. (2006). Elephants who marry mice are very unusual: The use of the relative pronoun who with nonhuman animals. *Society and Animals* 14(1), 79–105.
- Göksen, F., Fadaman, F. & Zenginobuz, E. (2002). On environmental concern, willingness to pay, and postmaterialist values: Evidence from Istanbul. *Environment and Behavior* 34(5), 616–633.
- Goldmeier, J. (1986). Pets or people: Another research note. *Gerontologist* 26(2), 203–206.
- Goodall, J. (1990). *Through a window: My thirty years with the chimpanzees of Gombe*. Boston: Houghton Mifflin.
- Gould, S. & Lewontin, R. (1979). The spandrels of San Marco and the Panglossian paradigm: A critique of the adaptationist programme. *Proceedings of the Royal Society of London, Series B* 205(1161), 581–598.
- Graber, S. (1976). *Wilderness as sacred space*. Monograph Series of the Association of American Geographers No. 8. Washington, DC: Association of American Geographers.
- Graefe, A., Kuss, F. & Vaske, J. (1990). *Visitor impact management: The planning framework*. Washington DC: National Parks and Conservation Association.
- Grantham, T. & Nichols, S. (2002). Evolutionary psychology: Ultimate explanations and Panglossian predictions. In V.G. Hardcastle (ed.), *Where biology meets psychology: Philosophical essays* (pp. 47–66). Cambridge, MA: Bradford/MIT Press.
- Greenebaum, J. (2004). It's a dog's life: Elevating status from pet to “fur baby” at Yappy Hour. *Society and Animals* 12(2), 117–135.
- Greenway, R. (1996). Wilderness experience and ecopsychology. *International Journal of Wilderness* 2(1), 26–30.
- Grier, K.C. (1999). Childhood socialization and companion animals: United States, 1820–1870. *Society and Animals* 7(2), 95–120.
- Groff, A., Lockhart, D., Ogden, J. & Dierking, L.D. (2005). An exploratory investigation of the effect of working in an environmentally themed facility on the conservation-related knowledge, attitudes and behavior of staff. *Environmental Education Research* 11, 371–387.
- Gross, H. & Lane, N. (2007). Landscapes of the lifespan: Exploring accounts of own gardens and gardening. *Journal of Environmental Psychology* 27(3), 225–241.
- Gruenewald, D. (2003). Foundations of place: A multidisciplinary framework for place-conscious education. *American Educational Research Journal* 40(3), 619–654.
- Gunderson, K.I. & Watson, A. (2007). Understanding place meanings on the Bitterroot National Forest, Montana. *Society and Natural Resources* 20(8), 705–721.
- Gustafson, P. (2001). Meanings of place: Everyday experiences and theoretical conceptualizations. *Journal of Environmental Psychology* 21, 5–16.
- Haan, N. (1977). *Coping and defending: Processes of self-environment organization*. New York: Academic Press.
- Haan, N., Aerts, E. & Cooper, B. (1985). *On moral grounds: The search for a practical morality*. New York: New York University Press.
- Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review* 108, 814–834.
- Haidt, J. (2003). Elevation and the positive psychology of morality. In C.L.M. Keyes & J. Haidt (eds), *Flourishing: Positive psychology and the life well-lived* (pp. 275–289). Washington, DC: American Psychological Association.

- Han, K-T. (2007). Responses to six major terrestrial biomes in terms of scenic beauty, preference and restorativeness. *Environment and Behavior* **39**, 529–556.
- Hardin, G. (1968). The tragedy of the commons. *Science* **162**, 1243–1248.
- Harrison, R.P. (1992). *Forests: The shadow of civilization*. Chicago: University of Chicago Press.
- Hart, L. (1994). The Asian elephant–driver partnership: The drivers' perspective. *Applied Animal Behaviour Science* **40**, 297–312.
- Hart, R. (1979). *Children's experience of place*. New York: Irvington Publishers.
- Hart, R. (1992). *Children's participation: From tokenism to citizenship*. Innocenti Essays No. 4. Florence: UNICEF International Child Development Centre.
- Hart, R. (1997). *Children's participation: The theory and practice of involving young citizens in community development and environmental care*. London: Earthscan/UNICEF.
- Hastings, P.D., Zahn-Waxler, C. & McShane, K. (2006). We are, by nature, moral creatures: Biological bases of concern for others. In M. Killen & J.G. Smetana (eds), *Handbook of moral development* (pp. 483–516). Mahwah, NJ: Lawrence Erlbaum.
- Hatano, G. & Inagaki, K. (1997). Qualitative changes intuitive biology. *European Journal of Psychology of Education* **12**(2): 111–130.
- Hattie, J., Marsh, H.W., Neill, J.T. & Richards, G.E. (1997). Adventure education and outward bound: Out-of-class effects that have a lasting effect. *Review of Educational Research* **67**, 43–87.
- Hauser, M. (2006). *Moral minds: How nature designed our universal sense of right and wrong*. New York: HarperCollins.
- Havel, V. (1990). *Disturbing the peace: A conversation with Karel Hvizdala* (P. Wilson, trans.). New York: Knopf.
- Haymond, J.L. (1990). Wildlife attitudes of early adopters who own forestland. *Society and Natural Resources* **3**, 11–18.
- Hayward, J. (1989). Urban parks: Research, planning, and social change. In I. Altman & E. Zube (eds), *Public places and spaces* (pp. 193–216). New York: Plenum Press.[000]
- Hayward, J. & Rothenberg, M. (2004). Measuring success in the Congo Gorilla Forest Conservation Exhibition. *Curator* **47**, 261–282.
- Health Council of the Netherlands (2004). *Nature and health: The influence of nature on social, psychological, and physical well-being*. Publication No. 2004/09E, RMNO Publication No. A02ae. The Hague: Health Council of the Netherlands and RMNO. Available at www.healthcouncil.nl.
- Hearne, V. (1986). *Adam's task: calling animals by name*. New York: Vintage.
- Heath, Y. & Gifford, R. (2006). Free-market ideology and environmental degradation: The case of belief in global climate change. *Environment and Behavior* **38**(1), 48–71.
- Heberlein, T. (1977). Density, crowding, and satisfaction: Sociological studies for determining carrying capacities. In *Proceedings of the River Recreation Management and Research Symposium* (pp. 67–76). USDA Forest Service General Technical Report No. NC-28. Ogden, UT: USDA Forest Service.
- Heerwagen, J. & Orians, G. (1993). Humans, habitats, and aesthetics. In S. Kellert & E.O. Wilson (eds), *The biophilia hypothesis* (pp. 138–172). Washington, DC: Island Press.
- Heerwagen, J.H. & Orians, G.H. (2002). The ecological world of children. In P.H. Kahn, Jr. & S.R. Kellert (eds), *Children and nature* (pp. 29–63). Cambridge, MA: MIT Press.
- Heft, H. (2001). *Ecological psychology in context: James Gibson, Roger Braker, and the legacy of William James's radical empiricism*. Mahwah, NJ: Lawrence Erlbaum.
- Hendrickx, L. & Nicolaij, S. (2004). Temporal discounting and environmental risks. *Journal of Environmental Psychology* **24**(4), 409–422.
- Herda-Rapp, A. & Goedeke, T.L. (2005). *Mad about wildlife: Looking at social conflict over wildlife*. Leiden: Brill.
- Herrington, S. & Studtmann, K. (1998). Landscape interventions: New directions for the design of children's outdoor play environments. *Landscape and Urban Planning* **42**(2/4), 191–205.
- Herzog, H.A. (2007). Gender differences in human–animal interactions: A review. *Anthrozoös* **20**(1), 7–21.

- Herzog, T. & Chernick, K. (2000). Tranquility and danger in urban and natural settings. *Journal of Environmental Psychology* **20**(1), 29–39.
- Herzog, T., Black, A.M., Fountaine, K.A. & Knotts, D.J. (1997). Reflection and attentional recovery as distinctive benefits of restorative environments. *Journal of Environmental Psychology* **17**, 165–170.
- Herzog, T., Chen, H. & Primeau, J. (2002). Perception of the restorative potential of natural and other settings. *Journal of Environmental Psychology* **22**(3), 295–306.
- Higgs, E.S. (1997). What is good ecological restoration? *Conservation Biology* **11**, 338–348.
- Hill Jr., T.E. (1983). Ideals of human excellence and preserving natural environments. *Environmental Ethics* **5**, 211–224.
- Hine, D. & Gifford, R. (1991). Fear appeals, individual differences, and environmental concern. *Journal of Environmental Education* **23**, 36–41.
- Hines, J.M., Hungerford, H.R. & Tomera, A.N. (1987). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *Journal of Environmental Education* **18**, 1–8.
- Hirschfeld, L. & Gelman, S. (eds) (1994). *Mapping the mind: Domain specificity in cognition and culture*. Cambridge: Cambridge University Press.
- Hirsh-Pasek, K. & Treiman, R. (1982). Doggerel: Motherese in a new context. *Journal of Child Language* **9**, 229–237.
- Ho, C., Sasidharan, V., Elmendorf, W., Willits, F., Graefe, A. & Godbey, G. (2005). Gender and ethnic variations in urban park preferences, visitation, and perceived benefits. *Journal of Leisure Research* **37**, 281–306.
- Hodgkinson, S. & Innes, M. (2000). The prediction of ecological and environmental belief systems: The differential contributions of social conservatism and beliefs about money. *Journal of Environmental Psychology* **20**(3), 285–294.
- Hoffman, M. (2000). *Empathy and moral development*. New York: Cambridge University Press.
- Hogan, K. (2000). Assessing students systems reasoning in ecology. *Journal of Biological Education* **35**(1): 22–28.
- Holekamp, K. (n.d.). *Spotted hyenas: Cognition*. Available at <http://hyenas.zoology.msu.edu/crocuta/socialcognition.html> (accessed March 12, 2008).
- Holzer, D., Scott, D. & Bixler, R. (1998). Socialization influences on adult zoo visitation. *Journal of Applied Recreation Research* **23**, 43–62.
- Hopper, J.R. & Nielsen, J.M. (1991). Recycling as altruistic behavior: Normative and behavioral strategies to expand participation in a community recycling program. *Environment and Behavior* **23**, 195–220.
- Howard, G.S. (2000). Adapting human lifestyles for the 21st century. *American Psychologist* **55**(5), 509–515.
- Hume, D. (1978). *A Treatise of human nature*. Oxford: Oxford University Press. (Original work published 1739.)
- Hummon, D.M. (1992). Community attachment. In I. Altman & S.M. Low (eds), *Human behavior and the environment: Advances in theory and research, Vol. 12. Place Attachment* (pp. 253–278). New York: Plenum Press.
- Humphrey, N. (1984). *Consciousness regained*. New York: Oxford University Press.
- Hungerford, H. & Volk, T. (1990). Changing learner behavior through environmental education. *Journal of Environmental Education* **21**(3), 8–21.
- Hunter, L.M. & Brehm, J. (2004). A qualitative examination of value orientations toward wildlife and biodiversity by rural residents of the intermountain region. *Human Ecology Review* **11**(1), 13–26.
- Hyland, B. (2004). *Market trends*. Available at <http://www.greenscaper.net/about.php> (accessed March 23, 2008).
- Inagaki, K. & Hatano, G. (1987). Young children's spontaneous personification as analogy. *Child Development* **58**, 1013–1020.
- Inglehart, R. (1995). Public support for environmental protection: Objective problems and subjective values in 43 societies. *PS: Political Science* **15**, 57–71.

- Ingold, T. (1988). Introduction. In T. Ingold (ed.), *What is an animal?* (pp. 1–16). London: Unwin Hyman.
- Irons, W. (1998). Adaptively relevant environments versus environment of evolutionary adaptiveness. *Evolutionary Anthropology* 6(6), 194–204.
- Irvine, L. (2004). *If you tame me: Understanding our connection with animals*. Philadelphia: Temple University Press.
- Irwin, P.G. (2003). A strategic review of international animal protection. In Salem, D.J. & A.N. Rowan (eds), *The State of the Animals II: 2003* (pp. 1–8). Washington, DC: Humane Society Press.
- Jackson, S. & Csikszentmihalyi, M. (1999). *Flow in sports*. Champaign, IL: Human Kinetics.
- Jacobson, S. (ed.) (1995). *Conserving wildlife: International education and communication approaches*. New York: Columbia University Press.
- Jakes, P., Kruger, L., Monroe, M., Nelson, K. & Sturtevant, V. (2007). Improving wildfire preparedness: Lessons from communities across the U.S. *Human Ecology Review* 14(2), 188–197.
- James, W. (1902). *The varieties of religious experience*. New York: Modern Library.
- James, W. (1961). *Psychology: The briefer course*. New York: Harper. (Original work published 1892.)
- James, W. (1981). *The principles of psychology*. Cambridge, MA: Harvard. (Original work published 1890.)
- Jamieson, D. (1985). Against zoos. In P. Singer (ed.), *In defense of animals* (pp. 108–117). Oxford: Basil Blackwell.
- Jamieson, D. (1995). Zoos revisited. In B. Norton, M. Hutchins, E. Stevens & T. Maple (eds), *Ethics on the ark* (pp. 52–66). Washington, DC: Smithsonian Institution Press.
- Johnson, C.Y., Bowker, J.M. & Cordell, H.K. (2004). Ethnic variation in environmental belief and behavior. *Environment and Behavior* 36, 157–186.
- Johnson, C.Y., Bowker, J.M., Cordell, H.K. & Bergstrom, J.C. (2005). Wilderness value differences by immigration, race/ethnicity, gender and socioeconomic status. In H.K. Cordell, J.C. Bergstrom & J.M. Bowker (eds), *The multiple values of wilderness* (pp. 143–159). State College, PA: Venture Publishing.
- Jones, C.D., Hollenhorst, S. & Perna, F. (2003). An empirical comparison of the four channel flow model and adventure experience paradigm. *Leisure Sciences* 25(1), 17–31.
- Jones, R.T., Ribbe, D.P., Cunningham, P. & Weddle, J.D. (2003). Psychosocial correlates of wildfire disaster: Post disaster adult reactions. *Fire Technology* 39, 103–117.
- Jung, C.G. (1964). Approaching the unconscious. In C.G. Jung (ed.), *Man and his symbols* (pp. 1–94). New York: Dell Publishing.
- Kafer, R., Lago, D., Wamboldt, P. & Harrington, F. (1992). The Pet Relationship Scale: Replication of psychometric properties in random samples and association with attitudes toward wild animals. *Anthrozoös* 5(2), 93–105.
- Kahn Jr., P.H. (1999). *The human relationship with nature*. Cambridge, MA: MIT Press.
- Kahn Jr., P.H. (2002). Children's affiliations with nature: Structure, development and the problem of environmental generational amnesia. In P.H. Kahn Jr. & S. Kellert (eds), *Children and nature: Psychological, sociocultural and evolutionary investigations* (pp. 93–116). Cambridge, MA: MIT Press.
- Kahn Jr., P.H. (2003). The development of environmental moral identity. In S. Clayton & S. Opatow (eds), *Identity and the natural environment* (pp. 113–134). Cambridge, MA: MIT Press.
- Kahn Jr., P.H. & Kellert, S. (eds) (2002). *Children and nature*. Cambridge, MA: MIT Press.
- Kahn Jr., P.H., Saunders, C.D., Severson, R.L., Myers Jr., O.E. & Gill, B.T. (in press). Moral and fearful affiliations with the animal world: Children's conceptions of bats. *Anthrozoös*.
- Kahneman, D. (1986). Comments on the contingent valuation method. In Cummings, R.G., Brookshire, D.S. & Schulze, W.D. (eds), *Valuing environmental goods: An assessment of the contingent valuation method*. Savage, MD: Rowman and Littlefield.
- Kahneman, D. & Tversky, A. (1979). Prospect theory: An analysis of decisions under risk. *Econometrica* 47, 313–327.

