The Psychology of Environmental Sustainability

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What do pollution, deforestation, the extinction of species, and climate change have in common? You might instantly respond, "They're all environmental problems." But if you stop to think about it, is it really the environment that has the problem? What ties all these issues together is their cause: maladaptive human behavior. Particularly for the last 150 years, humans have been behaving in ways that are unsustainable. We burn fossil fuels that pollute the air and change the climate, dump wastes into water and soil, overconsume resources, and invade the habitats of other species. Because the real problem is destructive human behavior—and underlying thoughts, attitudes, feelings, values, and decisions—psychologists are increasingly applying their expertise to these issues (e.g., Clayton & Myers, 2009; Reger & Winter, 2010). As you will see, psychological insights are critical to the achievement of a sustainable world—one in which human activities and needs are balanced with those of other species and future generations, taking into account ecological as well as social and economic factors (Schmuck & Schultz, 2002).

The earliest psychological research on environmental issues emerged in the 1970s, against a backdrop of growing public concern about air and water pollution and nuclear waste. Most of this research was conducted by environmental psychologists, researchers who study how individuals are affected by, and interact with, their physical environments. Importantly, the term environmental in this context does not refer specifically to the natural environment. Instead, it refers to the interests of environmental psychologists study nature-related topics, such as how spending time in nature restores one's ability to pay attention and cope with stress (Kaplan, 1995). Most environmental psychologists study human-built environments, focusing on topics such as noise, crowding, and urban design.

In the 1990s, holistic thinkers calling themselves ecopsychologists began promoting the idea that modern life robs people's sense of connection to nature, leaving them developmentally deprived and psychologically distressed (Roszak, 1992; Roszak, Gomes, & Kassler, 1995). Convinced by this notion, some clinicians have incorporated ecopsychological therapies into their practices. Their goal is to revive a connection to nonhuman nature that may help people feel better and guide them to behave in more environmentally friendly ways (e.g., Buzzell & Chalquist, 2009). Empirical research testing the validity of the ecopsychological premise has emerged over the past decade, and the first peer-reviewed research journal on the topic, Ecopsychology, made its debut in 2009. Specifically, several researchers have created measures to operationally define (see Chapter 2) the connection to nature (e.g., Mayer & Frantz, 2004; Nisbet, Zolenski, & Murphy, 2009; Schultz, 2000). If we can measure it, we can determine whether it is related to mental well-being and if it predicts pro-environmental attitudes and sustainable behavior, as ecopsychologists propose.

Over the past several years, another label has emerged to describe the work of researchers in traditional branches of psychology (primarily social, behavioral, and cognitive) who study how to promote pro-environmental behaviors (e.g., energy conservation and decrease anti-environmental behaviors (e.g., material consumption). Conservation psychology is defined as the study of the interactive relationships between humans and the rest of nature, with a particular focus on applying psychological theory and research to enhance conservation of natural resources (Saunders, 2003). Some, but not all, environmental psychologists and ecopsychologists see their work fitting this definition.
In the following section, we will review some facts regarding how humans are negatively affecting the larger systems upon which our lives depend. We then go on to illustrate how many subdisciplines of psychology can aid in understanding—and hopefully solving—the foundational problems in people’s thinking and behavior. (Note: A more thorough discussion of these issues is available in Koger & Winter, 2010.)

The Escalating Environmental Crisis

Unless you’ve been living in a cave without social access, you are at least somewhat familiar with the environmental issues currently confronting humanity. In fact, you may even feel tired of hearing the “gloom and doom” reports concerning melting ice caps and rising sea levels, toxic chemicals in the air and water, overpopulation, dwindling forests, and species losses. It may all seem too depressing, overwhelming, and perhaps even terrifying. Or maybe it doesn’t seem to have much to do with you personally, and you feel powerless to make any difference.

Such responses are understandable and consistent with an evolutionary perspective. Human cognitive and perceptual systems evolved in an environment where the primary threats to safety were sudden and dramatic. As a result, people have difficulty responding to slowly developing but potentially calamitous conditions, especially when the consequences seem far away in terms of time or place. People discount distant dangers and take them less seriously than “risks with negative outcomes that occur for sure, now, here, and to us” (Gattig & Hendricks, 2007, p. 22). The tendency is to delay action until problems are large scale and readily apparent rather than working to prevent the problems. Unfortunately, by then it may be too late.

Let’s take, for example, the problem of global warming. Gases such as carbon dioxide, methane, and nitrous oxide trap heat in the atmosphere. The naturally resulting greenhouse effect is necessary to maintain a climate suitable for life on this planet. Gas levels vary naturally to some extent, but as you have probably heard, modern living has created an unprecedented increase in greenhouse gas concentrations (see Figure C.1). Simultaneously, our forests, which act as the lungs of the Earth by converting carbon dioxide to oxygen, have been rapidly shrinking because of logging and the clearing of forest land for other uses. As a result, carbon dioxide in the atmosphere is at its “highest level in 650,000 years” (Gardner & Prugh, 2008, p. 3) and is clearly correlated with planetary warming (see Figure C.2). Although it is not possible to establish causation from these correlational analyses, the “scientific consensus is that global warming is happening and that it is induced by human activity” (Associated Press, 2010).

