The Physical Environment

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Opening Questions

• What is the relationship between the physical environment and human behavior?
• What are some implications of the research on the relationship between the physical environment and human behavior for social work practice?

Key Ideas

As you read this chapter, take note of these central ideas:

1. To better understand the relationship between the physical environment and human behavior, social workers can draw on multidisciplinary research from the behavioral sciences and design disciplines.
2. Four broad categories of theories about human behavior and the physical environment are stimulation theories, control theories, behavior settings theories, and ecocritical theories.
3. Researchers have found a strong human preference for elements of the natural environment and positive outcomes of time spent in the natural environment, but overstimulation of features of the natural environment can be hazardous to human well-being.
4. Information and communication technologies are reshaping human behavior and social life.
5. Built environments may promote health and healing.
6. Humans form bonds of attachment with physical places as well as with other humans.
7. A recent recognition that built physical environments can be disabling has led to legislation to protect the civil rights of persons with disabilities.

CASE STUDY

Ben Watson's Changing Experience With the Physical Environment

Author's Note: Ben Watson narrates his own story.
I finished my final semester in the Bachelor's of Architecture Program, and a couple of friends and I decided to spend a few days doing some rock climbing before graduation. I already had a job lined up with a small architecture firm down in North Carolina. Things were looking good.

It doesn't take but a minute to change things forever. I fell 500 feet and knew, as soon as I came to, that something was very wrong. My legs were numb, I couldn't move them, and I had terrific pain in my back. My friends knew not to move me, and one stayed with me while the other went for help.

I don't remember much about the rescue, the trip to the nearest hospital, or the medivac to the closest trauma center. In my early days at the trauma hospital, I saw lots of medical people, but I vividly remember the doc who
told me that I had an incomplete spinal cord injury, that I would have some sensation below my lesion but no movement. I didn’t really believe it. Movement was what I was all about. I spent 5 months in the hospital and rehabilitation center, and I gradually began to understand that my legs were not going to move. I was depressed, I was angry (furious really), and for 1 week I wanted to give up. My parents and my brothers pulled me through. They showered me with love but were firm when I tried to refuse rehabilitation treatments. Oh yeah, some of my friends were terrific also. When things get rough, you learn who your real friends are. I also appreciated a chance to talk with the rehab social worker about my grief over this unbelievable turn in my life. It was good to talk with him because he wasn’t dealing with his own grief about my situation the way my family and friends were.

I left rehab with my new partner, a sophisticated titanium wheelchair, and went home to live with my parents. They rearranged the house so that I could have the first-floor bedroom and bath. I appreciated the assistance from my parents and brothers, and my friends made heroic efforts to get me out of the house. As we did so, I began to learn the importance of the word access. The first time my friends took me out, we wanted to go to a bar; after all that’s what 20-something guys do. My friends called around to find a nearby bar that would be accessible to me and my wheelchair. That turned out to be tougher than they thought. Did you ever notice how many bars require dealing with stairs? Finally, they were assured that one bar was accessible—well, actually, nobody wanted to say their place wasn’t accessible, given the law and all, plus most folks haven’t given any thought to what that really means. So, my friends had to run through a set of questions about stairs, ramps, size of doors, etc., to make their own determination about accessibility. One question they didn’t think to ask was whether there were stairs leading to the bathroom. So, we went out drinking, but I was afraid to drink or eat because I couldn’t get to the bathroom.

After several months at home, I began to get restless and wanted to get on with my life. After my accident, the architecture firm down in North Carolina had told my parents that they would still be interested in having me work for them when I was strong enough. So, I began to talk with my parents about making the move to North Carolina. They understood that I needed to get on with my life, but they worried about me moving 350 miles away. I was still dependent on them for a lot of personal care, but I was gradually learning to do more for myself.

I knew from my interviews that the architecture firm was accessible by wheelchair—it was in a relatively new building with a ground-level entrance, a spacious elevator, wide doors, and accessible bathrooms. With some trepidation my dad drove me down to look for housing. There were plenty of new apartment complexes, but we found that everybody, not just people with disabilities, wants ground-floor apartments with the open architectural features that make wheelchair mobility so much easier. After a lot of calls, we found a one-bedroom apartment that I could afford. I immediately loved the location in a part of the city where there was a lot happening on the streets, with shops, restaurants, and a movie theater. The apartment was attractive, convenient, and accessible, but most important it was mine. I was finally beginning to feel like an adult. I would have my privacy, but the open floor plan would allow me to have friends over without feeling cramped. And I loved the abundance of windows that would allow for good natural lighting from the sun. I couldn’t afford to get my own car with hand controls yet, but the apartment luckily was only a short cab ride from my office.

My father and brothers helped me make the move, and my grandmother came for a visit to add some charming decorating touches. I hired a personal assistant to help me get ready in the mornings—well, actually, my parents paid him for the first few months, until I could get my finances worked out.

Given my profession, it is good that I still have excellent function of my upper body, particularly my hands. My colleagues at work turned out to be good friends as well as good colleagues. And I never paid much attention to issues of accessibility in my design studios at school, but I have become the local expert on accessible design.
HUMAN BEHAVIOR AND THE PHYSICAL ENVIRONMENT

As with most stories we hear as social workers, Ben Watson's is a multidimensional story of person and environment interactions over time. It presents issues of life course development, family and friend relationships, physical disability, a struggle for emotional well-being, and interactions with formal organizations. And, of course, a supremely important dimension of this unfolding story is the physical environment. Ben's story reminds us that all human behavior occurs in a physical context, and it also reminds us of the impact that human behavior has on the physical environment.

Jane Addams, founder of the U.S. settlement house movement, recognized a robust relationship between the physical environment and public health. She was concerned about urban overcrowding, sanitation, and factory inspection, and she ran for and was elected to be neighborhood sanitation inspector in 1895 (Addams, 1910). Throughout most of its history, however, the social work profession has paid little attention to the physical environment; its person and environment construct considered the social environment but ignored the physical environment. In the 1970s, Carel Germain proposed an ecological model of social work, which she and colleague Alex Gitterman called the life model (see Gitterman & Germain, 2008). This model recognized the physical environment as an important dimension of the person and environment construct (see Germain, 1981). In recent years, some social work scholars, like scholars in other behavioral science disciplines, have begun to pay attention to robust findings about the relationship between human well-being and the physical environment (see Gray, Coates, & Hetherington, 2013).

The relationship between human behavior and the physical environment is a multidisciplinary study that includes contributions from the social, behavioral, and health sciences of psychology, sociology, geography, anthropology, neuroscience, and public health, as well as from the design disciplines of architecture, landscape architecture, interior design, and urban and regional planning. This chapter gives you some ways of thinking about the relationship between human behavior and the physical environment as you begin to consider the environment; its person and environment construct considered the social environment but ignored the physical environment. In the 1970s, Carel Germain proposed an ecological model of social work, which she and colleague Alex Gitterman called the life model (see Gitterman & Germain, 2008). This model recognized the physical environment as an important dimension of the person and environment construct (see Germain, 1981). In recent years, some social work scholars, like scholars in other behavioral science disciplines, have begun to pay attention to robust findings about the relationship between human well-being and the physical environment (see Gray, Coates, & Hetherington, 2013).

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role it plays in the stories of the individuals and collectivities you encounter in practice. When thinking about human interactions with the physical environment, it is important to consider both the natural and the built environments; both of these aspects of the physical environment are examined in this chapter.

Four broad categories of theory about human behavior and the physical environment are introduced in this chapter: stimulation theories, control theories, behavior settings theories, and ecocritical theories. Each of these categories of theory, and the research they have stimulated, provides useful possibilities for social workers to consider as they participate in person–environment assessments and consider possibilities for intervention at multiple levels of person and environment interactions. The ecocritical perspective is raising interesting and important new questions about the social work profession’s responsibilities to the natural environment. Exhibit 7.1 presents the key ideas and important concepts of these four types of theories.

Stimulation Theories

Have you thought about how you would react to the abundance of sunlight in Ben Watson’s new apartment or the activity on his street? That question is consistent with stimulation theories, which focus on the physical environment as a source of sensory information essential for human well-being. The stimulation may be light, color, heat, texture, or scent, or it may be buildings, streets, and parks. Stimulation theorists propose that patterns of stimulation influence thinking, feelings, social interaction, and health.

Stimulation varies by amount—intensity, frequency, duration, number of sources—and by type. Stimulation theories based on theories of psycho-physiological arousal assume that moderate levels of stimulation are optimal for human behavior (Gifford, 2007). Thus, both stimulus overload (too much stimulation) and restricted environmental stimulation (once called stimulus deprivation) have a negative effect on human behavior. Theorists interested in the behavioral and health effects of stimulus overload have built on Han Selye’s work regarding stress (see Chapter 5).

Some stimulation theories focus on the direct, concrete effect of stimulation on behavior; others focus on the meanings people construct regarding particular stimuli. In fact, people respond to both the concrete and the symbolic aspects of their physical environments. A doorway too narrow to accommodate a wheelchair has a concrete effect on the behavior of a person in a wheelchair; it will also have a symbolic effect, perhaps contributing to the person’s feelings of exclusion and stigma. You probably will have a very different emotional reaction to a loud bang depending on whether it occurs during a street riot or at a New Year’s Eve party; your understanding of the meaning of the noise has a strong influence on your reaction. In this case, your response is primarily symbolic. Stimulation theories alert social workers to consider the quality and intensity of sensory stimulation in the environments where their clients live and work.