- Kaiser, F.G. & Shimoda, T.A. (1999). Responsibility as a predictor of ecological behavior. *Journal of Environmental Psychology* **19**, 243–253.
- Kals, E. (1996). Are proenvironmental commitments moderated by health concerns or perceived justice? In L. Mondata & M. Lerner (eds), *Current societal concerns about justice* (pp. 231–258). New York: Plenum Press.
- Kals, E. & Ittner, H. (2003). Children's environmental identity. In S. Clayton & S. Opatow (eds), *Identity and the natural environment* (pp. 135–157). Cambridge, MA: MIT Press.
- Kals, E. & Maes, J. (2002). Sustainable development and emotions. In P. Schmuck & P.W. Schultz (eds), *Psychology of sustainable development* (pp. 97–122). Boston: Kluwer.
- Kals, E., Schumacher, D. & Montada, L. (1999). Emotional affinity towards nature as a motivational basis to protect nature. *Environment and Behavior* **31**(2), 178–202.
- Kaltenborn, B.P., Bjerke, T., Nyahongo, J.W. & Williams, D.R. (2006). Animal preferences and acceptability of wildlife management actions around Serengeti National Park, Tanzania. *Biodiversity and Conservation* **15**, 4633–4649.
- Kaplan, R. (1973). Some psychological benefits of gardening. *Environment and Behavior* **5**(2), 142–162.
- Kaplan, R. (1993). The role of nature in the context of the workplace. *Landscape and Urban Planning* **26**, 193–201.
- Kaplan, R. (2001). The nature of the view from home: Psychological benefits. *Environment and Behavior* **33**, 507–542.
- Kaplan, R. & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge, UK: Cambridge University Press.
- Kaplan, R. & Kaplan, S. (2002). Adolescents and the natural environment: A time out? In P.K. Kahn Jr. & S.R. Kellert (eds), *Children and nature* (pp. 227–257). Cambridge, MA: MIT Press.
- Kaplan, S. (1990). Being needed, adaptive muddling and human–environment relationships. Paper presented at the Conference of the Environmental Design Research Association, Champaign-Urbana, IL, 1990.
- Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology* **15**, 169–182.
- Karp, D.G. (1996). Values and their effect on pro-environmental behavior. *Environment and Behavior* **28**, 111–133.
- Kasser, T. (2002). *The high price of materialism*. Cambridge, MA: MIT Press.
- Kearney, A.R. (1994). Understanding global change: A cognitive perspective on communicating through stories. *Climate Change* **27**, 419–441.
- Keil, F.C. (1989). *Concepts, kinds and cognitive development*. Cambridge, MA: MIT Press.
- Keller, C., Siegrist, M. & Gutscher, H. (2006). The role of the affect and availability heuristics in risk communication. *Risk Analysis* **26**(3), 631–639.
- Keller, R. (2006). Forest kindergartens. *Whatcom Watch* July, 11.
- Kellert, S.R. (1989). Perceptions of animals in America. In R.J. Hoage (ed.), *Perceptions of animals in American culture* (pp. 5–24). Washington, DC: Smithsonian Institution Press.
- Kellert, S.R. (1993). Attitudes, knowledge, and behavior towards wildlife among the industrial superpowers: United States, Japan, and Germany. *Journal of Social Issues* **49**(1), 53–72.
- Kellert, S.R. (1996). *The value of life: Biological diversity and human society*. Washington, DC: Island Press.
- Kellert, S.R., Black, M., Rush, C.R. & Bath, A.J. (1996). Human culture and large carnivore conservation in North America. *Conservation Biology* **10**(4), 977–990.
- Kellert, S.R., Heerwagen, J. & Mador, M. (eds) (2008). *Biophilic design: The theory, science and practice of bringing buildings to life*. New York: Wiley.
- Kellert, S.R. & Wilson, E.O. (eds) (1993). *The biophilia hypothesis*. Washington, DC: Island Press.
- Kempton, W., Boster, J. & Hartley, J. (1995). *Environmental values in American culture*. Cambridge, MA: MIT Press.

- Kempton, W., Darley, J.M. & Stern, P. (1992). Psychological research for the new energy problems: Strategies and opportunities. *American Psychologist* **47**, 1213–1223.
- Kempton, W. & Holland, D. (2003). Identity and sustained environmental practice. In S. Clayton & S. Opatow (eds), *Identity and the natural environment* (pp. 317–341). Cambridge, MA: MIT Press.
- Kendler, K., Neale, R., Kessler, A., Heath, A. & Eaves, L. (1992). The genetic epidemiology of phobias in women. *Archives of General Psychiatry* **49**, 273–281.
- Kidd, A.H., Kelly, H. & Kidd, R. (1983). Personality characteristics of horse, turtle, snake and bird owners. *Psychological Reports* **52**, 719–729.
- Kidd, A.H. & Kidd, R.M. (1987). Seeking a theory of the human/companion animal bond. *Anthrozoos* **1**(3), 140–157.
- Kihlstrom, J., Cantor, N., Albright, J., Chew, B., Klein, S. & Neidenthal, P. (1988). Information processing and the study of the self. In L. Berkowitz (ed.), *Advances in experimental social psychology*, Vol. 21 (pp. 145–180). San Diego: Academic Press.
- Kilbourne, W.E., Beckmann, S.C., Lewis, A. & Van Dam, Y. (2001). A multinational examination of the role of the dominant social paradigm in environmental attitudes of university students. *Environment and Behavior* **33**(2), 209–228.
- Kim, J. & Kaplan, R. (2004). Physical and psychological factors in sense of community. New urbanist Kentlands and nearby Orchard Village. *Environment and Behavior* **36**, 313–340.
- Kim, M. (2002). *Non-western perspectives on human communication*. Thousand Oaks, CA: Sage Publications.
- King, D.L. (1995). *Doing their share to save the planet: Children and environmental crisis*. New Brunswick, NJ: Rutgers University Press.
- Kirkby, M. (1989). Nature as a refuge in children's environments. *Children's Environments Quarterly* **6**(1), 7–12.
- Klenosky, D.B. & Saunders, C.D. (2008). Put me in the zoo! A laddering study of zoo visitor motives. *Tourism Review International* **11**, 317–327.
- Kluckhohn, F.R. & Strodtbeck, F.L. (1961). *Variations in value orientations*. Evanston, IL: Row, Peterson.
- Knight, S., Vrij, A., Cherryman, J. & Nunkeosing, K. (2004). Attitudes towards animal use and belief in animal mind. *Anthrozoös* **17**(1), 43–62.
- Knotek, K. (2006). Understanding social influences on wilderness fire stewardship decisions. *International Journal of Wilderness* **12**(1), 22–25.
- Kohlberg, L., Levine, C. & Hewer, A. (1984a). The current formulation of the theory. In L. Kohlberg, *Essays on moral development, Vol. 2: The psychology of moral development* (pp. 212–319). San Francisco: Harper and Row.
- Kohlberg, L., Levine, C. & Hewer, A. (1984b). Synopses and detailed replies to critics. In L. Kohlberg, *Essays on moral development, Vol. 2: The psychology of moral development* (pp. 320–94). San Francisco: Harper and Row.
- Kohls, R. (1984). *The values Americans live by*. Washington, DC: Meridan House International.
- Koole, S.L. & van den Berg, A.E. (2005). Lost in the wilderness: Terror management, action orientation and nature evaluation. *Journal of Personality and Social Psychology* **88**(6), 1014–1028.
- Korn, R. and Associates (2003). *Summative evaluation of Vanishing Wildlife*. Monterey, CA: Monterey Bay Aquarium.
- Korpela, K.M. (1989). Place identity as a product of environmental self-regulation. *Journal of Environmental Psychology* **9**, 241–256.
- Korpela, K.M. (1992). Adolescents' favorite places and environmental self-regulation. *Journal of Environmental Psychology* **12**, 249–258.
- Korpela, K.M. (2002). Children's environment. In R. Bechtel & A. Churchman (eds), *Handbook of environmental psychology* (pp. 363–373). New York: Wiley.
- Korpela, K.M., Hartig, T., Kaiser, F.G. & Fuhrer, U. (2001). Restorative experience and self-regulation in favorite places. *Environment and Behavior* **33**, 572–589.

- Kortenkamp, K.V. & Moore, C.F. (2001). Ecocentrism and anthropocentrism: Moral reasoning about ecological commons dilemmas. *Journal of Environmental Psychology* **21**, 261–272.
- Kramer, R. & Brewer, M. (1984). Effects of group identity on resource use in a simulated commons dilemma. *Journal of Personality and Social Psychology* **46**, 1044–1057.
- Krenichyn, K. (2004). Women and physical activity in an urban park. *Journal of Environmental Psychology* **24**, 117–130.
- Krosnick, J.A., Holbrook, A.L. & Visser, P.S. (2000). The impact of the fall 1997 debate about global warming on American public opinion. *Public Understanding of Science* **9**(3), 239–260.
- Kuczynski, L., Harach, L. & Bernardini, S.C. (1999). Psychology's child meets sociology's child: Agency, power and influence in parent–child relations. In C. Shehan (ed.), *Through the eyes of the child: Revisioning children as active agents of family life* (pp. 21–52). Stanford, CT: JAI Press.
- Kuhlemeier, H., van den Bergh, H. & Lagerweij, N. (1999). Environmental knowledge, attitudes and behavior in Dutch secondary education. *Journal of Environmental Education* **30**(2), 4–14.
- Kuo, F. & Faber Taylor, A. (2004). A potential natural treatment for attention-deficit/hyperactivity disorder: Evidence from a national study. *American Journal of Public Health* **94**(9), 1580–1586.
- Kuo, F. & Sullivan, W. (2001). Aggression and violence in the inner city: Effects of environment via mental fatigue. *Environment and Behavior* **33**, 543–571.
- Kuo, F., Sullivan, W., Coley, R. & Brunson, L. (1998). Fertile ground for community: Inner-city neighborhood common species. *American Journal for Community Psychology* **26**, 823–851.
- Kyle, G., Graefe, A., Manning, R. & Bacon, J. (2004). Effects of place attachment on users' perceptions of social and environmental conditions in a natural setting. *Journal of Environmental Psychology* **24**, 213–225.
- Labouvie-Vief, G. & Diehl, M. (2000). Cognitive complexity and cognitive-affective integration: Related or separate domains of adult development? *Psychology and Aging* **15**, 490–504.
- Lachapelle, P.R., Smith, P.D. & McCool, S.F. (2004). Access to power or genuine empowerment? An analysis of three community forest groups in Nepal. *Human Ecology Review* **11**(1), 1–12.
- Lakoff, G. (2004). *Don't think of an elephant!* White River Junction, VT: Chelsea Green.
- Laland, K.M. & Brown, G.R. (2002). *Sense and nonsense: Evolutionary perspectives on human behaviour*. Oxford: Oxford University Press.
- Larsen, L., Adams, J., Deal, B., Kweon, B-S. & Tyler, E. (1998). Plants in the workplace: The effects of plant density on productivity, attitudes and perceptions. *Environment and Behavior* **30**, 261–281.
- Larson, R.W. (1997). The emergence of solitude as a constructive domain of experience in early adolescence. *Child Development* **68**(1), 80–93.
- Laski, M. (1961). *Ecstasy*. Bloomington, IN: Indiana University Press.
- Latane, B. & Darley, J. (1970). *The unresponsive bystander: Why doesn't he help?* New York: Appleton-Century-Crofts.
- Laurent, E.L. (2000). Children, 'insects' and play in Japan. In A. Podberscek, E. Paul & J. Serpell (eds), *Companion animals and us* (pp. 61–89). Cambridge: Cambridge University Press.
- Lazarus, R. (1966). *Psychological stress and the coping process*. New York: McGraw-Hill.
- Lazarus, R.S. (1991). *Emotion and adaptation*. New York: Oxford University Press.
- Leach, J., Driver, R., Scott, C. & Wood-Robinson, C. (1995). Children's ideas about ecology (1): Theoretical background, design and methodology. *International Journal of Science Education* **17**(6): 721–732.
- Leach, J., Driver, R., Scott, C. & Wood-Robinson, C. (1996a). Children's ideas about ecology (2): Ideas found in children aged 5–16 about the cycling of matter. *International Journal of Science Education* **18**(1): 19–34.
- Leach, J., Driver, R., Scott, C. & Wood-Robinson, C. (1996b). Children's ideas about ecology (3): Ideas found in children aged 5–16 about the interdependency of organisms. *International Journal of Science Education* **18**(2): 129–141.
- Lederach, J.P. (1997). *Building peace: Sustainable reconciliation in divided societies*. Washington, DC: United States Institute of Peace Press.