The years between 2001 and 2011 were eleven of the twelve warmest since 1850, when recording of global temperatures began. January 2012 was the 32nd consecutive month with a global temperature higher than the 20th-century average (National Oceanic and Atmospheric Administration, 2012). The trends suggest that warming greenhouse gases, including CO2 and methane, will continue to rise if current industrial and social practices do not change dramatically and quickly. In its most recent report, the Intergovernmental Panel on Climate Change (2007) predicted that the planet could warm as much as 11 degrees Fahrenheit by 2100. That may not sound like much, but let’s put that number in perspective: during the last ice age the world was only 9 degrees cooler than it is today. Thus, we are facing the real possibility of planetary temperature changes of ice age magnitudes within this century.

You may be wondering why the warming of the planet matters. It matters because of the associated global climatic changes. For example, we are already witnessing melting of the Earth’s ice caps, and it’s not just the polar bears that are in trouble. Melting ice is threatening people living on islands and near the ocean because it leads to rising sea levels, erosion, and flooding. A recent report states that the melting is happening so quickly that sea levels may rise 5 feet in this century (Ritter, 2011). This means that U.S. coastal cities such as Miami, New Orleans, Tampa, and Virginia Beach could lose more than 10% of their land by 2100 (Weiss, Overpeck, & Stuiver, 2011).

Climate changes will mean flooding in some regions and drought in others. Tornadoes, typhoons, and hurricanes will likely become more intense. The U.S. Centers for Disease Control and Prevention (2009) are gearing up in anticipation of the possibility of millions of people suffering from malnutrition, disease, and injury as a result of extreme weather. These physical hardships will have significant mental health impacts. Loss, disruption, and displacement, as well as worry about future consequences, will create profound stress. There will likely be an increase in acute and posttraumatic stress disorders and related problems such as anxiety, substance abuse, grief, depression, and suicide (Fritze et al., 2008). And, of course climate change will affect everyone, not just people in flooded or drought-ridden areas. As many as 20%–30% of known plant and animal species are at an increased risk for extinction because of climate change. Species extinction means a
decrease in the biodiversity that is necessary to maintain healthy ecosystems (Lovejoy & Hannah, 2005)—ecosystems on which we all rely for basic life support.

Given the dire nature of these predicted outcomes, why aren’t people responding collectively and as individuals to reduce use of fossil fuels and associated emissions? As Harvard Psychologist Daniel Gilbert (2006) put it, “Environmentalists despair that global warming is happening so fast. In fact, it isn’t happening fast enough.” Humans respond best to threats that are “PAINful: i.e., Personal, Abrupt, Immoral, and happening Now” (Gilbert, 2008; see also Frantz & Mayer, 2009). But, despite the “hard-wiring” of the human brain that makes it difficult for people to anticipate and plan for long-term problems on the scale of global climate change, our species is capable of dramatic and rapid behavioral change. Consider, for example, the pace of the technological revolution. As undergraduates, the two of us relied on typewriters for writing papers after engaging in library research with massive printed publication indexes and bound volumes of journals. (Can you imagine?) Now, the idea of using anything other than high-speed computers and the Internet to conduct research and write papers seems horribly inefficient and cumbersome. In theory, the human capacity for behavioral adaptation could help us reverse current ecological trends.

However, before someone changes his or her behaviors, that person must recognize which behaviors need changing, know how to change them, and feel that changing them is worthwhile. In fact, the majority of people will not even initiate change until they experience a personal crisis (Bedloe et al., 2009), commonly known as “hitting bottom.” or until risks become salient and personally relevant. Breaking any addiction—whether to unsustainable consumption, to substances like alcohol, or to the Internet requires patience and perseverance because most people relapse (i.e., fall back on old habits). This perspective from the psychology of addiction helps us understand why many people don’t feel galvanized to respond to issues like climate change. Such environmental risks probably don’t seem personally relevant to most people. What does environmental destruction have to do with you as an individual? You yourself do not produce industrial wastes or log forests. What, then, is each person doing to deplete the capacity of the planet to sustain human life? The best way to address these questions is to consider individuals’ extravagant use and misuse of the world’s natural resources.

Human impacts on the planet can be estimated by using the ecological footprint—a measure of how fast a person (or population) consumes resources and generates waste in comparison to how rapidly nature can absorb the waste and replenish the resources (see Figure C.3). People who live in the United States have the largest footprints in the world, consuming considerably more resources and generating more waste than any other people on the planet. Unfortunately, the gap between this ecological footprint and the planet’s carrying capacity is growing at an alarming pace (see Figure C.4). “If everyone in the world had an ecological footprint equivalent to that of the typical North American or Western European, global society would overshoot the planet’s biocapacity three to five fold” (Kates et al., 2008, p. 468). In other words, if everyone lived like those in the United States do, more than three additional planets would be needed to support this lifestyle.

People living in the United States are by far the biggest users of the world’s energy. Less than 5% of the global population lives in the United States, and the country holds only about 3% of the planet’s oil (Kranzler, 2005), yet U.S. residents use a staggering 25% of the total commercial supply: 18,771,000 barrels of oil per day—72% of which is used for transportation (U.S. Energy Information Administration, 2010). The next largest consumer is China, but consider this: China has four times the population of the United States and uses less than half of the amount of oil. Each person in the United States uses, on average, more than thirty times the amount of gasoline as the average person in a developing country (World Resources Institute, 2003). This “addiction to oil” is fostering a dangerously unstable international political climate. Middle Eastern countries rest on more than 60% of the planet’s oil reserves, inspiring military-based foreign policies that emphasize control and access (e.g., Winter & Cava, 2000). Wars over access to resources including oil will likely become more common.