Environmental design scholars have begun to incorporate recent advances in neuroscience research to understand how people’s brains respond to different types of stimulation in physical environments (see Eberhard, 2008). Their goal is to use this knowledge to design environments that support brain development and functioning for the general population as well as for groups with special needs, such as premature newborns and persons with Alzheimer’s disease (Zeisel, 2006, 2009). Neuroscientists are also working with architects and environmental psychologists to learn what aspects of the physical environment stimulate emotional and physical healing (Sternberg, 2009).

Control Theories

The ability to gain control over his physical environment is a central theme of Ben Watson’s story. In that way, the story is a good demonstration of
the ideas found in control theories. **Control theories** focus on the issue of how much control we have over our physical environments and the attempts we make to gain control (Gifford, 2007). Four concepts are central to the work of control theorists: privacy, personal space, territoriality, and crowding. Personal space and territoriality are *boundary regulating mechanisms* that we use to gain greater control over our physical environments.

**Privacy**

Altman (1975, p. 18) defines **privacy** as “selective control of access to the self or to one’s group.” This definition contains two important elements: Privacy involves control over information about oneself as well as control over interactions with others. Virginia Kupritz (2003) has extended Altman’s work by making a distinction between speech or conversational privacy (being able to hold conversations without being overheard) and visual privacy (being free of unwanted observation). Contemporary innovations in communication technologies have introduced new concerns about having control over information with respect to oneself and one’s group and about how to balance, among other things, national security with rights to privacy. Privacy is a frequent topic of articles in the journal *Computers in Human Behavior* (see, for example, Mohamed & Ahmad, 2012).

Some of us require more privacy than others, and some situations stimulate privacy needs more than other situations. Ben Watson was accustomed to sharing a house with his university pals and didn’t mind the lack of privacy that came with that situation. He felt differently about lack of privacy in his parents’ home after rehab and was eager for a more private living situation, even though his privacy in some areas would be compromised by his need for a personal care assistant.
It appears that people in different cultures use space differently to create privacy. Susan Kent (1991) theorizes that the use of partitions, such as walls or screens, to create private spaces increases as societies become more complex. She particularly notes the strong emphasis that European American culture places on partitioned space, both at home and at work (see Duvall-Early & Benedict, 1992). More recent research supports this idea; for example, college students in the United States have been found to desire more privacy in their residence halls than Turkish students (Kay & Weber, 2003). The situation appears to be different when it comes to privacy in online communications, however. For example, researchers have found college students in China and Japan to be more concerned about privacy in online communications than college students in the United States (Lowry, Cao, & Everard, 2011; Maynard & Taylor, 1996).

Researchers have examined the physical attributes of workplace offices that satisfy the privacy needs of the U.S. workforce. In recent decades employers have limited personal space of employees, using open-plan cubicles, based on the belief that such open-plan arrangements will facilitate communication among employees, as well as on a desire to cut costs. The consistent finding is that employees are not satisfied with the level of privacy in open-plan arrangements (see Lee, 2010). There is also evidence that employees tend to communicate less when they feel they cannot control the privacy of communications (Kupritz, 2003). Personal space and territoriality are two mechanisms for securing privacy.

**Personal Space**

**Personal space**, also known as interpersonal distance, is the physical distance we choose to maintain in interpersonal relationships. Robert Sommer (1969) has defined it as "an area with invisible boundaries surrounding a person's body into which intruders may not come” (p. 26). More recent formulations (Gifford, 2007) emphasize that personal space is not stable but contracts and expands with changing interpersonal circumstances and variations in physical settings. The distance you desire when talking with your best friend is likely to be different from the distance you prefer when talking with a stranger, or even with a known authority figure like your social work professor. The desired distance for any of these interpersonal situations is likely to expand in small spaces (Sinha & Mukherjee, 1996). We will want to recognize our own personal space requirements in different work situations and be sensitive to the personal space requirements of our co-workers and clients.

Variations in personal space are also thought to be related to age, gender, attachment style, previous victimization, mental health, and culture. Personal space requirements have been found to increase with age until early adulthood (Gifford, 2007). One research project found that, in shopping malls in the United States and Turkey, adolescents interacting with other adolescents kept the largest interpersonal distance of any age group (Ozdemir, 2008). Males have often been found to require greater personal space than females, and research indicates that the largest interpersonal distances are kept in male-male pairs, followed by female-female pairs, with the smallest interpersonal distances kept in male-female pairs (Ozdemir, 2008). There is evidence that adults with insecure attachment style require a larger personal space than children and adults with secure attachments (Kaitz, Bar-Haim, Lehrer, & Grossman, 2004). Physically abused children have been found to keep significantly larger personal space than nonabused children, suggesting that personal space provides a protective function for these children (Vranic, 2003). A study of combat veterans in Croatia found that veterans diagnosed with PTSD preferred significantly larger interpersonal distance than veterans without PTSD (Bogovic, Mihanovic,
Both groups of veterans maintained greater interpersonal distance when approached by a man than when approached by a woman. The veterans with PTSD required greater distance when they were approached from behind while the veterans without PTSD required greater distance when approached from the front. Individuals diagnosed with schizophrenia have also been found to require more personal space than people without such a diagnosis (Nechamkin, Salganik, Modai, & Ponizovsky, 2003).

In *The Hidden Dimension*, Edward Hall (1966) reported field research indicating that members of contact-oriented, collectivist cultures (e.g., Latin, Asian, Arab) prefer closer interpersonal distances than members of noncontact-oriented, individualist cultures (e.g., northern European, North American). More recent research has supported this suggestion; for example, pairs in Turkish malls have been observed to interact more closely than pairs in U.S. malls (Ozdemir, 2008), but within-culture differences in interpersonal distance preferences have also been noted (Evans, Lepore, & Allen, 2000). There is some evidence that people require less personal space when interacting with people they consider to be like themselves in some important category (Novelli, Drury, & Reicher, 2010).

Sommer (2002) has updated his discussion of personal space by raising questions about how personal space is affected by digital technology. Perhaps you have been interested, as I have been,
with how people define their personal space while talking on their cell phones. It seems that we are still negotiating the appropriate interpersonal distance while using our cell phones, but I have been surprised to sit very close to strangers in public spaces who are using cell phones to “break up” with a partner or to try to straighten out a credit problem. Sommer also raises questions about the impact of the computer on personal space, noting that at work people sometimes communicate by e-mail with co-workers who are sitting beside them in the same office. Other researchers have examined how much personal space people need when using automatic teller machines and other technology where private information is stored and found that people report larger desired space than the space actually provided (Shu & Li, 2007). Researchers are also investigating how personal space applies to virtual worlds such as Second Life and computer games and finding that people tend to keep and protect a space around their avatars in much the same way they do in the “real” world (see Amo-oka, Laga, Yoshie, & Nakajima, 2011). Developers of artificial intelligence systems are concerned about active personal space (APS) in human-robot interactions; they want to program service robots in such a way that they do not invade the personal space of humans (Banik, Gupta, Habib, & Mousumi, 2013).

**Territoriality**

Personal space is a concept about individual behavior and the use of space to control the interpersonal environment. **Territoriality** refers primarily to the behavior of individuals and small groups as they seek control over physical space (Taylor, 1988), but recently, the concept has also been used to refer to attempts to control objects, roles, and relationships (Brown, Lawrence, & Robinson, 2005). For example, Robert Gifford (2007) defined territoriality as “a pattern of behavior and attitudes held by an individual or group, based on perceived, attempted, or actual ownership or control of a definable physical space, object, or idea” (p. 166). Territoriality leads us to mark, or personalize, our territory to signify our “ownership” and to engage in a variety of behaviors to protect it from invasion. The study of animal territoriality has a longer history than the study of human territorial behavior. For humans, there is much evidence that males are more territorial than females, but there is also some contradictory evidence (Kaya & Burgess, 2007; Kaya & Weber, 2003). For example, in crowded living conditions in Nigerian university residence halls, female students appeared to use more territorial strategies to cope while male students used more withdrawal strategies (Amole, 2005). By their midteens, many youth want some territory of their own, as is sometimes demonstrated with graffiti, tagging, and gang behavior (Pickering, Kintrea, & Bannister, 2012).

Irwin Altman (1975) classifies our territories as primary, secondary, and public. A **primary territory** is one that evokes feelings of ownership that we control on a relatively permanent basis and that is vital to our daily lives. For most of us, our primary territory would include our home and place of work. **Secondary territories** are less important to us than primary territories, and control of them does not seem as essential to us; examples might be our favorite table at Starbucks, our favorite cardio machine at the gym, or our favorite seat in the classroom (Costa, 2012). **Public territories** are open to anyone in the community, and we generally make no attempt to control access to

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**Critical Thinking Questions 7.1**

Have you given much thought to your need for private space? Do you have sufficient privacy in your home and work environments to feel some sense of control over who has access to you and your interpersonal interactions? Do the clients at your field agency have private space? What have you observed about how people deal with privacy issues when using cell phones? When using social media of various types?
them—places such as public parks, public beaches, sidewalks, and stores. For people who are home
less and lack access to typical primary territories, however, public territories may serve as primary territories.

Much of the literature on territoriality draws on the functionalist sociological tradition, emphasizing the positive value of territorial behavior to provide order to the social world and a sense of security to individuals (Taylor, 1988). We know, however, that territorial behavior can also be the source of conflict, domination, and oppression. Recently, it has been suggested that globalization is reducing territoriality among nation-states (Kythreotis, 2012). And, indeed, globalization does blur national boundaries, but ongoing national conversations about “securing our borders” are prime examples of territorial behaviors, and wars are still being fought to protect both geographical boundaries and ideas.