- Lee, K. (1993). *Compass and gyroscope: Integrating science and politics for the environment*. Washington, DC: Island Press.
- Leeming, F.C., Dwyer, W.O., Porter, B.E. & Cobern, M.K. (1993). Outcome research in environmental education: A critical review. *Journal of Environmental Education* **24**(4), 8–21.
- Leiserowitz, A. (2003). *Global warming in the American mind: The roles of affect, imagery and world-views in risk perception, policy preferences and behavior*. Doctoral dissertation, University of Oregon, Eugene, OR.
- Leiserowitz, A. (2005). American risk perceptions: Is climate change dangerous? *Risk Analysis* **25**, 1433–1442.
- Leonhardt, D. (2008). Maybe money does buy happiness after all. *New York Times* April 16.
- Leopold, A. (1949). *A Sand County almanac*. New York: Oxford University Press.
- Lévi-Strauss, C. (1966). *The savage mind*. Chicago: University of Chicago Press.
- Levy-Bruhl, L. (1966). *How natives think*. New York: Washington Square Press.
- Lewin, K. (1951). *Field theory in social science: Selected papers*. New York: Harper.
- Lieberman, G. & Hoody, L. (1998). *Closing the achievement gap: Using the environment as an integrating context for learning*. San Diego, CA: State Education and Environment Roundtable.
- Light, A. & Katz, E. (eds) (1996). *Environmental pragmatism*. New York: Routledge.
- Likona, T. (1991). *Educating for culture*. New York: Bantam Books.
- Lindemann-Matthies, P. & Kramer, T. (2006). The influence of an interactive educational approach on visitors' learning in a Swiss zoo. *Science Education* **90**(2), 296–315.
- Loeb, P.R. (1999). *Soul of a citizen: Living with conviction in a cynical time*. New York: St. Martins Griffin.
- Long, C.R., Seburn, M., Averill, J.R. & More, T.A. (2003). Solitude experiences: Varieties, settings, and individual differences. *Personality and Social Psychology Bulletin* **29**, 578–583.
- Loomis, J.B. & Richardson, R. (2000). *Economic values of protecting roadless areas in the United States*. Available at <http://www.wilderness.org/Library/Roadless.cfm> (accessed August 22, 2007).
- Louv, R. (2005). *The last child in the woods*. Chapel Hill: Algonquin Books.
- Luckner, J.L. & Nadler, R.S. (1997). *Processing the experience: Strategies to enhance and generalize learning*. Dubuque, IA: Kendall/Hunt.
- Lukas, K.E. & Ross, S.R. (2005). Zoo visitor knowledge and attitudes toward gorillas and chimpanzees. *Journal of Environmental Education* **36**, 33–48.
- Maas, J., Verheij, R., Groenewegen, P., de Vries, S. & Spreeuwenberg, P. (2006). Green space, urbanity and health: How strong is the relationship? *Journal of Epidemiology and Community Health* **60**, 587–592.
- MacIntyre, A. (1984). *After virtue*, 2nd edn. Notre Dame, IN: Notre Dame University Press.
- Mae, L., McMorris, L. & Hendry, J. (2004). Spontaneous trait transference from dogs to owners. *Anthrozoös* **17**(3), 225–243.
- Malkus, A. & Musser, L. (1997). Environmental concern in school-age children. Paper presented at the Biennial Meeting of the Society for Research in Child Development, Washington DC, April 3–6. ERIC Report No. ED407099.
- Maller, C., Townsend, M., Pryor, A., Brown, P. & St. Leger, L. (2005). Healthy nature healthy people. *Health Promotion International* **21**, 45–54.
- Manfredo, M. & Teel, T. (2008). Integrating concepts: Demonstration of a multi-level model for exploring the rise of mutualism value orientations in post-industrial society. In M. Manfredo, *Who cares about wildlife*. New York: Springer Press.
- Manfredo, M., Teel, T. & Dayer, A. (2006). Are wildlife values changing in the United States? Paper presented at the 20th Annual Meeting of the Society for Conservation Biology, San Jose, CA, June 24–28.
- Mannell, R.C., Zuzanek, J. & Larson, R. (1988). Leisure states and “flow” experiences: Testing perceived freedom and intrinsic motivation hypotheses. *Journal of Leisure Research* **20**(4), 289–304.
- Mannetti, L., Pierro, A. & Livi, S. (2004). Recycling: Planned and self-expressive behavior. *Journal of Environmental Psychology* **24**, 227–236.

- Manning, R., Lawson, S., Newman, P., Laven, D. & Valliere, W. (2002). Methodological issues in measuring crowding-related norms in outdoor recreation. *Leisure Sciences* **24**, 339–348.
- Manzo, L.C. (2005). For better or worse: Exploring multiple dimensions of place meaning. *Journal of Environmental Psychology* **25**, 67–86.
- Maple, T. (1995). Toward a responsible zoo agenda. In B. Norton, M. Hutchins, E. Stevens & T. Maple (eds), *Ethics on the ark* (pp. 20–30). Washington, DC: Smithsonian Institution Press.
- Margoluis, R., Myers, S., Allen, J., Roca, J., Melnyk, M. & Swanson, J. (2001). *An ounce of prevention: Making the link between health and conservation*. Washington, DC: Biodiversity Support Program. Available at <http://www.worldwildlife.org/bsp/publications/aam/ounce/Titlepage.htm>.
- Marino, L. & Lilienfeld, S.O. (1998). Dolphin-assisted therapy: Flawed data, flawed conclusions. *Anthrozoös* **11**, 22–32.
- Marino, L. & Lilienfeld, S.O. (2007). Dolphin-assisted therapy: More flawed data and more flawed conclusions. *Anthrozoös* **20**, 239–249.
- Markus, H., Crane, M., Bernstein, S. & Siladi, M. (1982). Self-schemas and gender. *Journal of Personality and Social Psychology* **42**(1), 38–50.
- Markus, H.R. & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion and motivation. *Psychological Review* **98**, 224–252.
- Markus, H.R. & Kitayama, S. (1998). The cultural psychology of personality. *Journal of Cross-Cultural Psychology* **29**, 63–87.
- Martin, P. & Priest, S. (1986). Understanding the adventure experience. *Journal of Adventure Education* **3**(1), 18–21.
- Mascia, M. (2003). Conservation psychology: Challenges and opportunities. *Human Ecology Review* **10**, 163–164.
- Mason, P. (2000). Zoo tourism: The need for more research. *Journal of Sustainable Tourism* **8**, 333–339.
- Massey, C. & Gelman, R. (1988). Preschoolers' ability to decide whether a photographed unfamiliar object can move itself. *Developmental Psychology* **24**(3), 307–317.
- Massimini, F. & Carli, M. (1986). La selezione psicologica umana tra biologia e cultura. In F. Massimini & P. Inghilleri (eds), *L'esperienza quotidiana* (pp. 65–84). Milan: Franco Angeli.
- Mathews, F. (1991). *The ecological self*. London: Routledge.
- Maxey, I. (1999). Playgrounds: From oppressive spaces to sustainable places? *Built Environment* **25**(1), 18–24.
- Maxted, J. (2005). Coming home: Adolescents and the nature-based solo. In C.E. Knapp & T.E. Smith (eds), *Exploring the power of solo, silence and solitude* (pp. 121–136). Boulder, CO: Association for Experiential Education.
- Mayer, F.S. & Frantz, C.M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology* **24**, 503–515.
- Maynard, M. (2007). Toyota hybrid makes a statement, and that sells. *New York Times* July 4, A1, A11.
- Mazur, N.A. (2001). *After the ark: Environmental policy-making and the zoo*. Victoria, Australia: Melbourne University Press.
- McCool, S. & Cole, D. (1997). *Proceedings – Limits of acceptable change and related planning processes: Progress and future direction*. USDA Forest Service General Technical Report No. INT-371. Ogden, UT: USDA Forest Service.
- McCrea, E.J. & deBettencourt, K. (2000). *Environmental studies in the K-12 classroom: A teacher's view*. ERIC Report No. ED465515. College Park, MD: Survey Research Center, University of Maryland.
- McKenzie-Mohr, D. (2000). Fostering sustainable behavior through community-based social marketing. *American Psychologist* **55**, 531–537.
- McKenzie-Mohr, D. & Smith, W. (1999). *Fostering sustainable behavior: An introduction to community-based social marketing*. Gabriola Island, British Columbia: New Society.
- McKeown, R. (2005). UN launches decade of education for sustainable development. *NAAEE Communicator* **35**(2), 1 and 6.

- McNay, M.E. (2002). *A case history of wolf–human encounters in Alaska and Canada*. Wildlife Technical Bulletin No. 13. Juneau, AK: Alaska Department of Fish and Game.
- McNicholas, J. & Collis, G. (2000). Dogs as catalysts for social interactions: Robustness of the effect. *British Journal of Psychology* **91**, 61–70.
- Medin, D.L. & Atran, S. (2004). The native mind: Biological categorization and reasoning in development and across cultures. *Psychological Review* **111**(4), 960–983.
- Meijinders, A., Midden, C. & Wilke, H. (2001). Role of negative emotion in communication about CO₂ risks. *Risk Analysis* **21**, 955–966.
- Meinhold, J. & Malkus, A. (2005). Adolescent environmental behaviors: Can knowledge, attitudes and self-efficacy make a difference? *Environment and Behavior* **37**, 511–532.
- Melson, G.F. & Fogel, A. (1988). Children's ideas about animal young and their care: A reassessment of gender differences in the development of nurturance. *Anthrozoös* **2**(4), 265–273.
- Merchant, C. (1980). *The death of nature: Women, ecology, and the scientific revolution*. San Francisco: Harper and Row.
- Merchant, C. (1992). *Radical ecology: The search for a liveable world*. New York: Routledge.
- Messent, P. (1983). Social facilitation of contact with other people by pet dogs. In A. Katcher & A. Beck (eds), *New perspectives on our lives with companion animals* (pp. 37–46). Philadelphia: University of Pennsylvania Press.
- Messick, D., Wilke, H., Brewer, M., Kramer, R., Zenke, P. & Lui, L. (1983). Individual adaptations and structural change as solutions to social dilemmas. *Journal of Personality and Social Psychology* **44**(2), 294–309.
- Michel-Guillou, E. & Moser, G. (2006). Commitment of farmers to environmental protection. *Journal of Environmental Psychology* **26**, 227–235.
- Miles, J.C. & Priest, S. (1999). *Adventure programming*, 2nd edn. State College, PA: Venture Publishing.
- Milfont, T.L. & Duckitt, J. (2004). The structure of environmental attitudes: A first- and second-order confirmatory factor analysis. *Journal of Environmental Psychology* **24**(3), 289–303.
- Milfont, T.L. & Gouveia, V. (2006). Time perspective and values: An exploratory study of their relations to environmental attitudes. *Journal of Environmental Psychology* **26**(1), 72–82.
- Milinski, M., Sommerfeld, R., Krambeck, H., Reed, F. & Marotzke, J. (2008). The collective-risk social dilemma and the prevention of simulated dangerous climate change. *Proceedings of the National Academy of Sciences* **105**, 2291–2294.
- Miller, C. (2002). Comment. Panel discussion at the first Conference on Conservation Psychology, Brookfield Zoo, Chicago, IL.
- Millitt, I. (2004). *Der Waldkindergarten: Dimensionen eines pädagogischen Ansatzes*, 3rd edn. Weinheim: Beltz Verlag.
- Millot, J.-L. & Filiatre, J.-C. (1986). The behavior sequences in the communication system between the child and his pet dog. *Applied Animal Behaviour Science* **16**, 383–390.
- Mills, D.S. (2005). What's in a word? A review of the attributes of a command affecting the performance of pet dogs. *Anthrozoös* **18**(3), 208–221.
- Mitchell, R.W. (1987). *Projects, routines, and enticements in interspecies play between familiar and unfamiliar dogs and people*. Doctoral dissertation, Clark University, Worcester, MA.
- Mitchell, R.W. & Edmonson, E. (1999). Functions of repetitive talk to dogs during play: Control, conversation or planning? *Society and Animals* **7**(1), 55–81.
- Moore, C. (2003). *Silent scourge: Children, pollution, and why scientists disagree*. New York: Oxford.
- Moore, R.C. (1986a). *Childhood's domain*. London: Croom-Helm.
- Moore, R.C. (1986b). The power of nature. *Children's Environments Quarterly* **3**(3), 52–69.
- Moore, R.C. & Cooper Marcus, C. (2008). Healthy planet, healthy children: Designing nature into the daily spaces of childhood. In S. Kellert, J. Heerwagen & M. Mador (eds), *Biophilic design* (pp. 153–203). Hoboken, NJ: John Wiley.