Amazingly, much of this huge expenditure of energy is wasted (Miller, 2007). People in North America waste over 43% of their energy by selecting energy-inefficient automobiles, appliances, and home heating systems when more efficient choices are available. Energy expert Amory Lovins puts it plainly, “If the United States wants to save a lot of oil and money and increase national security, there are two simple ways to do it: Stop driving Petroligs and stop living in energy savers” (quoted in Miller, 2007, p. 385).

**Figure C.4** Trends in the collective ecological footprint of the United States. This graph shows how the ecological footprint of the United States has increased dramatically since the 1970s in relation to the decreasing carrying capacity that our habitat can support. Carrying capacity, or "biocapacity," varies depending on ecosystem management, agricultural practices (such as tillage, crop rotation, deforestation, and nitrogen fertilization), soil erosion, and weather. Overall, biocapacity is diminishing as population pressures, changing climates, and urbanization degrade land and other resources. As you can see, the trends are not encouraging.


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Those living in the United States also overuse and abuse water. The toxic chemicals used in industrial production, as well as those used to keep pests like bugs and weeds, clean houses, and even groom and beautify people and pets, are polluting groundwater, lakes, rivers, and oceans. Demand for water from growing populations in arid locations is lowering reservoirs and aquifers. At least one-quarter of the groundwater that is currently withdrawn is not being replenished. For example, Las Vegas has doubled in population since 1980. The city gets 90% of its water from the Colorado River, which is experiencing the worst drought in its recorded history (Hutchinson, 2007). Already more than 1 billion people on the planet do not have safe drinking water. In contrast, people in the developed world pollute and waste gallons of drinking-quality water every time they flush the toilet.

The wasteful use of energy and water are two of the primary contributors to the enormous ecological footprint of the U.S. population. Another major factor is diet. Livestock farming produces more greenhouse gases than transportation (Food and Agriculture Organization of the United Nations, 2006), and it has been estimated that it takes 600 gallons of water to produce just one hamburger (Kreutz, 1991). Recently, Japanese researchers have estimated that the CO2 emissions associated with the production of just 2.2 pounds of beef is equivalent to the amount emitted by an average European car every 155 miles (Bittman, 2008). Thus, if U.S. citizens merely decreased meat consumption by 25%, the energy savings and reduction in greenhouse gases would be equivalent to all of us trading in our average sedans for a Prius (Walsh, 2008). Yet, as a result of increasing affluence in other parts of the world and a rapidly expanding global population, worldwide meat consumption is projected to rise 53% by 2050 (World Resources Institute, 2010).

Most people in the United States regularly eat food that is out of season or does not grow in their region. This means that their food must travel long distances to get to them. It is typical in the United States for food to travel more than 1500 miles from its source to the dinner table (Pirig & Benjamin, 2003). Popular convenience foods are subject to energy-intensive processing and are packaged in containers and wrappers that cannot be reused or recycled. Further, 34 million tons of food is wasted every year in the United States (U.S. Environmental Protection Agency, 2011), about 39% of the edible food supply (Stokstad, 2009). Much of that food ends up in landfills, and as it rots it releases methane, a greenhouse gas that is twenty times more powerful than carbon dioxide at trapping heat in the atmosphere (U.S. EPA, 2011).

Energy, water, and food are not the only major areas of environmental concern. In fact, overconsumption of consumer goods constitutes the biggest drain on the Earth’s carrying capacity. Many people suffer from affluenza, an “unsustainable addiction to overconsumption and materialism” (Miller, 2007, p. 19). Those who are addicted to consumption use shopping as a coping strategy similar to smoking, drinking, or surfing the Internet. Each person in North America consumes, directly or indirectly, vastly more raw materials than those in developing countries and even more than people in other developed nations. And the things people buy—clothes, electronics, cars, furnishings—are produced from materials that leave a long trail of pollution elsewhere that is invisible to the U.S. consumer. A pair of pants made of polyester and sold in an American department store may be sewn in a sweatshop in Indonesia, from synthetic material manufactured in Singapore, which comes from farmed and highly productive people all over the world. There are many examples to show that people in developing countries are aiming for “the good life,” hurrying to develop the same extravagant lifestyles modeled in movies, television, advertising, and tourism.

Conspicuous consumption of convenience foods and consumer goods yields astonishing amounts of solid waste. Each person in North America generates more than 4.5 pounds of garbage per day (Miller, 2007). People throw away approximately 2.5 million nonreturnable plastic bottles every hour and toss about 25 billion Styrofoam coffee cups in the garbage each year. Electronic waste, or “e-waste,” is growing exponentially. Every year, people living in the United States discard an estimated 139 million cell phones and 100 million computers, monitors, and television sets, only recycling about 10% (Miller, 2007). But even careful household recycling will not change the biggest solid waste problem. Commercial and industrial activities generate 98.5% of the waste. Average citizens sponsor this enormous waste production every time they buy a product that was inefficiently manufactured, is overpackaged, is not recyclable or biodegradable, or has traveled a long distance to get to them (which describes the vast majority of consumer products, including some that are misleadingly labeled “eco-friendly”).

Ironically, there is evidence that overconsumption is not “delivering the goods.” Rather, happiness is predicted by quite different kinds of “savings and reduction of energy and water use,” fulfilling work, and a positive outlook—not how much stuff we own (see Chapter 9). In fact, the race to pay for material possessions is likely to detract from these primary ingredients of happiness. Thus, attempting to meet psychological needs through overconsumption jeopardizes not only people’s physical habitat but also their psychological well-being (Kaiser & Ranen, 2004). You may have heard of the 3 Rs: Reduce, Reuse, Recycle. But effective solutions to environmental problems must start with Refusing to buy things that aren’t really necessary and choosing sustainably produced options for the things that are (Miller, 2007).