**Crowding**

Crowding has sometimes been used interchangeably with density, but environmental psychologists make important distinctions between these terms. Density is the ratio of persons per unit area of a space. Crowding is the subjective feeling of having too many people around. Crowding is not always correlated with density; the feeling of being crowded seems to be influenced by an interaction of personal, social, and cultural as well as physical factors. For example, in one study the perception of crowding was associated with density among older adults living

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**Photo 7.2** Both geographical boundaries and shared ideas provide a sense of security to individuals, and both can become a source of conflict.

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with extended families in India, but perceived social support in high-density environments buffered the perception of crowding and decreased personal space requirements (Sinha & Nayyar, 2000). Researchers (Evans et al., 2000) have compared different ethnic groups that live in high-density housing in the United States. They found that Latin American and Asian American residents tolerate more density before feeling crowded than Anglo Americans and African Americans. These researchers also found, however, that all four ethnic groups experienced similar psychological distress from crowding. Another research team found that Middle Eastern respondents were less likely to perceive high-density retail situations as crowded than their North American counterparts (Pons, Laroche, & Mourali, 2006).

Research has also found gender differences in response to crowding. Women living in crowded homes are more likely to be depressed while men living in crowded homes demonstrate higher levels of withdrawal and violence (Regoezzi, 2008). In crowded elementary school classrooms, girls’ academic achievement and boys’ classroom behavior are adversely affected (Maxwell, 2003).

Crowding has been found to have an adverse effect on child development (Evans & Saegert, 2000) and to be associated with elevated blood pressure and neuroendocrine hormone activity (Gifford, 2007), poor compliance with mental health care (Menezes Sczuca, Rodrigues, & Mann, 2000), increased incidence of tuberculosis (Baker, Das, Venugopal, & Howden-Chapman, 2008; Wanyeki et al., 2006), and aggressive behavior in prison inmates (Lawrence & Andrews, 2004).

Behavior Settings Theories

Would you expect to observe the same behaviors if you were observing Ben Watson in different settings—for example, his parents’ home, his apartment, running errands in his neighborhood, at work, at a party with friends, or on an outing in the natural environment? My guess is that you would not. A third major category of theories about the relationship between human behavior and the physical environment is behavior settings theories. According to these theories, consistent, uniform patterns of behavior occur in particular places, or behavior settings. Behavior is always tied to a specific place, and the setting may have a more powerful influence on behavior than characteristics of the individual (Scott, 2005).

Behavior settings theory was developed by Roger Barker (1968), who, unexpectedly, found that observations of different persons in the same setting were more similar than observations of the same person in different settings. For example, your behavior at a musical festival is more similar to the behavior of other festival attendees than it is to your own behavior in the classroom or at the grocery store. Barker suggested that programs—consistent, prescribed patterns of behavior—develop and are maintained in many specific settings. For example, when you enter a grocery store, you grab a cart, travel down aisles collecting items and putting them in the cart, and take the cart to a checkout counter where you wait while store employees tabulate the cost of the items and bag them. Imagine how surprised you would be if you went into the grocery store to find everybody kicking soccer balls! Behavioral programs are created conjointly by individuals and their inanimate surroundings, and behavior settings are distinctive in their physical-spatial features as well as their social rules.

In recent years, behavior settings theory has been extended to explain behavior in settings other than physical behavior settings, more specifically to explain behavior in virtual behavior settings such as chat rooms and blogs (Blanchard, 2004; Stokols & Montero, 2002). This line of inquiry is interested in how interaction in such virtual behavior settings is integrated, or not, with the place-based settings in which it occurs, such as home, workplace, or Internet café.

Behavior settings as conceptualized by Barker had a static quality, but Allan Wicker (2012) has more recently written about the changing nature—the life histories—of behavior settings. Some
settings disappear, and some become radically altered. The high school prom my neighbor attended in 2009 was a different setting, with a very different behavioral program, from the high school prom I attended in 1963. And, these days, that trip to the grocery store often involves getting your own reusable grocery bags from the car before entering the store (or making a trip back to the car to get them when you are almost at the store door). It may also include running your own items through a scanner and bagging them yourself. Wicker (2012) also argues that behavioral scientists must pay attention to the larger contexts of settings, which often belong to networks that include a number of other settings.

Community psychologist Edward Seidman (2012) argues that focusing on the setting, rather than the individual, as the location for change opens the way for a wealth of interventions. Behavior settings theory has implications for social work assessment and intervention. It suggests that patterns of behavior are specific to a setting and, therefore, that we must assess settings as well as individuals when problematic behavior occurs. Behavior settings theory also suggests that the place where we first learn a new skill helps re-create the state necessary to retrieve and enact the skill. When assisting clients in skill development, we should pay particular attention to the discontinuities between the settings where the skills are being “learned” and the settings where those skills must be used.

Another key concept in behavior settings theory is the level of staffing (Barker, 1968; Brown, Shepherd, Wituk, & Meissen, 2007). Different behavior settings attract different numbers of participants, or staff. It is important to have a good fit between the number of participants and the behavioral program for the setting. Overstaffing occurs when there are too many participants for the behavioral program of a given setting; understaffing occurs when there are too few participants. A growing body of research also suggests that larger settings tend to exclude more people from action, and smaller settings put pressure on more people to perform. The issue of appropriate staffing, in terms of number of participants, for particular behavioral programs in particular behavior settings has great relevance for the planning of social work programs. Indeed, behavior settings theory and the issue of optimal staffing have been used to understand the benefits of member participation in consumer-run mental health organizations (Brown et al., 2007).

Ecocritical Theories

In Chapter 2, we wrote about ecological theory in the systems perspective, a theory that focuses on the relationships and interactions between living organisms and their environments. This theory emphasizes the interdependence and mutual influence of organisms and their environments. In the past 2 decades, ecological theory has been extended in several disciplines to take a more critical view of human interactions with the natural environment. For the purpose of this discussion, I will call the theories in this tradition ecocritical theories, because they call attention to the ways that human behavior degrades and destroys the natural world, the unequal burden of environmental degradation on different groups, and ethical obligations that humans have to nonhuman elements of the natural environment. Given space limitations, this discussion will touch on two such theories developed in the last quarter of the 20th century: deep ecology and ecofeminism.

Deep ecology is both a theory and a social movement. In simplest terms, deep ecology suggests that social work should focus on “person with environment,” rather than “person and environment” (Besthorn, 2012). It emphasizes the total interconnectedness of all elements of the natural and physical world and the inseparability of human well-being and the well-being of planet Earth. It argues for the intrinsic value of all life forms, for the value of ecological diversity, and for the responsibility of humans to respect the rest of
nature and live in ways that have minimal impact on the well-being of other life forms. It calls attention to the way that current human interactions with the natural environment are unsustainable, leading to global warming, atmospheric pollution, and other forms of environmental degradation that put the long-term survival of all elements of nature at risk. What distinguishes deep ecology from other theories discussed in this book is that it is ecocentric (earth centered) rather than anthropocentric (human centered). It insists on a nonhierarchical form of justice, in which humans do not control or have dominance over nature. Humans have no more value than other forms of nature. Deep ecologists note that some cultures have long held the view that ethical decision making must respect the interests of the natural world. Fred Besthorn (2012) has been a strong voice recommending that deep ecology is the theory that social workers should use to think about human-environment interactions.

Ecofeminism, also both a theory and a social movement, took shape about the same time as deep ecology, in the 1970s, but its roots go back much further. Although there are different strains of ecofeminism, the approach is best described as a feminist approach to environmental ethics. Ecofeminists see the oppression of women and the domination of nature as interconnected. They suggest that nature and women, as well as other groups such as children and people of color, have been conceptualized as separate and inferior in order to legitimate dominance over them by an elite male-dominant social order (Gaard, 2011). More than the deep ecologists, they call attention to the ways that women and other nondominant groups bear the burdens of environmental hazards such as toxic waste. Susan Mann (2011) argues that the intersection of feminism and environmentalism is not new, noting that throughout the Progressive Era in the United States, women played important roles in both wildlife conservation and activism to promote clean air, water, and food for people living in urban centers. As noted earlier, Jane Addams was such a woman.

**Critical Thinking Questions 7.2**

What have you observed about the impact of the physical environment on your behavior and the behavior of others? How well do stimulation theories, control theories, or behavior settings theories account for the influence of the physical environment on your behavior and the behavior of other people you know? What do you think of the deep ecology argument that humans have no more value than other forms of nature?

**THE NATURAL ENVIRONMENT**

If I asked you to engage in a relaxation exercise by picturing yourself in your favorite place, where would that be? Research shows that places in the natural environment—that part of the environment made up of all living and nonliving things naturally occurring—are among people’s favorite places (White, Pahl, Ashbullby, Herbert, & Depledge, 2013). This is, of course, not true for all people, but it appears to be true for the majority of people in all cultures (Wolsko & Hoyt, 2012). Most of the research on the relationship between human behavior and the natural environment has been in the stimulation theory tradition—looking for ways in which aspects of the natural environment affect our thinking, feeling, social interaction, and health. At a time of great international concern about the damage being done to the natural environment by human endeavors, ecocritical theorists are calling for humans to rethink their relationship with the natural environment.