- Moore, R.C. & Cosco, N.G. (2007). What makes a park inclusive and universally designed? A multi-method approach. In C. Ward Thompson & P. Travlou (eds), *Open space people space* (pp. 85–110). London: Taylor and Francis.
- Moore, R.L. & Graefe, A.R. (1994). Attachments to recreation settings. *Leisure Sciences* **16**, 17–31.
- Morgan, J.M. & Hodgkinson, M. (1999). The motivation and social orientation of visitors attending a contemporary zoological park. *Environment and Behavior* **31**, 227–239.
- Morris, J., Briggs, M. & Zidenberg-Cherr, S. (2000). School-based gardens can teach kids healthier eating habits. *California Agriculture* **54**(5), 40–46.
- Morris, M. & Schagen, I. (1996). *Green attitudes or learned responses?* Slough, UK: National Foundation for Educational Research.
- Morrison, D. & Dunlap, R. (1986). Environmentalism and elitism: A conceptual and empirical analysis. *Environmental Management* **10**, 581–589.
- Mugford, R. & M'Comisky, J.G. (1975). Some recent work on the psychotherapeutic value of caged birds with old people. In R.S. Anderson (ed.), *Pets, animals and society* (pp. 54–65). London: Balliere Tindall.
- Munro, D.B. (2008). Canadian poisonous plants information system. Available at http://www.cbif.gc.ca/pls/pp/poison?p_x=pxpoison.html (accessed March 20, 2008).
- Munson, B.H. (1994). Ecological misconceptions. *Journal of Environmental Education* **25**(4), 30–34.
- Mussen, P. & Eisenberg-Berg, N. (1977). *Roots of caring sharing and helping*. San Francisco: Freeman.
- Myers Jr., O.E. (2006). *The psychology of photographic imagery in communicating conservation*. Available at <http://www.linc.us/articles/Myers-PsychologyofConservationPhotography.pdf>.
- Myers Jr., O.E. (2007). *The significance of children and animals: Social development and our connections to other species*, 2nd, revised edition. West Lafayette, IN: Purdue University Press. (Original work published 1998.)
- Myers Jr., O.E. & Beringer, A. (in press). Sustainability in higher education: Psychological research for effective pedagogy. *Sustainability: Science, Practice and Policy*.
- Myers Jr., O.E. & Russell, A. (2003). Human identity in relation to wild black bears: A natural-social ecology of subjective creatures. In S. Clayton & S. Opatow (eds), *Identity and the natural environment* (pp. 67–90). Cambridge, MA: MIT Press.
- Myers Jr., O.E. & Saunders, C.D. (2002). Animals as links to developing caring relationships with the natural world. In P.H. Kahn Jr. & S.R. Kellert (eds), *Children and nature: Psychological, sociocultural and evolutionary investigations* (pp. 153–178). Cambridge, MA: MIT Press.
- Myers Jr., O.E., Saunders, C.D. & Bexell, S. (2009). Fostering empathy with wildlife: Factors affecting free-choice learning for conservation concern and behavior. In J.H. Falk, J.E. Heimlich & S. Foutz (eds), *Free-choice learning and the environment*. Lanham, MD: AltaMira Press.
- Myers Jr., O.E., Saunders, C. & Birjulin, A. (2004). Emotional dimensions of watching zoo animals: An experience sampling study building on insights from psychology. *Curator* **47**(3), 299–321.
- Naess, A. (1989). *Ecology, community and lifestyle* (D. Rothenberg, trans. and ed.). Cambridge: Cambridge University Press.
- Nash, R. (1982). *Wilderness and the American mind*. New Haven, CT: Yale University Press.
- Nash, R. (2005). Forward. In P. Barlett (ed.), *Urban place: Reconnecting with the natural world* (pp. vii–viii). Cambridge, MA: MIT Press.
- Nassauer, J.I. (1988). The aesthetics of horticulture: Neatness as a form of care. *HortScience* **23**, 973–977.
- National Gardening Association (2006). *National gardening survey*. South Burlington, VT: National Gardening Association.
- National Park Service (1997). *VERP: The visitor experience and resource protection (VERP) framework: A handbook for planners and managers*. Denver: NPS Denver Service Center.
- NEETF (National Environmental Education and Training Foundation) & Roper Starch Worldwide (2001). *Lessons from the environment: The ninth annual national report card on environmental attitudes, knowledge, and behavior*. Washington, DC: NEETF.

- Neisser, U. (1982). *Memory observed: Remembering in natural contexts*. San Francisco: W.H. Freeman.
- Neisser, U. (1988). Five kinds of self-knowledge. *Philosophical Psychology* **1**, 35–59.
- Neu, J. & Volkan, V. (1999). *Developing a methodology for conflict prevention: The case of Estonia*. Atlanta, GA: Carter Center. Available at http://www.cartercenter.org/news/publications/peace/conflict_reports.html (accessed April 18, 2007).
- Nevers, P., Gebhard, U. & Billmann-Maheca, E. (1997). Patterns of reasoning exhibited by children and adolescents in response to moral dilemmas involving plants, animals and ecosystems. *Journal of Moral Education* **26**(2), 169–186.
- Newell, P. (1997). A cross-cultural examination of favorite places. *Environment and Behavior* **29**, 495–514.
- Nickas, G. & Proescholdt, K. (2005). Keeping the wild in wilderness. *International Journal of Wilderness* **11**(3), 13–18.
- Nijhuis M. (2007). Everybody's doing it. *Orion Magazine*, July/August. Available at www.orionmagazine.org.
- Nolan, J., Schultz, P.W., Cialdini, R., Goldstein, N. & Griskevicius, V. (2008). Normative social influence is undetected. *Personality and Social Psychology Bulletin* **34** (in press).
- Norem, J.K. (2001a). Defensive pessimism, optimism, and pessimism. In E.C. Chang (ed.), *Optimism and pessimism: Implications for theory, research and practice* (pp. 77–100). Washington, DC: American Psychological Association.
- Norem, J.K. (2001b). *The positive power of negative thinking*. Cambridge, MA: Perseus.
- Norris, K.S. & Jacobson, S.K. (1998). Content analysis of tropical conservation education programs: Elements of success. *Journal of Environmental Education* **30**(1), 38–44.
- Norton, B.G. (1987). *Why preserve natural variety?* Princeton, NJ: Princeton University Press.
- Norton, B.G. (1991). *Toward unity among environmentalists*. New York: Oxford University Press.
- Norton, B.G. (1995). A broader look at animal stewardship. In B. Norton, M. Hutchins, E. Stevens & T. Maple (eds), *Ethics on the ark* (pp. 102–121). Washington, DC: Smithsonian Institute Press.
- Norton, B.G. (2005). *Sustainability: A philosophy of adaptive ecosystem management*. Chicago: University of Chicago Press.
- O'Connor, R., Bord, R. & Fisher, A. (1999). Risk perceptions, general environmental beliefs, and willingness to address climate change. *Risk Analysis* **19**, 461–471.
- Ogden, J., Gentile, C. & Revard, B. (2004). Trends in conservation education. *Communique* August, 18–20.
- Öhman, A., Dimberg, U. & Öst, L-G. (1985). Animal and social phobias: Biological constraints on learned fear responses. In S. Reiss & R. Bootzin (eds), *Theoretical issues in behavior* (pp. 123–175). New York: Academic Press.
- Olli, E., Grendstad, G. & Wollebaek, D. (2001). Correlates of environmental behaviors: Bringing back social context. *Environment and Behavior* **33**, 181–208.
- Olson, D., Dinerstein, E., Wikramanayake, E. et al. (2001). Terrestrial ecoregions of the world: A new map of life on earth. *Bioscience* **51**(11), 933–938.
- Opotow, S. (1990). Moral exclusion and injustice: An introduction. *Journal of Social Issues* **4**(1), 1–20.
- Opotow, S. (1994). Predicting protection: Scope of justice and the natural world. *Journal of Social Issues* **50**, 49–64.
- Opotow, S. & Brook, A. (2003). Identity and exclusion in rangeland conflict. In S. Clayton & S. Opotow (eds), *Identity and the natural environment: The psychological significance of nature* (pp. 249–272). Cambridge, MA: MIT Press.
- Opotow, S. & Weiss, L. (2000). Denial and the process of exclusion in environmental conflict. *Journal of Social Issues* **56**(3), 475–490.
- O'Regan, J.K. & Noë, A. (2001). A sensorimotor account of vision and visual consciousness. *Behavioral and Brain Sciences* **24**, 939–1031.
- Ornstein, R. & Ehrlich, P. (1989). *New world/new mind: Moving toward conscious evolution*. New York: Doubleday.

- Orr, D. (1991). *Ecological literacy*. Albany, NY: SUNY Press.
- Oskamp, S. (2000). A sustainable future for humanity: How can psychology help? *American Psychologist* **55**, 496–508.
- Ostrom, E., Dietz, T., Dolšák, N., Stern, P.C., Stonich, S. & Weber, E. (eds) (2002). *The drama of the commons*. Washington, DC: National Academy Press.
- Ostrom, E., Gardner, R. & Walker, J. (1994). *Rules, games and common-pool resources*. Ann Arbor, MI: University of Michigan Press.
- Parker, J. & McDonough, M. (1999). Environmentalism of African Americans: An analysis of the subculture and barriers theories. *Environment and Behavior* **31**, 155–177.
- Parsons, R., Tassinary, L., Ulrich, R., Hebl, M. & Grossman-Alexander, M. (1998). The view from the road: Implications for stress recovery and immunization. *Journal of Environmental Psychology* **18**, 113–139.
- Paul, E. (2000). Love of pets and love of people. In A. Podberscek, E. Paul & J. Serpell (eds), *Companion animals and us* (pp. 168–186). Cambridge, UK: Cambridge University Press.
- Payne, L., Mowen, A. & Orsega-Smith, E. (2002). An examination of park preferences and behaviors among urban residents. *Leisure Sciences* **24**, 181–198.
- Petty, J. (2003). Social capital and the collective management of resources. *Science* **302**, 1912–1914.
- Petty, R.E. & Cacioppo, J.T. (1981). *Attitudes and persuasion: Classic and contemporary approaches*. Dubuque, IA: W.C. Brown Publishers.
- Petty, R.E., Haugvedt, C.P. & Smith, S.M. (1995). Elaboration as a determinant of attitude strength: Creating attitudes that are persistent, resistant, and predictive of behavior. In R.E. Petty & J.A. Krosnick (eds), *Attitude strength: Antecedents and consequences* (pp. 93–130). Mahwah, NJ: Lawrence Erlbaum.
- Piaget, J. (1975). *The child's conception of the world* (J. Tomlinson & A. Tomlinson, trans.). Towata, NJ: Littlefield, Adams and Co. (Original work published 1929.)
- Plous, S. (1993). Psychological mechanisms in the human use of animals. *Journal of Social Issues* **49**(1), 11–52.
- Podberscek, A. & Gosling, S. (2000). Personality research on pets and their owners: Conceptual issues and review. In A. Podberscek, E. Paul & J. Serpell (eds), *Companion animals and us* (pp. 143–167). Cambridge, UK: Cambridge University Press.
- Podberscek, A. & Serpell, J. (1997). Aggressive behavior in English cocker spaniels and the personality of their owners. *Veterinary Record* **141**, 73–76.
- Pol, E. (2002). Environmental management: A perspective from environmental psychology. In R. Bechtel & A. Churchman (eds), *Handbook of environmental psychology* (pp. 55–84). New York: Wiley.
- Pol, E., Moreno, E., Guàrdia, J. & Iniguez, L. (2002). Identity, quality of life, and sustainability in an urban suburb of Barcelona. *Environment and Behavior* **34**, 67–80.
- Polgreen, L. (2007). In Niger, trees and crops turn back the desert. *New York Times* February 11 (Section 1), 1.
- Posey, D.A. (1999). *Cultural and spiritual values of biodiversity*. London: Intermediate Technology.
- Preston, S.D. & de Waal, F.B.M. (2002). Empathy: Its ultimate and proximate bases. *Behavioral and Brain Sciences* **25**, 1–20.
- Price, E., Ashmore, L. & McGivern, A-M. (1994). Reactions of zoo visitors to free-ranging monkeys. *Zoo Biology* **13**, 355–373.
- Priest, S. & Bunting, C. (1993). Changes in perceived risk and competence during whitewater canoeing. *Journal of Applied Recreation Research* **18**(4), 265–280.
- Prochaska, J. & DiClemente, C. (2005). The transtheoretical approach. In J. Nordcross & M. Goldfried (eds), *Handbook of psychotherapy integration*, 2nd edn (pp. 147–171). New York: Oxford.
- Proshansky, H.M. (1978). The city and self-identity. *Environment and Behavior* **10**(2), 147–169.
- Putnam, R.D. (2000). *Bowling alone*. New York: Simon and Schuster.
- Rabb, G.B. & Saunders, C.D. (2005). The future of zoos and aquariums: Conservation and caring. *International Zoo Yearbook* **39**, 1–26.