As we read this section, did you feel despair? Anxiety? Irritation? Hopelessness? Did you scan the material, thinking to yourself that you already knew it? Did you find yourself growing overwhelmed, angry, or afraid? Did you feel guilty, defensive, or skeptical? Did you feel a sense of apathy? These psychological reactions are important because they determine how serious people are about what they are willing and able to do about them. In fact, the environmental crisis we face has been named the “pivotal psychological reality of our time” (Macy, 1995, p. 241). It would be naive to suggest that any one academic discipline will provide all the solutions to the environmental crisis; however, as we will show in the following sections, psychology has a lot to offer for understanding the roots of environmental destruction, the psychological forces maintaining it, and what it will take for people to change.

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intentions do not necessarily result in behavior. Most people endorse environ- mentally responsible behaviors such as recycling, but depending on the situation their actual behavior may be quite different. Social psychologists have seen light use disparities between attitudes and behavior.

In the 1970s, the United States had a general injunctive norm against littering. Still, in some places the descriptive norm is to litter. Researchers tested how these norms interact to influence behavior. They found that in a littered setting, seeing a confederate litter made participants more likely to litter; however, in a clean setting, participants who saw a confederate litter were less likely to do so themselves, as compared to those who saw no littering behavior. Can you figure out why? It’s because the stark contrast between the clean setting and the confederate’s littering brought to mind the injunctive norm against littering (Cialdini et al., 1990).

Though social psychologists focus on the power of situational influence, they recognize that behavior is also shaped by internal factors such as attitudes and values. Individuals whose behavior is guided by egocentric and materialistic values that emphasize personal wealth and status tend to exhibit fewer environmentally friendly actions (Schultz et al., 2005). Still, biocentric values are no guarantee of environmentally friendly behavior. There is often a gap between people’s attitudes and their behaviors. Even individuals with pro-environmental attitudes often find that situational constraints can make it difficult (or costly, inconvenient, or awkward) to act in an attitude- consistent manner (Kollmuss & Agyeman, 2002).

Sometimes when individuals behave in an attitude-discrepant way, they experience cognitive dissonance, an uncomfortable state of arousal that motivates them to change their behaviors or their attitudes to bring them in sync with each other (Festinger, 1957; see also Chapter 12). In a few studies, researchers have successfully induced a state of cognitive dissonance that led to increased environmentally friendly behavior. For example, students on their way to the gym were intercepted and asked whether they ever wasted water (all did) and whether they would sign their name to a public message about the importance of water conservation (all did). Researchers lurking in the locker room found that these students took shorter showers after their workouts than students who hadn’t been reminded of their own hypocritical behavior (Dickerson, et al., 1992). However, as long as individuals can justify their attitude-discrepant behavior to themselves, dissonance will not be aroused and their behavior is unlikely to change.

Many environmental problems result from people acting out of self-interest in the moment, ultimately harming the greater whole. Social dilemmas contribute to environmental degradation in several ways (e.g., Gardner & Stern, 2002; Oswaldtson & Sheldon, 2002; Vlek & Steg, 2007):

- First, in commons dilemmas, individuals take more than their fair share of a communal resource (such as oil or water).
- Second, in public goods dilemmas, individuals contribute less than their fair share to a communal resource (such as not wanting to pay higher taxes for bus services).
- Third, in risk dilemmas, an individual’s behavior exposes the greater whole to hazards (e.g., a homeowner uses toxic herbicides because he wants a green lawn).
- Fourth, ecological dilemmas occur when acting from self-interest upsets larger systems (e.g., a landowner fills in a wetland on his property, thereby interfering with waterfowl migration).

In these examples, rewards to the individual are more immediate and compelling than the delayed costs to the population. People don’t always act in self-interest, however. Individuals will sometimes forgo personal benefits in favor of a common goal (such as driving less to reduce global emissions) if they identify with the group and feel responsible toward it (Dawes, 1980; Van Vugt, 2002) and if they perceive the long-term benefits as personally relevant (Milinski et al., 2008).

The founder of experimental social psychology, Kurt Lewin, emphasized that behavior is a function of both the situation and the person. How people define their self-concepts and their social identities certainly has implications for environmentally relevant behaviors. For example, negative stereotypes about environmentalists discourage some individuals from behaving in overtly sustainable ways. (Do you know anyone who is afraid of being perceived as a “tree hugger”?) Recently, some social psychologists have turned their attention to the notion of the ecologically connected self. Theoretically, the more one defines oneself as part of nature, the more empathy one should have for other living things (Brugg, 1996). Several studies support the idea that an ecologically connected self is positively correlated with environmentally friendly attitudes and behaviors (e.g., Clayton, 2003; Mayer & Franz, 2004; Schultz, 2001). Yet, it is probably safe to say that the self-concepts of most people living in industrialized countries today lack a sense of ecological connection.

**Insights from Theories of Personality**

As you learned in Chapter 11, one of the earliest personality theorists was Sigmund Freud, who believed that personality is shaped by how one resolves unconscious conflicts in early childhood. Because most of Freud’s ideas cannot be empirically tested, they have inspired vigorous criticism. Still, his suggestion that people use unconscious defenses to ward off emotional discomfort seems relevant for understanding environmental issues. Awareness of the probable collapse of the planet’s ecosystems should trigger powerful and uncomfortable feelings, but people often fail to act on those feelings. If people do use ego-protective defense mechanisms as proposed by Freud and his daughter Anna (A. Freud, 1938), this may explain how people can “know” about environmental problems and yet not change their behaviors.