**Benefits and Costs of Human Interaction With the Natural Environment**

Do you find that you feel refreshed from being in the natural environment—walking along the
beach, hiking in the mountains, or even walking in your neighborhood? As it has for many people, the natural environment has always been a place of serenity for Ben Watson. There is a long tradition of research into the benefits of the natural environment for human behavior. In recent years, this research has been based on two theories developed by environmental psychologists. **Attention restoration theory** (ART) proposes that interacting with nature restores depleted cognitive resources (Kaplan & Berman, 2010). **Psychophysiological stress recovery theory** (PSRT) is interested in how interacting with nature helps people to recover emotionally and physiologically (Ulrich et al., 1991).

In general, this research finds many positive outcomes of time spent in the natural environment and suggests that you should consider the benefits of interacting with nature for both you and your clients. These benefits are summarized in Exhibit 7.2, but because of the extensive research in this area only a few of the recent findings are reported here.

There are consistent findings from research using a variety of methods that interaction with natural environments can restore depleted emotional and cognitive resources (see White et al., 2013, for a review of these findings). Our interaction with nature can help to recharge our attentional capacities (Felsten, 2009), reduce psychophysiological stress (Kjellgren & Buhrkall, 2010), and enhance emotional states (Bowler, Buyung-Ali, Knight, & Pullin, 2010). This finding of benefit from interaction with the natural environment has been found even when controlling for individual characteristics, alone or with a group, types of activities, and length of interaction. It is not clear which aspects of the natural environment provide benefit, but research indicates that environments with water have the greatest positive effect (Barton & Pretty, 2010; Karmanov & Hamel, 2008). Interactions with woodlands and mountains have also been found to have a positive effect (White et al., 2013), and there is considerable evidence that interactions with domestic and companion animals have emotional and physiological benefits for humans (Anderson, 2008). There is some evidence that late adolescents derive less benefit from time spent in nature than other age groups, and middle-aged people derive the greatest benefit (White et al., 2013).

A preponderance of the research has investigated the effects of interaction with nature in populations in good health, but recently researchers have been interested in whether nature has similar benefits for people with specific health concerns. Berman and colleagues (2012) studied the benefits of walking in nature, versus walking in an urban setting, for a group of people diagnosed with major depressive disorder (MDD). Participants were found to have improvements in memory span and positive emotion after both types of walks, but the improvements were significantly greater after the nature walks, and the effect sizes were larger than those found in populations without MDD. Kjellgren and Buhrkall (2010) studied a group of people identified as suffering from mental fatigue

Exhibit 7.2 Benefits of Time Spent in the Natural Environment (Based on Stimulation Theory Research)

- Engaging children’s interest
- Stimulating children’s imagination
- Stimulating activity and physical fitness
- Increasing productivity
- Enhancing creativity
- Providing intellectual stimulation
- Aiding recovery from mental fatigue
- Improving concentration
- Increasing working memory
- Enhancing group cohesiveness and community cooperation
- Fostering tranquility and serenity
- Fostering a sense of oneness or wholeness
- Fostering a sense of control
- Fostering recovery from surgery
- Lowering heart rate, blood pressure, and muscle tension
- Improving emotional states, such as calmness, relaxation, and vitality
- Contributing to cognitive and emotional improvements in persons diagnosed with major depressive disorder (MDD)
- Reducing psychophysiological stress
- Decreasing vulnerability to illness

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and found improvements in stress level and energy after interaction with the natural environment. Walking in outdoor green spaces has been found to improve attention among children and adolescents with attention deficit disorder (ADD) (Taylor & Kuo, 2009).

Researchers have found synergistic effects between nature and physical activity, with moderate-intensity exercise in natural environments associated with the most positive effects (White et al., 2013). Thompson Coon et al. (2011) found that exercising in natural environments, compared with exercising indoors, was associated with greater revitalization and greater reduction in tension, confusion, anger, and depression. Research with individuals involved in both community gardening and backyard gardening indicates benefits that include a sense of tranquility, sense of control, and improved physical health (Shepard, 2013).

There is some evidence that you do not have to be active in the natural environment to derive benefits from it. Views of nature have been found to have positive benefits for cognitive and emotional functioning and to promote recovery from stress and surgery. Office workers have been found to experience less anger and stress when art posters with nature paintings are present (Byoung-Suk, Ulrich, Walker, & Tassinary, 2008). Indoor plants have also been found to be associated with improved attention in office settings (Raanaas, Evensen, Rich, Sjostrom, & Patil, 2011). Researchers have begun to explore whether views of nature are as beneficial as time spent in nature. In a study of participants identified as suffering from stress and burnout, Kjellgren and Buurkall (2010) investigated the similarities and differences in reactions to 30 minutes of relaxation in a natural environment versus 30 minutes of relaxation while viewing a slide show of photographs of the same natural environment. They found that pulse and diastolic blood pressure were lower after relaxation in both the natural environment and the simulated natural environment. They also found that the two types of relaxation situations were equally efficient in stress reduction. However, relaxation in the natural environment produced greater improvement in energy, sense of well-being, and tranquility than relaxation in the simulated natural environment.

The findings just discussed are not surprising, given the distinctive place accorded to the natural environment in the cultural artifacts—music, art, literature—of all societies. Sociobiologists propose that humans have a genetically based need to affiliate with nature; they call it biophilia (Simaika & Samways, 2010; Wilson, 2007). They argue that humans have a 2-million-year history of evolving in natural environments and have only lived in cities for a small fraction of that time, and that therefore we are much better adapted to natural environments than built environments. On the other hand, Karmanov and Hamel (2008) suggest that physical environments, both natural and built, accumulate meanings over time, and their research suggests that these meanings can be changed through storytelling about the environments in which people find themselves. It is important to note that access to nature is not equally shared by all groups.

The growing evidence of the psychophysiological benefits of time spent in nature is beginning to influence health policy and practice. Perhaps the best example of the use of this research to inform policy is a statement put out by the Faculty of Public Health, the standard-setting body for specialists in public health in the United Kingdom. This statement called for more use of walks in parks to treat mental illness, for general practitioners to consider providing advice about physical activity in the natural environment, for local authorities to provide more accessible green spaces, for full governmental support for programs to support physical activity in green spaces, and for major funding for research investigating the potential role of green space in preventing mental and physical ill health and reducing health inequalities (Faculty of Public Health, 2010). There is a growing call for ecotherapy, exposure to nature and the outdoors as a component of psychotherapy, as a major agenda for mental health promotion and treatment (see Social constructionist perspective).
Buzzell & Chalquist, 2009; Wolsko & Hoyt, 2012). Proponents of ecotherapy propose such interventions as inquiring about clients’ relationships with the natural environment, assigning a walk in the park as homework, use of plants and photos of natural settings in therapist offices, and developing forest experiences for adolescents (Hayward, Miller, & Shaw, 2013; Wolsko & Hoyt, 2012). The combination of green spaces with physical exercise has been found to be a particularly potent program for mood elevation in people experiencing symptoms of depression and anxiety (Mackay & Neill, 2010). This research indicates that the degree of perceived “greenness” of the environment has a greater influence than the intensity of the exercise on symptom relief, with the greater benefits coming from enhanced perception of greenness.

Ecotherapy includes time spent with domestic and companion animals.

Ben Watson made special note of the ample sunlight in his apartment. Design innovations for older adults, particularly those with Alzheimer’s disease, are emphasizing the benefit of natural over artificial light (Brawley, 2006, 2009). However, the relationship between sunlight and human behavior is curvilinear, with benefit coming from increasing amounts until a certain optimum point is reached, after which increasing amounts damage rather than benefit. Excessive sunlight can have negative impacts, such as glare and overheating, and inadequate sunlight has been identified as a contributor to depression, sometimes referred to as seasonal affective disorder (SAD), in some persons (Kurlanski & Ibay, 2012). Sunlight penetration in indoor

Photo 7.3 The physical environment (both natural and human-made) impacts our behavior. Researchers have found a strong preference for elements of the natural environment and positive outcomes of time spent in nature.

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spaces is related to feelings of relaxation, with patches of sunlight as the optimum situation, and both too little and too much penetration decreasing the feeling of relaxation (Brawley, 2009).

Although the natural environment can be a positive force, it also has the potential to damage cognitive, emotional, social, and physical well-being. The relationship between sunlight and human behavior provides a clue. Too little sun causes harm, but so does too much sun. Water is a favorite environmental feature for many people, but too little water causes drought and too much water causes flooding. The natural environment provides sensory stimulation in an uncontrolled strength, and the patterns of stimulation are quite unstable. Extremely stimulating natural events are known as natural disasters, including such events as hurricanes, tornadoes, floods, earthquakes, volcanic eruptions, landslides, avalanches, tsunamis, and forest fires. Natural disasters are cataclysmic events—a class of stressors with great force, sudden onset, excessive demands on human coping, and large scope. There is growing concern that climate change is leading to more frequent natural disasters (Datar, Liu, Linnemayr, & Stecher, 2013). Natural disasters have immediate effects on health and mortality, but they also have indirect long-term effects because they lead to disruptions in shelter, food supplies, income, and access to health care. Social workers play active roles in providing services to communities that have experienced natural disasters.

**Environmental/Ecological Justice**

Ben Watson says that he has become concerned about the damage he sees humans doing to the natural environment and about how some communities are suffering more than others from the health consequences of industrial and agricultural practices that put toxins into the soil, water, and air. Some social workers have also become concerned about these issues as indicated by recently published books, such as *Environmental Social Work* (Gray et al., 2013) and *Green Social Work: From Environmental Crises to Environmental Justice* (Dominelli, 2012). The concerns raised by Ben Watson and the authors of these books are at the heart of two social movements—the environmental justice movement and the ecological justice movement. These movements share a concern about the ways in which human activities are exhausting natural resources and polluting air, water, and land. But they differ in one important way: The environmental justice movement is concerned about human rights in relation to degradation of the natural environment while the ecological justice movement is concerned about the rights of nature to be protected from human activity (Besthorn, 2013).