- Radar, N. (1997). Change and variation in responses to perceptual information. In C. Dent-Read & P. Zukow-Goldring (eds), *Evolving explanations of development: Ecological approaches to organism-environment systems* (pp. 129–257). Washington, DC: American Psychological Association.
- Raffan, J. (2000). *Nature nurtures*. Toronto: Evergreen. Available at <http://www.evergreen.ca/en/lglg-resources.html>.
- Ramsey, J. (1993). The effects of issue investigation and action training on eighth-grade students' environmental behavior. *Journal of Environmental Education* **24**(3), 31–36.
- Randall, D. (2007). Perhaps only god can make a tree, but only people could put a dollar value on it. *New York Times*, April 18, A24.
- Reed, E.S. (1996). *Encountering the world: Toward an ecological psychology*. New York: Oxford University Press.
- Relf, P.D. (1998). People–plant relationship. In S.P. Simson & M.C. Straus (eds), *Horticulture as therapy: Principles and practice* (pp. 21–42). New York: Haworth Press.
- Relf, P.D. (2005). The therapeutic values of plants. *Pediatric Rehabilitation* **8**(3), 235–237.
- Relph, E. (1976). *Place and placelessness*. London: Pion.
- Reser, J.P. (1995). Whither environmental psychology? *Journal of Environmental Psychology* **15**, 235–257.
- Reser, J.P. (2007). *Psychology and the natural environment. A Position Statement prepared for the Australian Psychological Society*. Melbourne: Australian Psychological Society.
- Reser, J.P. & Scherl, L.M. (1988). Clear and unambiguous feedback: A transactional and motivational analysis of environmental challenge and self-encounter. *Journal of Environmental Psychology* **8**(4), 269–286.
- Responsive Management (1998). *Wildlife and the American mind*. Harrisburg, VA: Responsive Management.
- Responsive Management (n.d.). *Hunters and hunting: Public opinion on hunting*. Available at <http://www.responsivemanagement.com/hunting.html#pubop> (accessed December 14, 2006).
- Reuveny, R. (2008). Ecomigration and violent conflict: Case studies and public policy implications. *Human Ecology* **36**, 1–13.
- Rickinson, M. (2001). Learners and learning in environmental education: A critical review of the evidence. *Environmental Education Research* **7**(3), 207–320.
- Rickinson, M., Dillon, J., Teamey, K., Morris, M., Choi, M.Y., Saunders, D. & Benefield, P. (2004). *A review of research on outdoor learning*. London: National Foundation for Educational Research.
- Ritvo, H. (1987). *The animal estate*. Cambridge, MA: Harvard University Press.
- Robbins, P., Polderman, A. & Birkenholtz, T. (2001). Lawns and toxins: An ecology of the city. *Cities* **18**, 369–380.
- Roberts, C., McBride, E., Rosenvinge, H., Stevenage, S. & Bradshaw, J. (1996). The pleasure of a companion animal. In J. Nicholson & A. Podberscek (eds), *Further issues in research in companion animal studies* (p. 64). Burford, UK: Gene Society for Companion Animal Studies.
- Robins, D., Sanders, C. & Cahill, S. (1991). Dogs and their people: Pet-facilitated interaction in a public setting. *Journal of Contemporary Ethnography* **22**, 205–227.
- Robottom, I. & Hart, P. (1995). Behaviorist EE research: Environmentalism as individualism. *Journal of Environmental Education* **26**(2), 5–9.
- Rochberg-Halton, E. (1985). Life in the treehouse: Pet therapy as family metaphor and self-dialogue. In Sussman, M. (ed.), *Pets and the family* (pp. 175–189). New York: Haworth Press.
- Rohlf, V. & Bennett, P. (2005). Perpetration-induced traumatic stress in persons who euthanize non-human animals in surgeries, animal shelters and laboratories. *Society and Animals* **13**(3), 201–219.
- Roper Starch Worldwide (1994). *Environmental attitudes and behaviors of American youth with an emphasis on youth from disadvantaged areas*. Publication No. ED 381599. Washington, DC: National Environmental Education and Training Foundation.
- Rosegrant, J. (1976). The impact of set and setting on religious experience in nature. *Journal for the Scientific Study of Religion* **15**(4), 301–310.

- Rosengren, K.S., Gelman, S.A., Kalish, C.W. & McCormick, M. (1991). As time goes by: Children's early understanding of growth in animals. *Child Development* **62**, 1302–1320.
- Ross, N., Medin, D., Coley, J.D. & Atran, S. (2003). Cultural and experimental differences in the development of folkbiological induction. *Cognitive Development* **81**(1), 25–47.
- Rud Jr., A. & Beck, A. (2003). Companion animals in Indiana elementary schools. *Anthrozoös* **16**(3), 241–251.
- Ruskey, A., Wilke, R. & Beasley, T. (2001). A survey of the status of state-level environmental education in the United States – 1998 update. *Journal of Environmental Education* **32**(3), 4–14.
- Ryan, R.L. (2005). Exploring the effects of environmental experience on attachment to urban natural areas. *Environment and Behavior* **37**, 3–42.
- Ryan, R.M. & Deci, E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist* **55**(1), 68–78.
- Sabloff, A. (2001). *Reordering the natural world*. Toronto: University of Toronto Press.
- Sadalla, E. & Krull, J. (1995). Self-presentational barriers to resource conservation. *Environment and Behavior* **27**, 328–353.
- Samuelson, C., Peterson, T. & Putnam, L. (2003). Group identity in water resource management. In S. Clayton & S. Opatow (eds), *Identity and the natural environment* (pp. 273–295). Cambridge, MA: MIT Press.
- Sanders, C. (1990). The animal “Other”: Self-definition, social identity and companion animals. *Advances in Consumer Research* **17**, 662–668.
- Sanders, C. (1999). *Understanding dogs: Living and working with canine companions*. Philadelphia: Temple University Press.
- Sandler, R. (2005). Introduction: Environmental virtue ethics. In P. Cafaro & R. Sandler (eds), *Environmental virtue ethics* (pp. 1–12). Lanham, MD: Rowman and Littlefield Publishers.
- Sanginga, P.C., Kamugisha, R.N. & Martin, A.M. (2007). The dynamics of social capital and conflict management in multiple resource regimes: A case of the southwestern highlands of Uganda. *Ecology and Society* **12**(1), 6. Available at <http://www.ecologyandsociety.org/vol12/iss1/art6/> (accessed October 10, 2007).
- Saunders, C. (2003). The emerging field of conservation psychology. *Human Ecology Review* **10**, 137–149.
- Sayre, K. (1991). An alternative view of environmental ethics. *Environmental Ethics* **13**(3), 195–213.
- Schaller, G. (2007). Michael Bond interview: Feral and free. *New Scientist* **2598**, 46–47.
- Scherl, L.M. (1989). Self in wilderness: Understanding the psychological benefits of individual-wilderness interaction through self-control. *Leisure Sciences* **11**, 123–135.
- Schroeder, H.W. (1996). Psyche, nature and mystery: Some psychological perspectives on the values of natural environments. In B.L. Driver, D. Dustin, T. Baltic, G. Elsner & G. Peterson (eds), *Nature and the human spirit* (pp. 81–96). State College, PA: Venture Publishing.
- Schroeder, H.W. (2006). Symbolism, experience and the value of wilderness. *International Journal of Wilderness* **13**(1), 13–18.
- Schultz, P.W. (2001). The structure of environmental concern: Concern for self, other people, and the biosphere. *Journal of Environmental Psychology* **21**(4), 327–339.
- Schultz, P.W., Gamba, R.J. & Unipan, J.B. (2000a). Acculturation and ecological worldview among Latino Americans. *Journal of Environmental Education* **31**(2), 22–27.
- Schultz, P.W., Khazian, A. & Zaleski, A. (2008). Using normative social influence to promote conservation among hotel guests. *Social Influence* **3**, 4–23.
- Schultz, P.W., Shriver, C., Tabanico, J.J. & Khazian, A. (2004). Implicit connections with nature. *Journal of Environmental Psychology* **24**, 31–42.
- Schultz, P.W. & Tabanico, J. (2007). Self, identity, and the natural environment: Exploring implicit connections with nature. *Journal of Applied Social Psychology* **37**(6), 1219–1247.
- Schultz, P.W. & Zelezny, L. (2003). Reframing environmental messages to be congruent with American values. *Human Ecology Review* **10**(2), 126–136.

- Schultz, P.W., Zelezny, L. & Dalrymple, N.J. (2000b). A multinational perspective on the relation between Judeo-Christian religious beliefs and attitudes of environmental concern. *Environment and Behavior* 32(4), 576–591.
- Schuster, R.M., Tarrent, M. & Watson, A. (2005). The social values of wilderness. In H.K. Cordell, J.C. Bergstrom, & J.M. Bowker (eds) (2005). *The multiple values of wilderness* (pp. 113–142). State College, PA: Venture Publishing.
- Schwab, J. (1994). *Deeper shades of green: The rise of blue-collar and minority environmentalism in America*. San Francisco: Sierra Club Books.
- Schwartz, S. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. Zanna (ed.), *Advances in experimental social psychology*, Vol. 25 (pp. 1–65). San Diego: Academic Press.
- Schwartz, S. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues* 50(4), 19–45.
- Searles, H.F. (1960). *The nonhuman environment in normal development and schizophrenia*. New York: International Universities Press.
- Seed, J., Macy, J., Fleming, P. & Naess, A. (1988). *Thinking like a mountain: Toward a council of all beings*. Philadelphia, PA: New Society Publishers.
- Serpell, J.A. (1986). *In the company of animals*. Oxford: Blackwell.
- Serpell, J.A. (1988). Pet keeping in non-Western societies: Some popular misconceptions. In A. Rowan (ed.), *Animals and people sharing the world* (pp. 33–52). Hanover, NH: University Press of New England.
- Serpell, J.A. (1991). Beneficial effects of pet ownership on some aspects of human health and behavior. *Journal of the Royal Society of Medicine* 84, 717–720.
- Serpell, J.A. (2000). Creatures of the unconscious: Companion animals as mediators. In A. Podbersek, E. Paul & J. Serpell (eds), *Companion animals and us* (pp. 108–117). Cambridge, UK: Cambridge University Press.
- Severson, R. & Kahn Jr., P.H. (2005). Social and moral judgments about pesticides and the natural environment: A developmental study with farm worker children. Paper presented at the 20th Anniversary Conference of the Society for Human Ecology, Salt Lake City, Utah, October 13–16.
- Shambaugh, J., Oglethorpe, J., Ham, R. & Tognetti, S. (2001). *The trampled grass: Mitigating the impacts of armed conflict on the environment*. Washington, DC: Biodiversity Support Program.
- Shapiro, K. (1989). Understanding dogs through kinesthetic empathy, social construction, and history. *Anthrozoös* 3(3), 184–95.
- Shaw, B. (1997). A virtue ethics approach to Aldo Leopold's land ethic. *Environmental Ethics* 19, 53–67.
- Shelby, B., Vaske, J. & Donnelly, M. (1996). Norms, standards, and natural resources. *Leisure Sciences* 18, 103–123.
- Shepard, P. (1996). *The others: How animals made us human*. Washington, DC: Island Press.
- Sherkat, D. & Ellison, C. (2007). Structuring the religion–environment connection: Identifying religious influences on environmental concern and activism. *Journal for the Scientific Study of Religion* 46, 71–85.
- Shettel-Neuber, J. (1988). Second and third-generation zoo exhibits: A comparison of visitor, staff, and animal responses. *Environment and Behavior* 20, 452–473.
- Shibata, S. & Suzuki, N. (2004). Effects of an indoor plant on creative task performance and mood. *Scandinavian Journal of Psychology* 45, 373–381.
- Shore, D. (2002). Comment. Panel discussion at the first Conference on Conservation Psychology, Brookfield Zoo, Chicago, IL.
- Shweder, R.A., Much, N.C., Mahapatra, M. & Park, L. (1997). The “big three” of morality (autonomy, community, divinity), and the “big three” explanations of suffering. In A. Brandt & P. Rozin (eds), *Morality and health* (pp. 119–169). New York: Routledge.
- Sia, A.P., Hungerford, H.R. & Tomera, A.N. (1985/1986). Selected predictors of responsible environmental behavior: An analysis. *Journal of Environmental Education* 17(2), 31–40.

- Simmons, I. (1993). *Interpreting nature: Cultural constructions of the environment*. New York: Routledge.
- Simon, H.A. (1973). The structure of ill-structured problems. *Artificial Intelligence* 3/4 181–201.
- Sims, V.K., Chin, M.G., Sushil, D.J., Ellis, L.U. & Jones, R. (2005). Eye movements when judging affect in cats and dogs. Abstract of paper presented at the International Association for Anthrozoology 14th Annual Conference, Niagara Falls, July 11–12.
- Singer, P. (1975). *Animal liberation: A new ethics for our treatment of animals*. New York: Random House.
- Slimak, M.W. & Dietz, T. (2006). Personal values, beliefs, and ecological risk perception. *Risk Analysis* 26(6), 1689–1705.
- Slovic, P., Fischhoff, B. & Lichtenstein, S. (1980). Facts and fears: Understanding perceived risk. In R. Schwing & W. Albers Jr. (eds), *Societal risk assessment: How safe is safe enough?* New York: Plenum Press.
- Smith, M.C. & Pourchot, T. (eds) (2000). *Adult learning and development: Perspectives from educational psychology*. Boulder, CO: NetLibrary.
- Smith-Sebasto, N.J. & Cavern, L. (2006). Effects of pre-and post-trip activities associated with a residential environmental education experience on students' attitudes toward the environment. *Journal of Environmental Education* 37(4), 3–17.
- Snarey, J. & Keljo, K. (1991). In a *Gemeinschaft* voice: The cross-cultural expansion of moral developmental theory. In W.M. Kurtines & J.L. Gewirtz (eds), *Handbook of moral behavior and development: Vol. 1: Theory* (pp. 395–424). Hillsdale, NJ: Lawrence Erlbaum.
- Sobel, D. (1996). *Beyond ecophobia*. Great Barrington, MA: Orion Society.
- Solomon, S., Greenberg, J. & Pyszczynski, T. (2004). The cultural animal: Twenty years of terror management theory and research. In J. Greenbert, S. Koole & T. Pyszczynski (eds), *Handbook of experimental and existential psychology* (pp. 13–34). New York: Guilford Press.
- Sommer, R. (2000). Discipline and field of study: A search for clarification. *Journal of Environmental Psychology* 20(1), 1–4.
- Sommer, R. (2003). Trees and human identity. In S. Clayton & S. Opatow (eds), *Identity and the Natural Environment* (pp. 179–204). Cambridge, MA: MIT Press.
- Sommerville, J.A. & Decety, J. (2006). Weaving the fabric of social interaction: Articulating developmental psychology and cognitive neuroscience in the domain of motor cognition. *Psychonomic Bulletin and Review* 13(2), 179–200.
- Soule, M.E. (1985). What is conservation biology? *BioScience* 35, 727–734.
- Staats, H., Harland, P. & Wilke, H. (2004). Effecting durable change: A team approach to improve environmental behavior in the household. *Environment and Behavior* 36, 341–367.
- Staats, H., Kieviet, A. & Hartig, T. (2003). Where to recover from attentional fatigue: An expectancy-value analysis of environmental preference. *Journal of Environmental Psychology* 23, 147–157.
- Stankey, G., Cole, D., Lucas, R., Peterson, M., Frissell, S. & Washburne, R. (1985). *The limits of acceptable change (LAC) system for wilderness planning*. USDA Forest Service General Technical Report No. INT-176. Ogden, UT: USDA Forest Service.
- Staub, E. (1979). *Positive social behavior and morality, Vol. 2: Socialization and development*. New York: Academic Press.
- Stebbins, R.A. (2005). *Challenging mountain nature: Risk, motive and lifestyle in three hobbyist sports*. Calgary: Detselig Enterprises.
- Stedman, R.C. (2002). Toward a social psychology of place: Predicting behavior from place-based cognitions, attitude, and identity. *Environment and Behavior* 34, 561–581.
- Steg, L. & Sievers, I. (2000). Cultural theory and individual perceptions of environmental risks. *Environment and Behavior* 32(2), 250–269.
- Stern, P. (1992). What psychology knows about energy conservation. *American Psychologist* 47, 1224–1232.