Four defense mechanisms seem particularly applicable to people’s environmentally unfriendly behaviors. **Rationalization** is one of the most common. For instance, people may feel guilty about driving alone, they convince themselves, “I have to drive because carpooling is too inconvenient. Identification leads people to purchase nonessential status symbols so they can feel good about themselves. Denial about environmental problems includes minimizing their severity, seeing them as irrelevant, and seeing oneself as not responsible (Opotow & Weiss, 2008). Finally, **projection** occurs when people perceive in others what they fail to perceive in themselves. One of us recalls vehemently grumbling about all the cars on the road during rush hour, only to be reminded by her 3-year-old in the backseat, “But Mommy, you’re traffic, too!”

Contemporary personality theorists focus on traits, rather than unconscious motivations. Some personality traits are associated with caring for nonhuman nature. For example, Broida and colleagues (1993) found that college students classed as Introverted and Feeling on the Myers-Briggs Type Inventory tended to be more ecologically concerned and more opposed to animal experimentation than other personality types.
Mathews and Herzog (1997) administered the Sixteen Personality Factor Inventory to college students and found that two personality factors—sensitivity and imaginativeness—were positively correlated with attitudes toward animals. Furnham, McManus, and Scott (2004) measured the Big Five personality traits and found that openness was positively related to liking of animals and believing that animals have feelings. More recently, researchers have found a positive relationship between openness and general environmental concern (Hilirsh, 2010) and pro-environmental behaviors (Markowitz et al., 2012).

**Insights from Behavioral Psychology**

As you read in Chapter 6, one of the best-known behavioral psychologists, B. F. Skinner, argued that what people do depends on the consequences of their behavior: reinforcement encourages behavior, while punishment discourages it. Toward the end of his career, Skinner took a particular interest in environmental issues. In an address to the American Psychological Association, he criticized the efforts of environmental activists as inconsistent with operant learning principles. He said they should stop inspiring guilt, fear, and shame to motivate greener behaviors. Instead, they should help individuals see the potentially reinforcing consequences of sustainable lifestyles (Skinner, 1987). Yet, the benefits associated with environmentally damaging behaviors are often more obvious than the rewards of environmentally sustainable behaviors. For instance, can you think of any environmentally unfriendly behaviors that are rewarded by convenience or social status? Is it harder to think of environmentally friendly behaviors that are similarly reinforced?

One of the most common ways governments and companies reinforce pro-environmental behavior is through financial rewards. Although temporary incentives, such as tax rebates, can help motivate greener choices, their effectiveness may be limited. Often, when the incentive goes away (Abrahamse, Weyant, & Loucks, 2005; Lehman & Geller, 1994), people tend to revert to their previous habits. For example, imagine being reimbursed for energy-efficient driving not only by earning virtual dollars to buy online merchandise but also by earning points that would all of your Facebook friends know how green you are—and how much greener you are than they (Pritchard, 2010). By creating social status competition, researchers have been able to motivate people to choose less desirable but greener products over more luxurious nongreen products, especially when the greener product was the more expensive option and their choices were made public (Griskevicius, Tybur, & Van den Bergh, 2010).

Besides the use of reinforcement, another behavior modification strategy involves altering discriminative (antecedent) stimuli (see Chapter 6). For example, prominently placed signs in areas where drinks are consumed serve as prompts to recycle cans and bottles (Lehman & Geller, 2004). Another example is placing signs over light switches reminding people to turn off the lights when they leave a room. Research suggests that the more specific the prompt, the greater its effectiveness. A sign saying "Facuity and students please turn off lights after 5 pm" is more effective than one reading "Conserve Electricity." Police prompts are more effective than demanding ones (the more pleasant one can make a difference, and the closer the prompt is to the point of behavior, the better (a sign over a light switch is more effective than a sign across the room). Thus, polite, salient, and specific reminders can change behavior (Geller, Winett, & Everett, 1983; Lee, & Geller, 2004).

Although providing information is a technique widely used by environmental groups, there is little evidence that education alone changes what people actually do (see reviews by Abrahamse et al., 2010; Gardner & Stern, 2003; Lehman & Geller, 2004). Moreover, environmentally more effective messages are often less effective than the original. For example, in a study in which participants were exposed to a video showing a person turning down a thermostat, wearing warmer clothes, and using heavy blankets. With this treatment, viewers reduced their energy use by 28% (Winett et al., 1982). A more recent study involved users of a Facebook application that had been posting and commenting on climate change news stories. Though participants reported increases in both their knowledge about climate change science and their pro-environmental behavior, importantly, they claimed that it wasn’t the information that motivated their behavior change; it was the peer modeling they witnessed in the online community (Robelia, Greenhow, & Burton, 2011).

**Insights from Cognitive Psychology**

From the perspective of cognitive psychology, much environmentally destructive behavior is maintained by cognitive biases such as those described in Chapter 8. The tendency to deal with mental shortcuts called heuristics can lead to underestimation of the risks of environmental hazards. For example, the availability heuristic may explain why people downplay the significance of global warming. Most of us can’t easily visualize melting ice caps and rising sea levels, so the perils of climate change don’t easily come to mind. On the other hand, environmental hazards that have received dramatic media coverage, such as oil spills, feature prominently in our memories. Therefore, we may devote a lot of attention and resources to the vivid events, while neglecting the less vivid, but more insidious, hazards (Gardner & Stern, 2002).