*Environmental justice* is thought to occur when all groups of people have equal share of the harmful environmental effects of policies and operations of business and governments. In the United States, there is considerable evidence that the toxic load of pollution from pesticides, fertilizers, and factories is generally heaviest in poor communities of color (Perkins, 2012), and considerable research establishes that such pollution is a risk factor for cancer and respiratory diseases. There is also clear evidence that hazardous waste facilities are more likely to be located in poor and minority communities. One research team found that brownfields—properties that are no longer operational because of the presence of hazardous substances—are much more likely to be located in poor and minority communities than in areas of higher socioeconomic status. They also found that brownfields are cleaned up much more slowly when they are located in communities with larger minority populations (Eckerd & Keeler, 2012). Internationally, wealthy nations are exploiting the natural resources of poor nations, exacerbating the poverty in those nations. The degradation of the world ecosystems is growing significantly worse, and the burdens of that degradation go increasingly to the most marginalized populations, poor people, people of color, older people, women, and children (Hetherington & Boddy, 2013). Social justice and environmental justice become more and more tightly entwined; in many communities it is not possible to promote social justice without working on
issues of environmental justice. That is certainly true in the Coachella Valley of California where I live. At a recent community forum I attended in the eastern end of the valley, which is populated primarily by undocumented farm workers, community members reported that their greatest concerns are the lack of access to potable (drinkable) water, high levels of pesticides in the soil and groundwater, sewage sitting on top of the ground, and the impact of a nearby toxic waste treatment facility on soil, water, and air quality. If those are the community concerns, social workers should be collaborating with other community agencies to address those concerns. (You may know Coachella, California, as home to the huge music festival. The festival site sits in proximity to the conditions just described.)

As suggested earlier, the ecological justice movement approaches environmental issues from the standpoint of the rights of nature, not the rights of humans. Adherents argue for humanity in service to nature rather than nature in service to humanity. Besthorn (2013) gives two examples of national governments pursuing policies to promote ecological justice. In September 2008, Ecuador ratified a new constitution, becoming the first nation in the world to recognize the rights of nature and natural systems. In April 2011, the Bolivian National Congress passed legislation that emphasized that all human activities must align with the rights of the natural world. The thrust of the 2013 book Environmental Social Work is that social workers need to move beyond anthropocentric environmental justice to value ecological justice. They call for social work to reconsider its person and environment construct to develop a better balance between human and nature needs. Scientists in a number of disciplines are interested in understanding how people perceive their relationships with the natural environment and what motivates them to be concerned about protecting it (see Scannell & Gifford, 2013). The track record of environment policy implementation is not good, and there are grave concerns about the pace of environmental degradation. Indeed, in August 2013, Ecuador abandoned its conservation plan for the Amazon rainforest, blaming the international community for failure to provide economic support for the plan (Watts, 2013).

**Critical Thinking Questions 7.3**

What have you observed about how time spent in nature affects your emotions, cognitions, and behavior? How might social workers incorporate ecotherapy into their practice in different settings? Have you seen examples of this being done? How do you think social workers should be involved with environmental or ecological justice, if at all?

**THE BUILT ENVIRONMENT**

It is the uncontrollable quality of the natural environment that humans try to overcome in constructing the built environment—the portion of the physical environment attributable to human effort. The built environment includes tools, structures, buildings, and technologies of various sorts designed and built by humans to create comfort and controllability and to extend their abilities to meet goals. The built environment is produced by human behavior, and what humans build has a great effect on human behavior. Winston Churchill is often quoted as saying, “We shape our dwellings, and afterwards our dwellings shape us” (Mardy, n.d.). This is true for all aspects of the built environment, whether dwellings or technologies.

For several decades, environmental psychologists have been studying the impact of the built environment on such factors as mood, problem solving, productivity, and violent behavior. They have examined physical designs that encourage social interaction, sociopetal spaces, and designs that discourage social interaction, sociofugal spaces. Researchers have studied design features of such institutional settings as psychiatric hospitals, state schools for persons with cognitive disabilities, college dormitories, and correctional facilities. Exhibit 7.3 summarizes some of the key results of this line of inquiry. Late-20th-century
developments in biomedical science, particularly new understandings of the brain and the immune system, have allowed more sophisticated analysis of how the built environment affects physical and mental health and can be a source of healing. In the past 2 decades, researchers have also been interested in how information, communication, and other assistive technologies are affecting human behavior.

**Technology**

Ben Watson is in a partnership with his sophisticated titanium wheelchair. As I am working on this book, I am in partnership with my computer, which allows me to search for information (with soothing music in the background), put my thoughts into digital format that with time will be shared with you, and check my e-mail to see how contributing authors are progressing with their chapters. And, aided by my computer, in a few minutes I will take a break, view some photos of our recent family vacation, and check in to see what my Facebook friends have been doing lately. Since they first appeared on the earth, humans have used their cognitive capacities to build tools to manipulate and control the environment. Humans are not the only animals that have developed tools, but, to date, humans are the only animals to develop the types of complex tools resulting in rapid changes in our individual and collective behaviors. For the purposes of this discussion, **technology** is defined as the tools,

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**Exhibit 7.3 Selected Research Findings About the Therapeutic Use of Architecture**

<table>
<thead>
<tr>
<th>Therapeutic Design Features</th>
<th>Positive Behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tables with chairs instead of shoulder-to-shoulder and back-to-back seating</td>
<td>Increase in both brief and sustained interaction</td>
</tr>
<tr>
<td>Large spaces broken into smaller spaces</td>
<td>Increase in social interaction</td>
</tr>
<tr>
<td>Flowers and magazines placed on tables</td>
<td>Decrease in passive and inactive behavior</td>
</tr>
<tr>
<td>Special activity centers with partitions</td>
<td>Increase in social interaction</td>
</tr>
<tr>
<td>Sleeping dormitories divided into two bedrooms with table and chairs</td>
<td>Decrease in violent behavior in correctional facilities</td>
</tr>
<tr>
<td>Long hallways broken up</td>
<td>Increase in social interaction</td>
</tr>
<tr>
<td>Sound baffles added to high ceilings</td>
<td>Decrease in violent behavior in correctional facilities</td>
</tr>
<tr>
<td>Improved lighting, bright colors, and large signs added</td>
<td>Decrease in violent behavior in correctional facilities</td>
</tr>
<tr>
<td>Painted walls replacing bars</td>
<td>Increase in social interaction</td>
</tr>
<tr>
<td>Carpeted floors</td>
<td>Decrease in stereotypical behavior</td>
</tr>
<tr>
<td>Conventional furniture with fabric upholstery</td>
<td>Increase in alert, purposive behavior</td>
</tr>
<tr>
<td>Visually interesting public areas</td>
<td></td>
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<tr>
<td>Private rooms with outside windows</td>
<td></td>
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<tr>
<td>Solarium with exercise equipment</td>
<td></td>
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<tr>
<td>Open sleeping wards and dayroom turned into personal living spaces and a lounge</td>
<td></td>
</tr>
<tr>
<td>Places for personal belongings provided</td>
<td></td>
</tr>
<tr>
<td>Personalized decorations</td>
<td></td>
</tr>
<tr>
<td>Institutional furniture replaced with noninstitutional furniture</td>
<td></td>
</tr>
<tr>
<td>Rugs, lamps, and draperies added</td>
<td></td>
</tr>
<tr>
<td>Control over lighting</td>
<td></td>
</tr>
</tbody>
</table>

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machines, instruments, and devices developed and used by humans to enhance their lives. There are many types of technologies; examples include construction technology, industrial technology, information technology, communication technology, weapon technology, and medical technology. There is clear evidence that the pace of technological development is speeding up, as you may have noticed as your cell phone becomes obsolete very quickly these days.

Across time, and certainly since the industrial revolution, there have been proponents and critics of technological development. Proponents have had confidence that technology will benefit society. The most optimistic have believed that technology will allow humans to master all problems and control the future. Critics have argued that technology can limit our freedoms and have negative effects on our psychological health. And recently, the ecological justice movement has emphasized the ways in which new technologies destroy the natural environment. As with earlier technological revolutions, the rapid developments in information and communication technologies we are currently experiencing have both proponents and critics. Recent work by Ray Kurzweil and Sherry Turkle highlight some of the arguments on both sides.

Ray Kurzweil is an author, inventor, futurist, and director of engineering at Google. Among other things, he has invented an image scanner, a reading machine that allows people with visual impairments to have computer text read out loud, and a music synthesizer. He is, as you might guess, a great proponent of technology. In his 2012 book, *How to Create a Mind: The Secret of Human Thought Revealed*, Kurzweil enthusiastically reports that advancements in neurological science technologies are allowing us to understand our brains in more and more precise detail. This growing understanding will soon allow us to fix our brains when needed and vastly expand the powers of our own intelligence. He joyfully reminds us of the capacities of computers to route e-mails, produce an electrocardiogram, fly and land airplanes, and play games. He revels in the story of how the IBM computer Watson obtained a higher score on the game of *Jeopardy* than the best two human players in the world, answering questions based on 200 million pages of information in 3 seconds! He tells of work under way to develop a new version of Watson that will read vast amounts of medical literature and become a master diagnostician. He reminds us that we have artificial intelligence all around us with the

![Photo 7.4](https://example.com/photo7_4.png)

*Photo 7.4* Spanish entrepreneur Victor Rosich displays some of the old mobile phones purchased by his company Mobileswap, which recovers old phones through a network of distributors and sells them in Asian and African markets.