- Stern, P. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues* **56**, 407–424.
- Stern, P., Dietz, T., Abel, T., Guagnano, G. & Kalof, L. (1999). A value–belief–norm theory of support for social movements: The case of environmentalism. *Human Ecology Review* **6**(2), 81–97.
- Stern, P., Dietz, T. & Guagnano, G. (1995). The new environmental paradigm in social-psychological context. *Environment and Behavior* **27**, 723–743.
- Stewart, M.F. (1999). *Companion animal death*. Oxford: Butterworth Heinemann.
- Stoinski, T.S., Lukas, K.E. & Maple, T.L. (1998). A survey of research in North American zoos and aquariums. *Zoo Biology* **17**(3), 167–180.
- Storksdieck, M., Ellenbogen, K. & Heimlich, J.E. (2005). Changing minds? Reassessing outcomes in free-choice environmental education. *Environmental Education Research* **11**(3), 353–369.
- Strum, S.C. (1987). *Almost human: A journey into the world of baboons*. New York: Random House.
- Stuart, S.M. (2005). Lifting spirits: Creating gardens in California domestic violence shelters. In P.F. Barlett (ed.), *Urban place: Reconnecting with the natural world* (pp. 61–88). Cambridge, MA: MIT Press.
- Suedfeld, P. (1991). Levels of anxiety in polar environments. *Journal of Environmental Psychology* **11**(3), 265–275.
- Suedfeld, P. (1997). Homo invictus: The indomitable species. *Canadian Psychology* **38**(3), 164–173.
- Suleiman, R., Budescu, D., Fischer, I. & Messick, D. (eds) (2004). *Contemporary psychological research on social dilemmas*. New York: Cambridge University Press.
- Suzuki, D. & Dressel, H. (2002). *Good news for a change: How everyday people are helping the planet*. Vancouver, BC: Greystone Books.
- Swanagan, J. (2000). Factors influencing zoo visitor's conservation attitudes and behavior. *Journal of Environmental Education* **31**(4), 26–31.
- Syme, G. & Fenton, D. (1993). Perceptions of equity and procedural preferences for water allocation decisions. *Society and Natural Resources* **6**, 347–360.
- Takano, T., Nakamura, K. & Watanabe, M. (2002). Urban residential environment and senior citizens' longevity in megacity areas. *Journal of Epidemiology and Community Health* **56**, 913–918.
- Tangney, J.P., Stuewig, J. & Mashek, D.J. (2007). Moral emotions and moral behavior. *Annual Review of Psychology* **58**, 345–372.
- Tanner, T. (1980). Significant life experiences. *Journal of Environmental Education* **11**(4), 20–24.
- Taylor, A.F., Kuo, F.E. & Sullivan, W.C. (2002). Views of nature and self-discipline: Evidence from inner city children. *Journal of Environmental Psychology* **22**, 49–63.
- Taylor, S.E. (2002). *The tending instinct*. New York: Henry Holt.
- Teel, T. & Manfredo, M. (2006). Wildlife value orientations in the United States. Paper presented at the 20th Annual Meeting of the Society for Conservation Biology, San Jose, CA, June 24–28.
- Tennessen, C.M. & Cimprich, B. (1995). Views to nature: Effects on attention. *Journal of Environmental Psychology* **15**(1), 77–85.
- Terry, D., Hogg, M. & White, K. (1999). The theory of planned behavior: Self-identity, social identity, and group norms. *British Journal of Social Psychology* **38**, 225–244.
- Thomas, K. (1983). *Man and the natural world: A history of the modern sensibility*. New York: Pantheon.
- Thomashow, M. (1995). *Ecological identity: Becoming a reflective environmentalist*. Cambridge, MA: MIT Press.
- Thomashow, M. (2002). *Bringing the biosphere home: Learning to perceive global environmental change*. Cambridge, MA: MIT Press.
- Thompson, R.A. (1993). Socioemotional development: Enduring issues and new challenges. *Developmental Review* **13**, 372–402.
- Throop, W. & Purdom, R. (2002). Wilderness restoration: The paradox of public participation. *Restoration Ecology* **14**(4), 493–499.
- Tofield, S., Coll, R.K., Vyle, B. & Bolstad, R. (2003). Zoos as a source of free choice learning. *Research in Science and Technological Education* **21**, 67–99.

- Tomas, S.R., Crompton, J.L. & Scott, D. (2003). Assessing service quality and benefits sought among zoological park visitors. *Journal of Park and Recreation Administration* **21**, 105–124.
- Tönnies, F. (1957). *Community and Society* (C.P. Loomis, trans.). East Lansing, MI: Michigan State University. (Original work published 1887.)
- Toukhsati, S., Bennett, P. & Coleman, G. (2007). Behaviors and attitudes toward semi-owned cats. *Anthrozoös* **20**(2), 131–142.
- Trope, Y. & Liberman, N. (2003). Temporal construal. *Psychological Review* **110**, 401–421.
- Tuan, Y-F. (1971). *Man and nature*. Washington, DC: Association of American Geographers.
- Tudor, M.T. (1989). *A study of the expert and novice difference in strategies to problem solve an environmental issue using a verbal response*. PhD dissertation, University of Wisconsin-Madison.
- Tuler, S. & Webler, T. (2006). Introduction: Recent research in public participation: A focus on learning. *Human Ecology Review* **13**(2), 148–149.
- Turiel, E. (1983). *The development of social knowledge*. Cambridge, UK: Cambridge University Press.
- Turiel, E. (2002). *The culture of morality: Social development, context and conflict*. New York: Cambridge University Press.
- Turiel, E. (2006). Thought, emotions, and social interactional processes in moral development. In M. Killen & J.G. Smetana (eds), *Handbook of moral development* (pp. 7–35). Mahwah, NJ: Lawrence Erlbaum.
- Turley, S.K. (2001). Children and the demand for recreational experiences: The case of zoos. *Leisure Studies* **20**, 1–18.
- Turner, D. (2000). Human–cat interactions. In A. Podberscek, E. Paul & J. Serpell (eds), *Companion animals and us* (pp. 257–271). Cambridge, UK: Cambridge University Press.
- Turner, D., Riger, G. & Gygas, L. (2003). Spouses and cats and their effects on human mood. *Anthrozoös* **16**(3), 213–228.
- Twigger-Ross, C., Bonaiuto, M. & Breakwell, G. (2003). Identity theories and environmental psychology. In Bonnes, M., Lee, T. & Bonaiuto, M. (eds), *Psychological theories for environmental issues* (pp. 203–233). Burlington, VT: Ashgate Publishing.
- Twigger-Ross, C.L. & Uzzell, D.L. (1996). Place and identity processes. *Journal of Environmental Psychology* **16**, 205–220.
- Twight, B.W., Smith, K.L. & Wissinger, G.H. (1981). Privacy and camping: Closeness to the self vs. closeness to others. *Leisure Sciences* **4**(4), 427–441.
- Ulrich, R. (1984). View through a window may influence recovery from surgery. *Science* **224**, 420–421.
- Ulrich, R. (1993). Biophilia, biophobia, and natural landscapes. In Kellert, S.R. & Wilson, E.O. (eds), *The biophilia hypothesis* (pp. 73–137). Washington, DC: Island Press.
- Unti, B.O. (2002). *The quality of mercy: Organized animal protection in the United States 1866–1930*. Doctoral dissertation, American University, Washington, DC.
- USCOP (US Commission on Ocean Policy) (2004). *An ocean blueprint for the 21st century, final report*. Available at <http://www.oceancommission.gov/> (accessed March 27, 2008).
- USFWS (US Fish and Wildlife Service) (2007). *2006 National survey of fishing, hunting and wildlife-associated recreation – State report: Preliminary findings*. Washington, DC: USFWS.
- Uzzell, D., Pol, E. & Badenas, D. (2002). Place identification, social cohesion, and environmental sustainability. *Environment and Behavior* **34**, 26–53.
- Uzzell, D., Rutland, A. & Whistance, D. (1995). Questioning values in environmental education. In Y. Guerrier, N. Alexander, J. Chase & M. O'Brien (eds), *Values and the environment: A social science perspective* (pp. 171–182). New York: Wiley.
- Valera, S. & Guàrdia, J. (2002). Urban social identity and sustainability. *Environment and Behavior* **34**, 54–66.
- van den Berg, A.E., Hartig, T. & Staats, H. (2007). Preference for nature in urbanized societies: Stress, restoration, and the pursuit of sustainability. *Journal of Social Issues* **63**, 79–96.
- van den Berg, A.E. & ter Hiejne, M. (2005). Fear versus fascination: An exploration of emotional responses to natural threats. *Journal of Environmental Psychology* **25**(3), 261–272.

- Van Vugt, M. (2001). Community identification moderating impact of financial incentives in a natural social dilemma: Water conservation. *Personality and Social Psychology Bulletin* 27, 1440–1449.
- Vaske, J., Donnelly, M. & Heberlein, T. (1980). Perceptions of crowding and resource quality by early and more recent visitors. *Leisure Sciences* 3(4), 367–381.
- Vaske, J. & Kobrin, K. (2001). Place attachment and environmentally responsible behavior. *Journal of Environmental Education* 32, 16–21.
- Vaughan, E. & Siefert, M. (1992). Variability in the framing of risk issues. *Journal of Social Issues* 48, 119–136.
- Verbeek, P. & de Waal, F.B.M. (2002). The primate relationship with nature: Biophilia as a general pattern. In P. Kahn & S. Kellert (eds) *Children and nature: Psychological, sociocultural and evolutionary investigations* (pp. 1–27). Cambridge, MA: MIT Press.
- Vikan, A., Camino, C., Biaggio, A. & Nordvik, H. (2007). Endorsement of the New Ecological Paradigm: A comparison of two Brazilian samples and one Norwegian sample. *Environment and Behavior* 39(2), 217–228.
- Vining, J. (2003). The connection to other animals and caring for nature. *Human Ecology Review* 10(2), 87–99.
- Vining, J. & Merrick, M. (2006). Pet keeping, environmental attitudes and behavior, and quality of life. Paper presented at the 14th International Conference of the Society for Human Ecology, Bar Harbor, ME, October 18–21.
- Vittersø, J., Bjerke, T. & Kaltenborn, B.P. (1999). Attitudes toward large carnivores among sheep farmers experiencing different degrees of depredation. *Human Dimensions of Wildlife* 4(1), 20–35.
- Vittersø, J., Kaltenborn, B.P. & Bjerke, T. (1998). Attachment to livestock and attitudes toward large carnivores among sheep farmers in Norway. *Anthrozoös* 11(4), 210–217.
- Volk, T.L. & McBeth, B. (1998). *Environmental literacy in the U.S.: What should be... what is... getting from here to there*. Rock Springs, GA: North American Association for Environmental Education.
- Vollum, S., Buffington-Vollum, J. & Longmire, D.R. (2004). Moral disengagement and attitudes about violence toward animals. *Society and Animals* 12(3), 209–235.
- von Hassell, M. (2005). Community gardens in New York City: Place, community, and individuality. In P.F. Barlett (ed.), *Urban place: Reconnecting with the natural world* (pp. 91–116). Cambridge, MA: MIT Press.
- von Hofsten, C. (1997). On the early development of predictive abilities. In C. Dent-Read & P. Zukow-Goldring (eds), *Evolving explanations of development: Ecological approaches to organism–environment systems* (pp. 163–194). Washington, DC: American Psychological Association.
- Wackernagel, M., Schulz, N., Deumling, D. et al. (2002). Tracking the ecological overshoot of the human economy. *Proceedings of the National Academy of Sciences* 99(14), 9266–9271.
- Walker, L.J. (1991). Sex differences in moral reasoning. In W.M. Kurtines & J.L. Gewirtz (eds), *Handbook of moral behavior and development: Vol. 2: Research* (pp. 333–364). Hillsdale, NJ: Lawrence Erlbaum.
- Wals, A. (1999). *Environmental education and biodiversity*. Wageningen: National Reference Centre for Nature Management.
- Wals, A.E.J. (2007). *Social learning towards a more sustainable world: Principles, perspectives, and praxis*. Wageningen: Wageningen Academic Publishers.
- Walsh-Daneshmandi, A. & MacLachlan, M. (2000). Environmental risk to the self. *Journal of Environmental Psychology* 20(2), 141–149.
- Ward, P.I., Mosberger, N., Kistler, C. & Fischer, O. (1998). The relationship between popularity and body size in zoo animals. *Conservation Biology* 12, 1408–1411.
- WCED (World Commission on Environment and Development) (1987). *Our common future*. New York: Oxford University Press.
- Webb, N.L. & Drummond, P.D. (2001). The effect of swimming with dolphins on human well-being and anxiety. *Anthrozoös* 14(2), 81–85.