Although the use of mental shortcuts is automatic, it is possible to temporarily override this tendency. When people are sufficiently motivated and not mentally overloaded, they are capable of careful, logical, effortful reasoning. The key may be for each person to increase his or her awareness of the potential for errors in thinking. In this way, individuals will become better environmental decision makers... or will they? The question is whether "coldly rational" judgments are always superior to emotionally driven ones when it comes to environmental issues (Slovic et al., 1986). For example, after reading a description of nuclear energy that emphasized the negatives ("Waste is high; it is radioactive and contaminated with plutonium, a deadly element"), participants not only raised their estimates of the risks of nuclear power (as would be logically expected) but also lowered their estimates of the benefits of nuclear power—even though the description had not said anything about benefits. The researchers explained this change in participants’ benefit estimates as being due to an overall increase in negative feelings about nuclear power (Finucane et al., 2000). Participants who had used the affect (emotion-based) heuristic in making their judgments. Clearly, heuristics may sometimes bias people in an anti-environmental direction and sometimes in a pro-environmental direction.

Many cognitive biases protect people from threats to their self-esteem and feelings of security. They help people feel good about themselves in spite of their behavior or circumstances. Comparative optimism means individuals to believe they are less vulnerable than other people to all types of risks, including environmental threats, even though objectively there is no reason to think the risks are any different for one individual versus another (Pahl, 2005). False consensus helps people maintain positive self-esteem by convincing themselves that many others engage in the same undesirable behaviors as they do. For example, when a water shortage prompted a temporary shower ban at Princeton University in 1999, researchers conducted a 5-day field study during and after the ban (Bemot & Norton, 2003). They found that students who ignored the ban and showered as usual overestimated how many other people were similarly irresponsible. Finally, false polarization is the tendency to perceive the views of those on the opposite side of a debate as more extreme than they really are. In the shower ban study, participants believed that people who showered cared much less about the greater good than those who did not shower. However, self-report data suggested that the actual attitudes of those two groups were quite close. Can you see how this cognitive bias might contribute to the current political divide between Democrats and Republicans in the United States when it comes to environmental issues?
**Insights from Developmental Psychology**

The discipline of psychology emerged in an urban-industrialized context during the last century. This is probably why developmental psychologists have largely overlooked the vital role that nature plays in human’s cognitive, emotional, and social development. Only since the 1990s have some developmentalists turned their attention toward topics such as children’s relationship with animals, their understanding of life and ecological systems, their moral reasoning about environmental issues, and the implications of their experiences (or lack thereof) in natural settings.

Developmental psychologists have almost completely neglected the study of children’s relationship with animals. This is surprising given that animals are a primary focus in children’s lives: as companions (live, stuffed, or imaginary), as captive or wild specimens, as characters in books and films, and as creatures the children themselves pretend to be. Recently, however, few developmental psychologists have proposed that in order to fully understand development, researchers must extend the list of important childhood influences to include animals—perhaps even putting them at the top of the list (Mebbon, 2001; Myers, 2007).

As you may know from personal experience, one thing children learn about through their experience with animals is death. But even without firsthand experience, young children intuitively perceive, categorize, and think about living things differently than nonliving things—and they see connections among plants, animals, and humans. This naive understanding of nature is called folklore (Inagaki & Hattano, 2002). Seeing the similarities between themselves and other species inspires children to see nature as “something worthy of moral consideration” (Gebhard, Nevers, & Billman-Mahche, 2003, p. 92). Indeed, research on children’s moral reasoning suggests that humans sometimes adopt a biocentric perspective, where they view plants and animals as having rights and as deserving respect, just as people do. In several cross-cultural studies, children showed strong moral prohibitions against pollution, damage to natural systems, and other species (reviewed in Kahn, 2003). Research on children’s folklore and environmentally related moral reasoning will not only broaden our understanding of cognitive development in general but may also help psychologists to better understand why and how animals’ unsustainable behaviors may be influenced by anthropocentrism (human-centered thinking and ignorance about ecology).

Increasingly, child development experts are becoming convinced that children need outdoor experiences to fully develop their emotional, physical, mental, and social capabilities (e.g., Kahn & Kellert, 2002), a theory that captured the attention of the general public with the publication of Last Child in the Woods: Saving Our Children from Nature Deficit Disorder (Louv, 2005). Children may need opportunities for spontaneous and independent play in natural areas to fully develop their perceptual systems, their love relationships, and a sense of self (e.g., Kellert, 2002). Experiences in nature may also be vital for children’s mental health. Children living in rural communities with more “nearby nature” have less psychological distress, including anxiety and depression, and fewer conduct disorders, such as bullying, than those living in urban areas (Wells & Evans, 2003). And recent studies suggest that symptoms of attention deficit hyperactivity disorders can be ameliorated by time spent in natural settings (Haber Taylor & Kuo, 2009; van den Berg & van den Berg, 2011).

Unfortunately, many children today spend very little time outside, and when they do go out they experience only degraded and polluted conditions, making identification with nature more difficult (Kahn, 2007). More time inside generally means more screen time—as much as 6 to 9 hours per day engaged with electronic media (Roberts, Foehr, & Rideout, 2005). Technology bombards children with images and advertisements that promote an environmentally destructive consumer culture (Kassner, 2002; Linn, 2008). Further, time spent inside stunts children’s understanding of, and appreciation for, the natural world. Research on adults suggests that experiences in nature during childhood—and having family members who modeled appreciation for nature—are significant predictors of a pro-environmental orientation (e.g., Guiney & Oberhauser, 2009; Horwitz, 1996). In fact, some investigators have argued that love of nature and concern about its protection are developed only with consistent outdoor experiences (Chawla, 1998). This means that children who spend most of their time indoors may be ultimately less likely to engage in pro-environmental actions.