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digital brain that stores old memories, e-mail, text messaging, and Siri on the iPhone. He predicts that Google self-driving cars will have fewer accidents than human-driven cars. Kurzweil argues that we build these tools to extend our own reach and are producing and will continue to produce very powerful abilities. He predicts that humans will sooner or later create an artificial neocortex that has the range and flexibility of the human neocortex. He says that the machines of the future will appear to be conscious and come to be accepted as “conscious persons” (p. 209).

Sherry Turkle has a joint doctorate in sociology and personality psychology and is a clinical psychologist. She is professor of social studies and science and technology at the Massachusetts Institute of Technology. In her 2011 book Alone Together: Why We Expect More From Technology and Less From Each Other, Turkle reports on her research in two areas: human interaction with robots and human interaction with communication technologies. While she finds some benefit of both types of human interactions, she is not optimistic about the way these technologies are reshaping human emotional life.

The first half of the book is based on her research with human interaction with sociable robots, a type of robot that has a body, can sense its environment and respond to it, has some understanding of humans, and can communicate and interact with humans. R2-D2 and WALL-E are part of our science fiction genre, but sociable robots are a part of our current world, as well as a part of tomorrow’s story. Turkle reminds us of our succession of attempts to build the perfect sociable robot, Zhu Zhu robot pet hamsters, Furby robot toys, and My Real Baby robot. She also reports on the current state of development of robot companions being used to break the isolation of children and older adults. She notes that enthusiasm for robots is especially strong in Japan, where robot companions are used routinely in elder care facilities. Turkle acknowledges that robots can provide comfort and break isolation, but her own sensibilities coincide with those of a child in one of her studies who commented, “Don’t we have people to do that?” She found that both children and older adults suggest that robots can be more dependable than people, and she worries that humans are not present enough to each other. She also worries that interactions with robots can become preferable to human-human interaction because robots are less complex than people. She wonders if her concerns are peculiarly American, noting that the enthusiasm for robots in Japan makes sense in a culture where it is commonplace to think of inanimate objects as having a life force. Reminiscent of Kurzweil’s suggestion that we will come to think of machines as “conscious persons,” Turkle (2011) finds that her research participants describe the robots with which they interact as “alive enough to love and mourn” (p. 29). She suggests that this raises new questions about what makes a person and what makes a relationship.

Turkle is equally unenthusiastic about our thoroughly networked lives, which she describes as “always wirelessly connected” and “living full-time on the net” (pp. 151–152). She notes that communication technologies allow us to live in multiple worlds at the same time, so that we may be sitting together but using our smartphones to be somewhere else. She tells one story of attending a memorial service where attendees were using the memorial service program to hide their cell phones while they texted during the service. She suggests that our communication devices create new freedoms and pleasures but also create compulsions to use them: I must check my e-mail first thing in the morning; I have 150 text messages that must be answered. She notes that we get anxious when we leave our cell phone at home—or worse, when we lose it. Turkle (2011) also writes about the part of human life lived in virtual space, creating virtual selves in Second Life, playing computer games, and interacting on social networking sites, suggesting that “we have moved from multi-tasking to multi-lifing” (p. 160), sometimes creating new selves to share in virtual environments. She is concerned about what is happening to human societies as people live in a “continual world of partial attention” (p. 160) and concludes that we have to find a way to live with the seductive technologies we
have created and make them work to support our values and goals.

Ray Kurzweil emphasizes that we develop technologies to extend our capabilities. This is especially true in the rapidly expanding field of assistive technology. **Assistive technology** is technology developed and used to assist individuals with disabilities to perform functions that might otherwise be difficult or impossible. A tremendous variety of assistive technology is available today, including technology to assist with mobility, visual, hearing, and cognitive impairment; computer accessibility technology; and personal emergency response systems. Assistive technology can be as low-tech as colorful Post-it notes to serve as visual reminders for students who struggle with attention and organization or as high-tech as assistive robots for people with mobility impairments. Exhibit 7.4 provides a variety of examples of contemporary assistive technology but is not an exhaustive list of the rich array of available technologies. Unfortunately, the great majority of these technologies are quite expensive and beyond the reach of most people.

### Healing Environments

By many accounts, Roger Ulrich (1984) was the first researcher to measure the effects of the physical environment on physical health of hospital patients. He studied patients who had undergone gallbladder

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**Exhibit 7.4  Current and Near-Future Examples of Assistive Technology for Persons With Disabilities**

<table>
<thead>
<tr>
<th>Assistive Technology Device(s)</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>iPads</td>
<td>iPads can be used to record lectures, upload books, provide easier Internet access, take pictures, use social media, and allow easy ways to operate other devices.</td>
</tr>
<tr>
<td>Voice recognition software and hardware</td>
<td>Voice recognition provides the ability to use personal computers by voice only. A voice-activated device can now be plugged into the wall to access the Internet via Wi-Fi to control devices such as lights, Internet, TV, phone, and thermostat by using the voice only—no buttons to push.</td>
</tr>
<tr>
<td>Infrared technology to control environment and surroundings</td>
<td>Infrared (IR) technology allows a PC to be used remotely to control another device. IR receivers can now be attached to most any device.</td>
</tr>
<tr>
<td>Wheelchairs</td>
<td>Technology has vastly improved mobility with advances in wheelchair capabilities and ease of operation.</td>
</tr>
<tr>
<td>Computer eyeglasses</td>
<td>Google’s Glass allows those with arm, hand, or finger impairments to wear a smartphone and operate it by voice in order to take pictures, use the phone, and search the net, all by voice command.</td>
</tr>
<tr>
<td>Robot suits/exoskeletons</td>
<td>Soon a &quot;wearable robot suit&quot; that attaches to legs and torso to allow a person with paraplegia to walk may be as common as wheelchairs.</td>
</tr>
<tr>
<td>Brain/computer interface technologies</td>
<td>Interfacing brain signals with technology allows robotic arms to assist or replace nonfunctional limbs.</td>
</tr>
<tr>
<td>Adaptive sports equipment</td>
<td>Technology now allows those with body impairments to enjoy athletic activities such as skiing (sit skis, special chairs) and rafting (special chairs), increased body movement capabilities (bionic limbs, exoskeletons to allow movement and retrain limb function), and accessible playgrounds (wheelchair-friendly surfaces, better-designed play equipment, ramps and larger swing chairs).</td>
</tr>
<tr>
<td>Medical devices and prosthetics</td>
<td>Hearing aids, prostheses, and pacemakers, to name just a few, have vastly improved with technological advances.</td>
</tr>
</tbody>
</table>
surgery and had different views out their hospital room windows. One group had views of a brown brick wall, and the other group had views of a small stand of trees. The patients who had views of the trees left the hospital almost a day sooner than the patients with views of a brick wall. They also required less pain medication, received fewer negative comments from the nurses, and had slightly fewer postoperative complications.

The idea that nature is important to healing is not new; indeed, it has been around for thousands of years (Sternberg, 2009). There is a long tradition in architecture that proposes a connection among nature, architecture, and health (Joye, 2007). In the 19th century, hospitals were built with large windows, even skylights, and often in beautiful natural settings (Joye, 2007; Sternberg, 2009). Clinics and hospitals were particularly designed to take advantage of natural light because it was thought that sunlight could heal. Some public health scholars argue, however, that as medical technology became more sophisticated, design of hospital space began to focus more on care of the equipment than on care of the patient (Maller, Townsend, Pryor, Brown, & Ledger, 2005; Sternberg, 2009). These public health scholars are calling attention to biomedical research that links physical environments and human health.

Based on his early research, Roger Ulrich, a behavioral scientist, has collaborated with architects, environmental psychologists, and public and private agencies and foundations to develop a field called evidence-based design, which uses physiological and health outcome measures to evaluate the health benefits of hospital design features (Ulrich, 2006; Center for Health Design, 2008). Following on the earlier work of Ulrich, researchers use such measures as length of stay; amount of pain medication; rates of health complications; and patient satisfaction, stress, and mood to evaluate design innovations. By 2006, 700 rigorous studies had been identified (Ulrich, 2006), and the Center for Health Design had been established to engage in ongoing hospital design innovations and evaluations. Two foci of this research are discussed here: noise and sunlight.

A great deal of international research has focused on hospital noise as an impediment to healing. This research consistently finds that hospital noise has continued to increase over the past 50 years and exceeds the guidelines recommended by the World Health Organization (Eggerston, 2012). Hospital noise comes from a variety of sources, for example, staff conversations, roommates, overhead paging, moving of bed rails, and medical equipment alarms. The problem is exacerbated in hospitals that have hard, sound-reflecting floors and ceilings. It is also intensified in multibed rooms because of the activity of caring for multiple patients. Noise has been associated with high blood pressure and elevated heart rates; sleep loss; slower recovery from heart attack; and negative physiological responses such as apnea and fluctuations in blood pressure and oxygen saturation in infants in neonatal intensive care (Brown, 2009; Eggerston, 2012; Ulrich, 2006). Preterm infants exposed to prolonged high levels of noise are at risk for hearing loss, impaired brain development, and speech and language problems (Brown, 2009). Excessive noise also contributes to staff fatigue (Eggerston, 2012). A number of design innovations have been found to be effective in reducing hospital noise. These include single-bed rooms, replacing overhead paging with a noiseless system, covering neonatal incubators with blankets, and installing high-performance sound-absorbing ceiling tiles and floor carpets (Brown, 2009; Ulrich, 2006). These innovations have been found to be related to improved health outcomes and fewer rehospitalizations for patients as well as to improved staff satisfaction and home sleep quality (Sternberg, 2009).