- Weick, K.E. (1984). Small wins: Redefining the scale of social problems. *American Psychologist* **39**, 40–49.
- Weigel, L., Fairbank, J. & Metz, D. (2004). *Lessons learned regarding the “language of conservation”. Memorandum to the Nature Conservancy and the Trust for Public Land*. Denver CO: Public Opinion Strategies; Santa Monica, CA: Fairbank, Maslin, Maullin and Associates.
- Weigert, A.J. (1997). *Self, interaction, and natural environment*. Albany: State University of New York Press.
- Weiss, E.B. (1989). *In fairness to future generations: International law, common patrimony and intergenerational equity*. Dobbs Ferry, NY: Transnational Publishers.
- Wells, N. (2000). At home with nature: Effects of “greenness” on children’s cognitive functioning. *Environment and Behavior* **32**, 775–795.
- Wells, N. & Evans, G. (2003). Nearby nature: A buffer of life stress among rural children. *Environment and Behavior* **35**(3), 311–330.
- Wells, N. & Lekies, K.S. (2006). Nature and the life course: Pathways from childhood nature experiences to adult environmentalism. *Children, Youth, and Environments* **16**(1), 1–24.
- Werner, C.M. (2003). Changing homeowners’ use of toxic household products: A transactional approach. *Journal of Environmental Psychology* **23**, 33–45.
- Werner, C.M., Sansone, C. & Brown, B.B. (2008). Guided group discussion and attitude change: The roles of normative and informational influence. *Journal of Environmental Psychology* **28**(1), 27–41.
- Werner, C.M., Turner, J., Shipman, K., Twitchell, E.S., Dickson, B.R., Brusckie, G.V. & von Bismarck, W.B. (1995). Commitment, behavior, and attitude change: An analysis of voluntary recycling. *Journal of Environmental Psychology* **15**, 197–208.
- Weston, A. (2007). *Creative problem-solving in ethics*. New York: Oxford University Press.
- White, L. (1967). The historical roots of our ecological crisis. *Science* **155**, 1203–1207.
- Wiesenfeld, E. & Sanchez, E. (2002). Sustained participation: A community-based approach to addressing environmental problems. In R. Bechtel & A. Churchman (eds), *Handbook of environmental psychology* (pp. 629–643). New York: Wiley.
- Wilderness.net (2007). *The National Wilderness Preservation System, fast facts*. Available at <http://www.wilderness.net/index.cfm?fuse=NWPS&sec=fastfacts> (accessed August 21, 2007).
- Wilke, H. (1991). Greed, efficiency and fairness in resource management situations. In W. Stroebe & M. Hewstone (eds), *European review of social psychology* (pp. 165–187). New York: Wiley.
- Williams, K. & Cary, J. (2002). Landscape preferences, ecological quality, and biodiversity protection. *Environment and Behavior* **34**(2), 257–274.
- Williams, K. & Harvey, D. (2001). Transcendent experience in forest environments. *Journal of Environmental Psychology* **21**, 249–260.
- Wilson, E.O. (1984). *Biophilia*. Cambridge, MA: Harvard University Press.
- Winter, D. (2000). Some big ideas for some big problems. *American Psychologist* **55**, 516–522.
- Winter, D. & Koger, S. (2004). *The psychology of environmental problems*. Mahwah, NJ: Lawrence Erlbaum.
- Winter, P.L. & Chavez, D.J. (2008). Wildland recreationists’ natural resource management priorities and preferences: A connection to environmental identity. In D.J. Chavez, P.L. Winter & J.D. Absher (eds) *Recreation visitor research: Studies of diversity* (pp. 163–174). General Technology Report No. PSW-GTR-XXX. Albany, CA: USDA Forest Service, Pacific Southwest Research Station.
- Wohlwill, J. & Heft, H. (1987). The physical environment and development of the child. In D. Stokols & I. Altman (eds), *Handbook of environmental psychology*, Vol. 1 (pp. 281–328). New York: Wiley.
- Wolverton, B.C. (1997). *How to grow fresh air: 50 houseplants to purify your home or office*. New York: Penguin.
- Wong, P.T. (2001). *President’s column: A new algebra for positive psychology*. Langley, British Columbia: International Network on Personal Meaning. Available at http://www.meaning.ca/archives/presidents_columns/pres_col_dec_2001_new-algebra.htm (accessed May 4, 2007).

- Wong, P.T.P. (2003). *I'm glad that I'm a nobody: A positive psychology of humility*. Coquitlam, British Columbia: President's column, International Network on Personal Meaning. Available at http://www.meaning.ca/archives/presidents_columns/pres_col_nov_2003.htm. (accessed April 12, 2007).
- Woods, B. (2002). Good zoo/bad zoo: Visitor experiences in captive settings. *Anthrozoös* 15(4), 343–360.
- Woods, M. (1998). Federal Wilderness preservation in the United States. In J.B. Callicott & M. Nelson (eds), *The great new wilderness debate* (pp. 131–153). Athens, GA: University of Georgia Press.
- WorldPublicOpinion.org (2006). *30-country poll finds worldwide consensus that climate change is a serious problem*. Available at <http://worldpublicopinion.org/pipa/articles/btenvironmentra/> (accessed April 25, 2007).
- Xiao, C. & Dunlap, R. (2007). Validating a comprehensive model of environmental concern cross-nationally. *Social Science Quarterly* 88, 471–493.
- Yalowitz, S. (2004). Evaluating visitor conservation research at the Monterey Bay Aquarium. *Curator* 47(3), 283–297.
- Yalowitz, S. & Tomulonis, J. (2004). *Jellies: Living art. Summative evaluation*. Monterey, CA: Monterey Bay Aquarium.
- Zasloff, R. & Kidd, A. (1994). Loneliness and pet ownership among single women. *Psychological Reports* 75(2), 747–752.
- Zavestoski, S. (2003). Constructing and maintaining ecological identities: The strategies of deep ecologists. In S. Clayton & S. Opatow (eds), *Identity and the natural environment* (pp. 297–315). Cambridge, MA: MIT Press.
- Zelezny, L.C. (1999). Educational interventions that improve environmental behaviors: A meta-analysis. *Journal of Environmental Education* 31(1), 5–14.
- Zelezny, L., Chua, P. & Aldrich, C. (2000). Elaborating on gender differences in environmentalism. *Journal of Social Issues* 56, 443–457.
- Zimmer, C. (2008). Sociable and smart. *New York Times* March 4, D1, D4.
- Zimmerman, M.A. (1990). Toward a theory of learned hopefulness: A structural model analysis of participation and empowerment. *Journal of Research in Personality* 24, 71–86.
- Zullo, H.M. & Seligman, M. (1990). Pessimistic rumination predicts defeat of presidential candidates, 1900–1984. *Psychological Inquiry* 1, 52–61.

Index

Page numbers in **bold** refer to pages with tables; page numbers in *italic* refer to pages with figures

- action research, 74, 194
- adaptability, 199
- adaptive management, 51, 199, 203
- Adaptively Relevant Environment, 80
- administrative rationalism, **28**
- adoption programs, 70
- adult learners, 195
- adventure activities, 133, 135–6
- Adventure Experience Paradigm, 134, *135*
- affluence, 21, 160
- affordances, 77, 78
 - influence on behavior, 145
 - landscape preferences, 82
 - wilderness environments, 138
- alienation, 64
- altruism, 46, 199
- animal cruelty, 96
- animal euthanasia, 96
- animal–human interactions, 65–6
 - biodiversity education, 189
 - environmental education programs, 192
 - pet animals, 93–9, *94*
 - wild carnivores, 130–1
 - zoo visitors' experiences, 110, 111, 112
 - see also* human–nature relationships
- animal phobias, 81, 83
- animals
 - and care for nature, 99–100, 192
 - in the home, 91–100, **92**
 - role in identity, 57, 65–6
 - wild, 127, 128–32
- animistic cultures, 65
- anti-littering campaigns, 143, 144, 147
- applied behavioral analysis, 156
- aquariums, 106, 107–16
 - enhancement of viewing experiences, 114, 116
- archaic consciousness, 88
- Association of Zoos and Aquariums, 107
- attachment, 95
- Attention Restoration Theory, 85–6, 117
- attitude change, 152, 155
- attitudes, 19–22
 - behavior relationship, 31, 32, 68, 151–2
 - educational role of zoos, 107, 110–13
 - sustainable behavior promotion, 151–2, 156
 - to urban parks, 117
 - to wild animals, 129, 130–1
 - to wildfire, 128
- attribution of responsibility, 154
- autonomy, 60
- Autonomy Supportive Environments, 151, 176–7
- availability heuristic, 26
- bears, 57, 130, 131, 132
- behavior
 - choices, 30, 144–5
 - external influences, 145–6
 - identity relationship, 68–70
 - incentives, 149
 - internal influences, 147, 149
 - relationship to attitudes, 31, 32, 68, 151–2
 - social norms influence, 147
 - see also* sustainable behavior
- behavior change, 8, 9

- cognitive dissonance theory, 155
 - models, 156–7
 - target behaviors, 143, 144
- behavior choices *see* behavior
- behavior settings, 74
- Belgrade Charter for Environmental Education, 182, 183
- bias, 22
 - in information processing, 24–7
- biodiversity conservation
 - environmental education programs, 188–9
 - see also* international biodiversity conservation
- biodiversity loss, 3–4, 26
- Biodiversity Project, 38, 39
- Biodiversity Support Project, 173
- biological thinking, 79–80, 189–90
- biophilia, 81–4
 - conceptual development, 84
- biophobia, 81
- cardiovascular health of pet owners, 97
- caring for nature, 5–6, 54, 99–100, 191–2
 - moral issues, 43, 44
 - role of wilderness adventure programs, 135–6
 - zoo visitors' experiences, 112
- carnivores, 130–1, 178
- Center for a New American Dream, 160
- central governance, 165
- child development
 - affiliation with nature, 58–9
 - and animals, 46, 57, 96, 192
 - beneficial effects of green spaces, 102, 118–19
 - biological and ecological concepts, 80, 189–90
 - ecophobia, 192
 - empathy, 46
 - environmental generational amnesia, 191
 - identity, 55–8
 - internalization of moral norms, 46
 - memories of place, 55–8
 - moral reasoning, 40, 41–2, 43
 - nature and nurture as factors, 80, 84
 - and participation, 192–5
 - place attachments, 55–6, 56, 57, 58
 - socio-moral development and nature, 46–7
 - zoo design for, 114–16
 - zoo visits, roles in, 109–10
- clinical psychology, 4
- cognition in moral reasoning, 47, 48
- cognitive development
 - beneficial effects of green spaces, 119
 - environmental education, 189–91
- cognitive dissonance, 155
- cognitive maps, 77–8
- cognitive psychology, 4
- cognitive strategies, 203–4
- collaborative decision-making, 52
- collective sustainable behavior, 157–9
- collectivist cultures, 21
- commons dilemma, 30–1, 164–5, 166
 - common pool resources management, 164–8
- community-based, 167, 167–8
 - social capital concept, 168–70
- communion experience, 137
- community-based resource management, 167, 167–8
 - community psychology, 170–2
 - cost–benefit issues, 172–5
 - in developing countries, 169
 - internalization process, 168
 - social capital concept, 168–70, 171
- Community-Based Social Marketing, 156–7
- community identity, 66
- community-level behavior change, 159
- community psychology, 162
 - biodiversity conservation, 170–2
- confidence, 201, 201–2
- conflict situations
 - biodiversity conservation, 178
 - empathy in resolution, 46, 47
 - group identities, 69, 70
 - moral functioning, 42–3, 48, 50
 - preservation areas, local impact, 175
 - social/cognitive disequilibrium, 48, 49
 - wild animal interactions, 130, 131
- conformity, 146
- Connectedness to Nature scale, 62
- connection, 60–1
 - wilderness adventure programs, 135–6
 - zoo visitors' experiences, 112
- consequentialism, 45–8
- conservation
 - awareness following zoo visits, 111
 - definition, 2
- conservation governance, 164–5
 - central, 165
 - community-based resource management, 167, 167–8, 169–70
 - in developing countries, 169
 - land acquisition strategies, 166
 - privatization model, 165

- Conservation International, 164
 conservation psychology
 care for nature, 5–6
 definitions, 2–5
 potential, 7–10
 roots, 6–7
 consumerism, 159–60
 social status relationship, 67
 contingent valuation methods, 19
 controlling environment, 151
 Convention on Biodiversity, 164
 Convention on International Trade in
 Endangered Species, 163
 coping responses, 26–7, 48–9, 203–4
 cost–benefit issues, 172–7
 cougars, 130, 131
 “Council of All Beings” workshops, 58
 culture
 cultural evolution, 84–5, 85
 as factor in conservation, 170–2, 175
 curtailment behavior, 143, 144
 external influences, 145
 incentives, 148, 149
 social norms influence, 147
- deep ecology, 58, 59, 67
 deep flow experience, 138
 defensive thinking, 26, 49–50, 178
 deforestation, 22
 democratic pragmatism, **28**
 deontological ethics, 39–44, 41
 contextual factors, 43–4
 depth psychology, 87–8, 136
 designated Wilderness areas, 122
 quantity of use, 123
 developmental psychology, 4
 Diablo Trust, 70
 discourses, 27, **28–9**, 30
 displacement of populations, 122, 175–7
 dogs, 65, 91–9
 dolphins, 131, 132
 “Don’t mess with Texas” campaign, 70–1
- ecological knowledge
 agroforestry practices in Guatemala, 172
 development, 190–1
 ecological modernization, **29**
 ecological perception, 74–5
 ecological psychology, 74–8
 ecological self, 59, 61, 75
 ecological validity, 74
 economic rationalism, **29**
 ecopsychology, 9–10, 87
 ecosystem services, 19, 173, 174
 education for sustainable development, 185–6
 efficiency behaviors, 143
 Elaboration Likelihood Model of Persuasion, 157
 emotions
 biases, 26–7
 biodiversity conservation influence, 177
 biophilia relationship, 83
 environmental education, 182
 flow experiences, 134, 135
 modulation in conflict situations, 48
 role in consequentialist ethics, 45, 47
 solitude experiences of wilderness, 126
 sustainable behavior promotion, 152–3, 156
 zoo visitors’ experiences, 110, 111
- empathy
 development, 46
 environmental education, 182
 role in conflict resolution, 49, 178
 role in consequentialist ethics, 45–7
 sustainable behavior promotion, 152
 towards animals, 46, 47, 130–1
 zoo visitors’ experiences, 111
- empowerment, 178–9, 183, 203
 energy conservation, 144, 145, 147, 159
 behavioral choice, 30
 prompts, 150, 150
- Environment of Evolutionary Adaptiveness,
 78, 80
- environmental activism, 157–8
 environmental citizenship, 182, 183, 196
 affective dimension, 191
 skills development, 193, 194–5
 environmental degradation as stressor, 198–9
 environmental education, 180–97
 adult learners, 195
 affective factors, 191–2
 biodiversity-focused programs, 188–9
 classroom-based, 186–7, 196, 197
 cognitive development, 189–91
 contemporary trends, 185–9
 definitions, 182
 ecological knowledge, 183, 190–1
 effectiveness, 195–7
 goals, 181, 182, 195
 informal settings, 181
 life-long learning, 184