**Insights from Health and Clinical Psychology**

You read in Chapter 13 about the physiology of stress and its associated behavioral and health problems. It turns out that many aspects of contemporary environments that are ecologically unsound are also significant human stressors. Urban noise, traffic, overcrowding, pollution, and living near toxic industries or waste sites are all associated with increased stress and related symptoms such as anxiety, depression, anger, and aggression (Kuo & Sullivan, 2001; Landsberg, 1998). The effects of catastrophic environmental events can cause posttraumatic stress disorder (see Chapter 14). For example, mental health services were needed to treat depression, anxiety, and PTSD in approximately 250,000 survivors of Hurricane Katrina in 2005 (Siegel, 2007).

In the manufacture, use, and disposal of thousands of industrial and household chemicals are causing or contributing to increased rates of various forms of cancer, birth defects, reproductive abnormalities, immune system dysfunction, neurological impairments, and developmental disabilities, all significant stressors in their own right (e.g., Kogevinas, Schettler, & Weis, 2005, U.S. EPA, 2008). More than 85,000 chemicals are currently registered with the Environmental Protection Agency, including commonly used pesticides and household chemicals (e.g., paint thinners, cleaning agents, bleach). In addition, certain ingredients in plastics, electronics, and cosmetics are known to be toxic to humans and other animals. The net result is deteriorating health of human beings on physical, mental, emotional, and social levels, as well as degradation of the planet. The health of humans is directly related to the health of the planet Earth.

Perhaps not surprisingly, people strongly prefer healthy, natural settings that include bodies of water, plants, trees, and sunlight over urban environments filled with buildings and cars (Kaplan & Kaplan, 1989; van den Berg, Hartig, & Stants, 2007). Walking in natural settings, or simply having views of plants, can alleviate symptoms of stress (e.g., Kaplan & Kaplan, 1989) by activating the parasympathetic nervous system (see Chapters 3 and 13), providing recovery by reducing blood pressure and heart rate. Activities such as gardening, caring for indoor plants, and interacting with nonhuman animals such as pet dogs can all reduce stress (Frumkin, 2001). Spending time in nature can also provide recovery from prolonged work and concentration. You can probably relate to the worn-out feeling that accompanies intense studying during midterms and final exams. As little as 20 minutes spent in a natural setting has been shown to relieve this attentional fatigue (Berman, Jonides, & Kaplan, 2008).

Given their restorative benefits, natural environments have long been used in outpatient and nature-immersion therapies (Chalquist, 2009). For instance, Jordan and Marshall (2010) point out that Fred put his clients outside for analytic walks during experience with animals during childhood can have an impact on people’s attitudes about nature in general, not to mention their feelings about the importance of preserving endangered species.
What You Can Personally Do

I am only one. But still I am one.
I cannot do everything, but still I can do something:
And because I cannot do everything,
I will not refuse to do the something that I can do.
—Quote from Edward Everett Hale (1822–1909),
original source unknown

Many excellent guides are available (both online and in print) on how to become more environmentally responsible. You can start by taking the online quiz at http://www.myfootprint.org/ to determine your own ecological footprint and consider ways to alter your daily life based on your quiz results. You might also consider developing a behavior modification project (see the Personal Application in Chapter 6) addressing some of your environmentally relevant behaviors.

Six aspects of human lifestyles most significantly and adversely affect the environment (Gardner & Stern, 2008; Miller, 2007): agriculture, transportation, home energy use, water use, overall resource consumption and waste, and toxic chemical production, use, and disposal. We recommend that you think about these issues and take the following steps toward walking more lightly on the Earth. If you don’t feel you can do all of them, select at least a few to get you started on a more sustainable lifestyle, and then add a new one each month.

AGRICULTURE
- Reduce your meat consumption by eating no meat one day per week, then increase to two days, and so forth.
- Buy locally grown food for at least one month a year, and then try to increase this.
- Buy organically produced food or grow some of your own.

TRANSPORTATION
- Walk, bike, carpool, or take mass transit as much as you can.
- If possible, work at home or live near your work or school.
- When you have to drive, note that fuel efficiency can be dramatically increased by
  - reducing your speed;
  - avoiding rapid acceleration and sudden stops;
  - shutting off the engine rather than idling;
  - keeping tires inflated;
  - getting regular tune-ups; and
  - turning off your air conditioner.
- Record the distance you drive for one week, and then try to reduce the amount by 10%. Once you accomplish that, try reducing by 15% or more.
- When you purchase a new car, buy a small, fuel-efficient (greater than 35 mpg) model.

HOME ENERGY USE
- Turn down the heat by at least a few degrees in winter, and avoid using air conditioning (or turn the thermostat up a few degrees) in the summer.
- Turn off computers, printers, and other appliances when not in use.
- Replace your light bulbs with compact fluorescent bulbs.
WATER USE
- Always turn off the water while brushing your teeth and shaving.
- Take showers instead of baths, and limit them to 5 minutes if you can.
- Turn off the water while soaping up and shampooing.
- Reuse cups and plates when possible, rather than washing after each use.
- Only run dishwashers and clothes washers with full loads.
- Use the flushing rule: “If it’s yellow, let it1 roll, if it’s brown, flush it down” (urine is sterile).