There is also growing evidence that 19th-century hospital designers were accurate in their belief that sunlight can heal. Beauchemin and Hays (1998) found that patients recovering from heart attacks in sunny hospital rooms had significantly shorter hospital stays than patients recovering in rooms without natural light. Another research team studied patients recovering from spinal surgery in one hospital and compared the experiences of patients in sunny rooms with the experiences of patients in rooms without sunlight. Patients in sunny rooms took 22% less...
pain medication and had 21% less medication costs than similar patients recovering in rooms without sunlight (Walch, Day, & Kang, 2005). The patients in the sunny rooms also reported less stress than patients in the rooms without sunlight. Hospital rooms with morning sunlight have also been found to reduce the hospital stay of patients with unipolar and bipolar depression (Benedetti, Colombo, Barbini, Campori, & Smeraldi, 2001).

Roger Ulrich and Craig Zimring (2005) have reviewed the large array of evidence-based design research and proposed a list of hospital design changes that have been found to promote healing. These are overviewed in Exhibit 7.5. Ulrich (2006) reports that these design upgrades would increase initial construction cost by 5.4%, but those costs would be recaptured in only 1 year.

Critical Thinking Questions 7.4

Do you consider yourself a proponent or a critic of rapid advancements in information and communication technologies? Are you as optimistic as Ray Kurzweil? Why or why not? Are you as pessimistic as Sherry Turkle? Why or why not? Have you seen any evidence of evidence-based design in your visits to health care facilities?

Urban Design and Health

Prior to the early 20th century in the United States, public health experts focused on what they called “the urban penalty” for health and mortality. As city size increased, so did the death rate. Infectious diseases, such as tuberculosis, measles, small pox, and
influenza, were the main cause of the urban penalty. Such diseases spread quickly in high-density environments. By the 1920s, improved sanitation and other public health measures had eliminated the urban penalty in the United States and other wealthy nations, but it still exists in very large cities in poorer nations and in the poorest sections of cities in wealthy nations. The biggest threats to urban populations in the United States today are violent crime and pollution, the latter of which contributes to high rates of asthma (Sternberg, 2009).

In recent years, some public health officials have begun to suggest an increasing rural and suburban penalty and an urban advantage (see Vlahov, Galea, & Freudenberg, 2005). In 2007, New York City was declared the healthiest location in the United States today are violent crime and pollution, the latter of which contributes to high rates of asthma (Sternberg, 2009).

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In her book The End of the Suburbs, Leah Gallagher (2013) provides evidence that, while a majority of people still live in the suburbs, the United States is experiencing a population shift from the suburbs to cities—people moving to the city because they want access to city amenities and to spend less time in their cars. Considerable research has focused in recent years on urban sprawl and design features of suburban built environments that contribute to decreased physical activity. The researchers note the long distances suburban dwellers need to travel to work and to amenities, requiring more time spent in the car. These researchers have been particularly interested in whether suburban built environments contribute to obesity and the related health problems of cardiovascular disease and diabetes. The evidence is mixed on this question. Some researchers have found that urban sprawl is associated with overweight and obesity (Garden & Jalaludin, 2009; Slater et al., 2010). A Canadian study found an association between urban sprawl and coronary heart disease in women (Griffin et al., 2013). Others have found no significant relationship between urban sprawl and obesity (Seliske, Pickett, & Janssen, 2012), and some suggest that any connection between urban sprawl and obesity can be explained by a selection process whereby more sedentary people choose more sprawling locations to live (Cao, Mokhtarian, & Handy, 2009). The research indicates that urban sprawl may have a more negative effect on the health of adults than it does on the health of children and youth.

In response to concerns about negative health effects of urban sprawl as well as concerns about harm to the environment caused by automobile use, the new urbanist designers are designing suburban towns with several features known to contribute to walkability. These features include houses with front porches; neighborhood spots for congregation; sidewalks; short blocks; good lighting; amenities accessible by foot; public transportation; mixed-used areas, including residences, businesses, offices, and recreation centers; and bike paths, tennis courts, parks, and golf courses (Stevens & Brown, 2011). The hope is that these design features will contribute to resident activity and health. Researchers have found these design features to be associated with more physical activity in the neighborhood, and one research team found that the relationship holds when controlling for preexisting preferences.

**Exhibit 7.5 Features of Evidence-Based Design for Health Care Settings**

<table>
<thead>
<tr>
<th>Single-occupancy rooms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound-absorbing ceiling tiles and floors</td>
</tr>
<tr>
<td>Improved air quality and ventilation</td>
</tr>
<tr>
<td>Better lighting and access to natural light</td>
</tr>
<tr>
<td>Pleasant and comfortable patient rooms</td>
</tr>
<tr>
<td>Gardens</td>
</tr>
<tr>
<td>Nature views</td>
</tr>
<tr>
<td>Rooming-in spaces for families</td>
</tr>
<tr>
<td>Artwork on walls</td>
</tr>
<tr>
<td>Soothing music</td>
</tr>
<tr>
<td>Soothing colors</td>
</tr>
<tr>
<td>Spaces for family members to congregate for mutual support</td>
</tr>
<tr>
<td>Clearer signage to assist with wayfinding</td>
</tr>
</tbody>
</table>

**SOURCE:** Based on Ulrich & Zimring, 2005.
for activity level, the selection issue noted earlier (Stevens & Brown, 2011).

Lopez and Hynes (2006) enter this conversation with a more complicated story. They report that although it is true that obesity is associated with urban sprawl, inner-city populations have higher rates of obesity and inactivity than suburban dwellers. They suggest that different aspects of the physical environment are contributing to ill health for inner-city residents and making their neighborhoods unwalkable. Inner-city neighborhoods have some of the design features recommended by the new urbanist designers, features such as sidewalks, short blocks, and public transportation, but they have a set of barriers to walking that do not exist in suburbs, barriers such as hazardous waste sites, abandoned buildings, decaying sidewalks, disappearing tree canopies, and dilapidated school playgrounds and parks. For example, one study found that low-income neighborhoods are four times as likely as high-income neighborhoods to have hazardous waste facilities, power plants, and polluting industrial plants, and low-income minority neighborhoods are 20 times as likely as high-income neighborhoods to have these facilities (Faber & Krieg, 2005, cited in Lopez & Hynes, 2006). Public health officials also warn that with the new types of infectious diseases whose spread is fueled by global warming, dense cities contribute to contagion (Sternberg, 2009).

PLACE ATTACHMENT

Have you ever been strongly attached to a specific place—a beloved home, a particular beach or mountain spot, or a house of worship? Place attachment—the process in which people and groups form bonds with places—is the subject of a growing literature (Lewicka, 2011). Recent research on place attachment conceptualizes it as a multidimensional phenomenon involving person, place, and psychological processes of attachment (Scannell & Gifford, 2010a). In terms of person, researchers explore how place attachment occurs at both the individual and group levels. At the individual level, place attachment develops out of personally important experiences. At the group level, attachment develops out of symbolic meanings shared by a group. In the context of place attachment, place is defined as a “space that has been given meaning through personal, group, or cultural processes” (Low & Altman, 1992, p. 5). In terms of the psychological processes of attachment, place attachment is usually discussed in terms of emotional bonding (see Morgan, 2010), but an interplay of emotions, cognitions, and behaviors and actions appears to be what forges the people-place bond (Scannell & Gifford, 2010a).

When a strong place attachment develops, it has been suggested that the place has become an important part of the self, that we can’t think of who we are without some reference to the place (Rollero & Piccoli, 2010). When a particular place becomes an important part of our self-identity, this merger of place and self is known as place identity. Place attachment and place identity have been found to occur at several levels, including home, workplace, community, municipality, region, country, and continent (Lewicka, 2011). We run into the concept of place attachment again in Chapter 13 when we discuss community as a dimension of environment. Place identity can develop where there is strong negative, as well as positive, place attachment, resulting in negative views of the self.

Much of the research on place attachment has focused on the social aspects of the attachment, suggesting that we become attached to places because of the satisfying social relationships we experience in those places. Some researchers have begun to examine attachment to physical places, particularly to places in the natural environment. They are particularly interested in how attachment to places in nature affects behavior toward the natural environment. One research team (Scannell & Gifford, 2010b) found that attachment to the natural aspects of place contributes to pro-environmental behavior, but attachment to the social aspects of place, which they called civic place attachment, does not. Another research team (Cheng & Monroe, 2012) found that children’s connection
to nature was the single best predictor of interest in engaging in nature-friendly behaviors. And another team (Collado, Staats, & Corraliza, 2013) found that experiences in nature increased children’s attachment to nature, ecological beliefs, and willingness to engage in nature-friendly behavior.

Researchers have been interested in the distress and grief people experience when a place of attachment and identity is lost, particularly in situations of forced relocation (Scannell & Gifford, 2010a). We should pay particular attention to issues of place attachment and place identity when we work with immigrant and refugee families and families displaced by disaster. We should also consider the long-term consequences of early experiences, such as homelessness or frequent movement between foster homes, in which no stable place of attachment forms or that result in a negative place attachment.

**HOMELESSNESS**

As suggested, place attachment can be quite problematic for people without homes. In January 2012, a new definition of homeless was implemented by the U.S. Department of Housing and Urban Development (HUD; 2011) to delineate who is eligible for HUD-funded homeless assistance. This new definition includes the four broad categories presented in Exhibit 7.6. In general, people are homeless because they cannot find housing they can afford; there is a real scarcity of affordable housing. HUD defines housing affordability as spending no more than 30% of monthly income on housing, but according to the National Alliance to End Homelessness (NAEH; 2013a) about 12 million households in the United States pay more than 50% of their annual incomes for housing.