- need and support for, 183–4
- participation projects, 193, 194
- place-based, 187–8, 196
- pro-environmental activities, 192–5
- problem-solving, 193–4
- psychological foundations, 189–95
- for sustainable development, 185–6
- teacher training, 184
- environmental identity, 59–62
 - children's experiences of nature, 55–8, 120
 - measurement, 61–2
 - social factors, 66–8
 - zoo visitors' experiences, 112
- Environmental Identity Scale, 61, 61, 62, 124, 125
- environmental psychology, 6, 73–4
- environmentalist groups, 158–9
- essentialism, 79–80
- ethics, 25, 35–43
- ethnic differences
 - environmental attitudes, 20
 - urban park utilization, 117–18
 - Wilderness area use, 124–5
- evolutionary change, 190
- evolutionary psychology, 78–81, 84
- experiential approaches to nature, 86–7
- explanatory style, 202–3
- extreme environments, 132, 133, 134
- family planning, 144, 152
- fear, sustainable behavior motivation, 153
- feedback, 151
- fencing, 165
- fishery resource management, 166–7
 - community-based, 167, 167–8
- fishing, 129, 130
- flow experiences, 133–4, 134, 135, 136
- folk biological system, 79, 79–80, 189, 190
- folk ecological knowledge, agroforestry in
 - Guatamala, 171–2
- forest environment experiences, 138
- forest management
 - Guatamala, 170–2
 - Nepal, 169
- framing, 22, 23, 30
 - solitude experiences of wilderness, 126
- functional theory of emotion, 177
- gardening, 100–1, 101, 103–4, 104
 - social context, 104
- gender differences
 - environmental attitudes, 19, 20, 184
 - human–animal relationships, 99
 - risk perception, 24
 - urban park utilization, 118
- gene–culture evolution, 84–5, 85
- global warming/climate change, 3, 23, 26
 - responsibility for addressing problem, 30
- green rationalism, 29
- green romanticism, 29
- green spaces, 16, 68–9, 116–20
 - benefits for children, 118–20, 119
- group norms
 - community-based resource management, 167
 - sustainable behavior influence, 147–8
- guilt-based parental inductions, 46, 47
- Hamill Family Play Zoo, 114–16, 115
- happiness, 160
- health services, 173, 174
- horticultural therapy, 102–3
- house plants, 100, 101
 - health benefits, 101–2
 - horticultural therapy, 102–3
- household waste reduction, 149
- human–nature relationships, 8, 8, 73–88, 106
 - animal–human interactions *see* animal–human interactions
 - cultural belief systems, 22
 - experiential approaches, 86–8
 - focus of environmental psychology, 74
 - interactionist perspectives, 84–6
- humility as environmental virtue, 37, 37, 38
- hunting, 129, 130
- identity, 54–72
 - application to environmental issues, 70–2
 - behavior relationship, 68–70
 - collective, 31, 69, 71
 - concept, 54–5
 - development, 55–8
 - environmental, 59–62
 - place, 62–5, 63, 69
 - role of animals, 65–6
 - self-presentation, 9, 68
 - social, 66–8, 72
- imagery, 26, 191
- Implicit Association Test, 62
- inclusion, 44
- Inclusion of Nature in the Self scale, 61–2

- individualistic cultures, 21
- information processing biases, 24–7
- integrated conservation and development projects, 166
- international biodiversity conservation, 163–79
 - common pool resources, 164–5, 166–8
 - conflict situations, 178
 - cost–benefit issues, 172–7
 - cultural aspects, 170–2
 - displacement of populations, 175–7
 - goals, 164
 - institutions, 162–4, 167–72, 175, 178
 - local knowledge, 170–2
 - models of governance, 164–5
 - psychological biases/emotions, 177
- International Union for the Conservation of Nature, 163
- intrinsic value, 51
- issue investigation and action training, 194

- justice, 40, 43, 44
 - principles for resource distribution, 44

- knowledge
 - environmental education, 189–91
 - sustainable behavior promotion, 151

- land acquisition strategies, 166
- landscape preferences, 81–4, 82, 83
- landscaping, 100–1
- language, 27, 30
 - human–animal relationships, 94–5, 97
 - pragmatist ethics, 50
- lateral thinking, 52
- learned helplessness, 192, 202
- learned hopefulness, 203
- learning, 7
 - adult, 195
 - zoo visitors' experiences, 110–13
- lifestyle change, 144, 159
- light switch prompts, 150, 150
- Limits of Acceptable Change, 127
- local networks, 27
- local user groups, forest management in Nepal, 166

- magic consciousness, 88
- Malpai Borderland Group, 70

- marginalization of displaced populations, 175–6
- marine protection areas, 166–7
- meaning, search for, 204–6
- meaningful experiences, 137
- media coverage, 22–3, 152
- mental consciousness, 88
- mirror neuron system, 46, 95
- moral exclusion and disengagement, 49–50, 50, 130–1, 178
- moral issues, 34–5
 - contextual factors, 43–4
 - deontological approaches, 40
 - psychological dynamics, 48–50
 - role of emotions in reasoning, 47–8
 - social domains, 40–1
 - zoos, 108
- mutualism, 129
- mystical experiences, 137
- mythic consciousness, 88

- national parks, 163
- National Survey on Recreation and the Environment, 124, 125
- nature
 - core understandings, 15–17
 - development of affiliation, 58–9
 - in identity development, 56–7
 - value, 17, 18
 - window views, 102
 - see also* human–nature relationships
- Nature Conservancy, 164
- negative emotions towards nature, 18
- New Environmental Paradigm scale, 20, 21
- niche, 77
- North American Association for Environmental Education, 186
- Northwest Earth Institute, 160

- ocean conservation, 107
- open access problems, 165
- optimism and pessimism, 200–4
 - optimism versus hope, 204
- overcrowding, 3
- ownership, 183

- peace-making, 178
- peace parks, 178, 200
- peak experiences, 133
- perceived peer endorsement, 148

- perception, 75, 76–7
 affordances, 77, 78
 ecological approach, 74, 75–6
 personal reflection, 86
 pet animal trade, 100
 pet animals, 91–100, **92**
 connections with nature, 99–100
 cross-cultural variations, 93
 feral/semi-tame, 96
 health effects, 97–8
 historical background, 92–3
 human–animal relationships, 93–7, **94**
 social effects, 98–9
 physiological psychology, 4
 place attachment, 63–4
 development, 55–6, 56, 57, 58
 place-based education, 70, 187–8
 place dependence, 64
 place identity, 62–5, 63, 69
 social implications, 66
 wilderness experiences, 127
 placelessness, 64
 plant-facilitated therapy, 102–3
 plants in domestic sphere, 100–4
 poisonous plants, 101
 pollution, 3
 poverty, 164, 169, 173
 practical wisdom, 52, 53
 pragmatist ethics, 50–3
 contextual factors, 52–3
 preservation as environmental attitude, 20
 preservation movement, 122
 privacy, 60
 Promethean discourse, 27, **28**
 prompts to sustainable behavior, 150
 prospect theory, 25
 protection-motivation theory, 26
 prudence as environmental virtue, **37**, 38
 psychodynamic moral skill, 48–9
 psychology
 core areas, 4
 definition, 2–5
 public transportation, 146

 rangeland conflicts, 69, 70
 rationalizations, 45, 50
 reactance, 150, 165
 reasoning, 200
 in psychology of morality, 39, 40
 Recreation Experience Preferences, 124

 recycling, 68, 146, 153
 feedback, 151
 incentives, 149
 prompts, 150
 social norms influence, 147
 reframing, 52
 reinforcement contingencies, 148
 religiosity, 22
 religious experiences, 137
 religious virtue, 38
 research approaches, 7, 8
 resource depletion, 3
 resource exploitation
 behavioral choice, 30–1
 moral reasoning, 44
 see also common pool resources
 management; community-based
 resource management
 respect as environmental virtue, **37**, 38
 response to nature, 73–88
 responsibility, 30–1
 attribution, 154
 social identity relationship, 69
 sustainable behavior promotion, 154–5
 restoration of attentional capacity, 85–6, 117
 zoo visitors' experiences, 110
 risk perception, 22–4

 self-efficacy, 61
 sustainable behavior promotion, 153, **154**
 self-presentation, 9, 68
 self-reflection, 60
 self-regulation, 200–2
 shame-based parental inductions, 46, 47
 short-term thinking, 25
 social brain hypothesis, 79
 social capital, 168–70
 community-based resource management,
 171
 education for sustainable development,
 185–6
 social constructs, 15
 social disarticulation of displaced
 populations, 175, 176
 social identity, 66–8
 social interactions
 children in green spaces, 119–20
 zoo visitors' experiences, 110, 112
 social learning, 52, 199
 social marketing approach, 9

- social networks, community-based resource management, 167, 170, 171
- social norms, 9, 85
 environmentalist group activities, 159
 relationship to behavior, 31, 32
 social capital concept, 168, 169
 sustainable behavior influences, 146–7
 wilderness management approaches, 127
- social psychology, 4, 85
- socialization, role in consequentialist ethics, 45, 47
- solitude experiences, 60, 125–7, 136, 137
- spiritual beliefs, role in community-based resource management, 172
- spiritual experiences, wild nature, 136–8, **138**
- Stages of Change approach, 158
- State Education and Environment Roundtable, 186–7
- state matching, 45
see also empathy
- stewardship ethics, 38
- survivalism, **28**, 28
- sustainability, 2, 3
- sustainable behavior, 143–61
 collective behavior, 145, 157–9
 cognitive dissonance theory, 155–6
 determinant factors, 145, 146
 environmental education, 182–3
 external influences, 145–51
 fear-inducing strategies, 153
 feedback, 151
 goals, 151
 incentives, 148–9
 internal influences, 151–6
 personal responsibility perception, 154–5
 prompts, 150
 reminders, 150
 self-efficacy perceptions, 153, 154
 social norms, 146–7
 target behaviors identification, 143–5
- sustainable development, **29**
 environmental education, 185–6
 place identity considerations, 64
- swimming with dolphins, 131, 132
- taxes, 148
- Tbilisi Declaration, 183
- technology choices, 144, 145
- external influences, 146
 incentives, 149
 social norms influence, 147
- Theory of Planned Behavior, 31, 68, 128, 151, 153
- threat responses, 26, 27, 198–9
- totemism, 65
- transcendental experiences, 57, 60, 138
- trees, 19, 58, 100, 149
- trust, 69–70, 169–70, 171, 173, 178, 193
- United Nations Educational, Scientific and Cultural Organization, 163
- urban parks, 106, 116–20
 benefits for children, 118–20, 119
 health benefits, 116, 117
 quantity of use, 117
 social benefits, 117, 118
- utilitarianism *see* consequentialism
- utilization as environmental attitude, 20
- value, 2, 17–19
 constitutive, 51
 cost–benefit issues, 174–5
 environmental education programs, 188
 of local biodiversity, 173
 measurement, 18–19
 pragmatist ethics, 51–2
 relationship to behavior, 32, 68
 sustainable behavior promotion, 152
 transformative, 51
 of wilderness, 123–5
- Value–Belief–Norm model, 32, 32, 68, 152
- value rationality, 52, 53
- virtue ethics, 35–9, 71
 environmental virtues, 37
- Visitor Experience and Resource Protection, 127
- Visitor Impact Management, 127
- visual perception, 76
- Waldkindergarten, 187
- water conservation, 144, 151
- wild animals, 127, 128–32
- wild nature, 121
 attributes, 123
- wilderness, 121–39
 access, 122
 adventure activities, 133, 135–6
 attributes, 123

- challenge, 132–4
- definitions, 121–3
- management activities, 123
- natural features, 127
- problems with numbers of users, 126–7
- remoteness, 132–4
- solitude experiences, 125–7
- spiritual experiences, 136–8, **138**
- use, 123–5
- values, 123–5
- Wilderness Act (1964), 122, 123
- wildfire, 127, 128
- Wildlife Conservation Society, 164
- willingness to pay, 19
- window views of nature, 102
- wolves, 42, 130, 131, 178
- World Wildlife Fund, 164
- worldview, 20, 21
 - religious, 22
- youth participation projects, 183
- zoo volunteers, 71, 71, 110, 113
- zoos, 106, 107–16
 - conservation education activities, 107
 - enhancement of wildlife viewing experiences, 113–14
 - immersion experiences, 114, 116
 - impact on learning/attitudes, 107, 110–13
 - interactive experiences, 113, 114–16, 115
 - moral issues, 108
 - reasons for visiting, 109–10
 - role in identity development, 57
 - visitors' experiences, 52, 108, 110