RESOURCE CONSUMPTION
- The two most important ways to reduce consumption and waste are refusing to buy things you don’t really need, or that you could borrow or rent, and reusing as many items as possible (coffee cups, canvas or other bags for groceries, and your own to-go container for leftovers when you eat out). Refusing and reusing will save you money, as well as reduce your environmental impact. Recycling is important, but it still requires energy and encourages the production and use of more and more stuff. Keep a list of things you refuse to buy or re-used, and try to expand the list each month. Refer to the “Unshopping Card” in Figure C-5.
- Beware of “green-washing”—many products are misleadingly labeled “eco-friendly” or “all natural.”
- Buy secondhand items of all kinds whenever possible.
- Give away, donate to charity, or sell items you no longer need or use, rather than throwing them away—especially during move-out time at the end of the school year.
- Junk mail generates an astonishing amount of waste, utilizes an incredible amount of natural resources, and contributes to climate change. Let organizations know that you don’t want to receive their newsletters, catalogs, and solicitations, and be sure to recycle mailings you can’t refuse.

TOXIC CHEMICALS
- Pesticides are designed to kill bugs (insecticides), weeds (herbicides), rodents, and so forth. They are directly toxic to humans as well, producing cancers and learning disabilities, among other disorders. Don’t use any pesticides in your home, lawn, or garden, and educate others about their impacts on human health and neurological function, as well as detrimental effects on biodiversity.
- Avoid chemical cleaners. Baking soda and vinegar are excellent alternatives to many cleaning products; vinegar is also an effective herbicide.
- Many plastics, cosmetics, and personal care products contain chemicals that disrupt normal hormone functions (e.g., phthalates and bisphenol A or BPA). Don’t buy bottled water; don’t recharge microwave foods in plastic containers, use fewer products with fewer ingredients, and don’t trust claims like “dermatologist-tested,” “natural,” or “organic.” Read the ingredient labels and avoid fragrances, dyes, parabens or -paraben, and things you can’t pronounce.
- Reduce use of plastics by bringing your own refillable containers, buying in bulk, buying things with minimal packaging, and purchasing products in recyclable and recycled packaging.
- Dispose of household toxic products properly. Many items—paints, pesticides, batteries, and even energy-efficient compact fluorescent light bulbs—contain toxic ingredients. Drop these items off at a local household hazardous waste site.

Glossary

Absolute refractory period: The minimum length of time after an action potential during which another action potential cannot be generated.

Achievement motive: The need to master difficult challenges, to outperform others, and to meet high standards of excellence.

Acquired immune deficiency syndrome (AIDS): A disorder in which the immune system is gradually weakened and eventually disabled by the human immunodeficiency virus (HIV).

Adaptation: The formation of a new conditioned response tendency.

Action potential: A brief change in a neuron’s electrical charge.

Adaptation (growth): An inherited characteristic that increased in a population through natural selection because it helped solve a problem of survival or reproduction during the time it emerged. See also Sensory adaptation.

Additive color mixing: Formation of colors by superimposing lights, putting more light in the mixture than exists in any one light by itself.

Adoption studies: Research studies that assess hereditary influence by examining the resemblance between adopted children and both their biological and their adoptive parents.

Affective forecasting: A tool for help one’s emotional reactions to future events.

Afferent nerve fibers: Axons that carry information toward the central nervous system from the periphery of the body.

Afterimage: A visual image that persists after a stimulus is removed.

Aggression: Any behavior that is intended to hurt someone, either physically or verbally.

Agoraphobia: A fear of going out to public places.

Alcohol: A variety of beverages containing ethyl alcohol.

Anemia: A condition in which the red blood cell count is too low.

Anorexia nervosa: An eating disorder characterized by intense fear of gaining weight, disturbed body image, refusal to maintain normal weight, and dangerous measures to lose weight.

Antidepressant: A class of drugs with a variety of effects on the central nervous system.

Antipsychotic drugs: Medications used to gradually reduce psychotic symptoms, including delusions, hallucinations, and other symptoms of schizophrenia.

Behavior modification: A systematic approach to changing behavior through the application of the principles of conditioning.

Biological rhythms: Physical timekeeping systems.

Biopsychosocial model: A model of illness that holds that physical illness is caused by a complex interaction of biological, psychological, and sociocultural factors.

Biological therapies: Application of the principles of learning to direct efforts to change clients’ maladaptive behaviors.

Bipolar disorder (formerly known as manic-depressive disorder): Mood disorder characterized by the experience of both depressed and manic periods.

Biomarkers: A substance or pathway that changes in response to a disease.

Bystander effect: A social psychological phenomenon in which people are less likely to intervene when it appears that help needed when they are in groups than when they are alone.

Cannabis: The hemp plant from which marihuana, hashish, and THC are derived.

C3 supplements: A type of supplement that is used to improve mood and concentration.

Catastrophic thinking: Unrealistically pessimistic appraisal of one’s problems.

Central nervous system (CNS): The brain and the spinal cord.

Contrast: The tendency to focus on just one feature of a problem, neglecting other important aspects.

Dysfunctional schemas: Silhouettes of the past, present, and future.

Eating disorder: A disorder characterized by a disturbed body image and severe weight loss.

Emotional eating: The tendency to consume food in response to emotional states.

Emotion dysregulation: The inability to manage and control emotions.

Endogenous: Originating from within.

Environmental tobacco smoke: The smoke that is inhaled by smokers and is present in the environment.

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