It is a challenge to count the exact number of homeless people, and no recent estimates of the number of homeless persons worldwide are available. In the United States, HUD requires that each community do a point-in-time count on a single night in January every other year. According to the count in January 2012, 633,782 people experience homelessness on any given night in the United States. About 28% of these are people in families and 62% are individuals. For many people, homelessness is a short-lived experience, and only about 16% of those homeless on a given night are chronically homeless (NAEH, 2013b). More than half, 62.7%, of homeless persons are male, and 37.2% are female, but 79.3% of homeless persons in families are female. About equal proportions are White, Non-Hispanic (39.5%) and Black or African American (38.1%). The remainder are of other ethnicities. That means, of course, that Black or African American persons are greatly overrepresented in the homeless population, because they make up only about 13% of the total U.S. population. By age group, 22.1% of the homeless population is younger than age 18; 23.8% is 18 to 30; 35.8% is 31 to 50; 15.5% is 51 to 61; and 2.9% is 62 and older.

NAEH has special concern about four groups of homeless persons: families, youth, veterans,
and those who are chronically homeless (NAEH, 2013a). The reason for family homelessness is usually an unforeseen financial crisis such as a medical emergency or death in the family. Most homeless families are able to bounce back from homelessness with little public assistance, but they may need rent assistance, help finding permanent housing, or job assistance. Family conflict such as divorce, or neglect or abuse, is the most common reason youth become homeless. There is special concern about LGBTQ youth who become homeless because of family abuse or rejection. About 13% of homeless persons are veterans, who are often homeless because of war-related disabilities. Those counted among the chronic homeless either are homeless long-term or experience repeated bouts of homelessness. They often live in shelters and consume a large portion of the available homeless services. They are more likely than other homeless persons to have severe physical and mental health challenges.

The cost of homelessness can be quite high. When they become hospitalized, homeless people require, on average, 4 more days in the hospital than nonhomeless people. Homeless people are increasingly spending time in jail or prison, often for violating regulations against loitering, sleeping in cars, or begging. Emergency shelter is a costly way to house people. Research suggests that providing chronically homeless persons with permanent supportive housing is less costly than current arrangements when medical, correctional, and shelter costs are considered (NAEH, 2013c).

**ACCESSIBLE ENVIRONMENTS FOR PERSONS WITH DISABILITIES**

In recent years, we have been reminded that environments, particularly built environments, can be disabling because of their inaccessibility to many persons, including most people with mobility and visual disabilities. Ben Watson provides us with several examples of how the physical environment curtailed his activity at times, and he is now in a professional position to try to minimize the barriers people with disabilities experience in the world. The social model of disability emphasizes the barriers people with impairments face as they interact with the physical and social world, arguing that disability is a result of the relationship between the individual and the environment (see Martin, 2013).

This way of thinking about disability was the impetus for development of the Disabled People’s International (2013) in 1981, a network of national organizations that promotes the rights of people with disabilities worldwide. In the United States, the social model of disability led to legislation at all levels of government during the 1970s and 1980s, most notably two pieces of federal legislation. The Rehabilitation Act of 1973 (Pub. L. No. 93-112) was the first federal act to recognize the need for civil rights protection for persons with disabilities. It required all organizations receiving federal assistance to have an affirmative action plan to ensure accessibility of employment to persons with disabilities. The Americans with Disabilities Act of 1990 (ADA) (Pub. L. No. 101-336) extended the civil rights of persons with disabilities to the private sector. It seeks to end discrimination against persons with disabilities and promote their full participation in society. The social model of disability was also the driving force behind the United Nations Convention on the Rights of Persons with Disabilities that entered into force in May 2008 (United Nations Enable, 2013).

The five titles of the ADA seek to eliminate environmental barriers to the full participation of persons with disabilities. You will want to be aware of the legal rights of your clients with disabilities. Ben Watson has discovered that, in spite of the law, he still encounters many physical barriers to his full participation in society.

- **Title I** addresses discrimination in the workplace. It requires reasonable accommodations, including architectural modification, for disabled workers.
- **Title II** requires that all public services, programs, and facilities, including public transportation, be accessible to persons with disabilities.
- **Title III** requires all public accommodations and services operated by private organizations to be
accessible to persons with disabilities. It specifically lists 12 categories of accommodations: hotels and places of lodging; restaurants; movies and theaters; auditoriums and places of public gathering; stores and banks; health care service providers, hospitals, and pharmacies; terminals for public transportation; museums and libraries; parks and zoos; schools; senior centers and social service centers; and places of recreation.

• Title IV requires all intrastate and interstate phone companies to develop telecommunication relay services and devices for persons with speech or hearing impairments to allow them to communicate in a manner similar to that of persons without impairments.

• Title V covers technical guidelines for enforcing the ADA.

Under industrial capitalism, wages are the primary source of livelihood. People who cannot earn wages, therefore, tend to be poor. Around the world, people with disabilities are less likely than other people to be employed. In 2012, the unemployment rate in the United States for people with disabilities was 13.4%, compared with 7.9% for people without a disability (U.S. Bureau of Labor Statistics, 2013a). People with disabilities who lobbied for passage of the ADA argued that government was spending vast sums of money for what they called “dependency programs” but was failing to make the investments required to make environments accessible so that people with disabilities could become employed (Roulstone, 2004).

Social workers need to keep in mind the high prevalence of disabilities among older persons, the fastest growing group in the United States. More accessible environments may be an important way to buffer the expected deleterious effects of
a large elderly population. As the baby boomers age, they will benefit from the earlier activism of the disability community. Exhibit 7.7 lists some of the elements of environmental design that improve accessibility for persons with disabilities. It is important to remember, however, that rapid developments in assistive technology are likely to alter current guidelines about what is optimal environmental design. For example, the minimum space requirements in the ADA’s guidelines for wheelchairs are already too tight for the new styles of motorized wheelchairs.

**Exhibit 7.7 Elements of Accessible Environments for Persons With Disabilities**

- Create some close-in parking spaces widened to 8 feet to accommodate unloading of wheelchairs (1 accessible space for every 25 spaces).
- Create curb cuts or ramping for curbs, with 12 inches of slope for every inch of drop in the curb.
- Make ramps at least 3 feet wide to accommodate wheelchairs and provide a 5-by-5-foot square area at the top of ramps to allow space for door opening.
- Remove high-pile carpeting, low-density carpeting, and plush carpeting, at least in the path of travel. Put nonslip material on slippery floors.
- Avoid phone-in security systems in entrances (barrier for persons who are deaf).
- Make all doorways at least 32 inches wide (36 is better).
- Use automatic doors or doors that take no more than 5 pounds of force to open.
- Use door levers instead of doorknobs.
- Create aisles that are at least 3 feet wide (wider is better). Keep the path of travel clear.
- Connect different levels in buildings with ramps (for small level changes) or a wheelchair-accessible elevator.
- Place public phones no higher than 48 inches (35 to 42 is optimal). Place other things that need to be reached at this optimal height.
- Provide brightly lit foyers and areas with directories to assist persons with low vision. Use 3-inch-high lettering in directories.
- Install Braille signs about 5 feet off the ground.
- Make restroom stalls at least 3 feet deep by 4 feet wide (5 feet by 5 feet is optimal).
- Install toilets that are 17 to 19 inches in height. Provide grab bars at toilets.
- Hang restroom sinks with no vanity underneath, so that persons in wheelchairs can pull up to them.
- Avoid low seats and provide arm supports and backrests on chairs.
- Apply nonslip finish to tubs and showers. Install grab bars in tubs and showers.
- Use both visual and audible emergency warning systems.

**SOURCE:** Based on Brawley, 2006; Johnson, 1992.

**Implications for Social Work Practice**

This discussion of the relationship between human behavior and the physical environment suggests several practice principles:

- Assess the physical environment of your social service setting. Do clients find it accessible, legible, and comfortable? Do they find that it provides adequate privacy and control? Does it provide optimal quality and intensity of sensory stimulation? If it is a residential setting, does it promote social interaction?
• Routinely evaluate the physical environments of clients, particularly those settings where problem behaviors occur. Check your evaluation against clients' perceptions. If you have no opportunity to see these environments, have clients evaluate them for you. Provide space on the intake form for assessing the physical environments of clients.

• Know the physical environments of the organizations to which you refer clients. Assist referral agencies and clients in planning how to overcome any existing environmental barriers. Maximize opportunities for client input into design of their built environments.

• Be alert to the meanings that particular environments hold for clients. Recognize that people have attachments to places as well as to other people.

• When assisting clients to learn new skills, pay attention to the discontinuities between the setting where the skills are learned and the settings where they will be used.

• When planning group activities, ensure the best possible fit between the spatial needs of the activity and the physical environment where the activity will occur.

• Keep the benefits of the natural environment in mind when planning both prevention and remediation programs. When possible, help clients gain access to elements of the natural environment, and where appropriate, help them plan activities in the natural environment.

• Recognize any issues of environmental justice impacting the communities where you work.

• Assess the uses that clients make of information and communication technologies, considering both the benefits and the costs of their use of such technologies.

• Become familiar with new developments in assistive technologies for persons with disabilities and with the resources for financing them.

• Become familiar with technology for adapting environments to make them more accessible.

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Key Terms

- assistive technology
- behavior settings
- behavior settings theories
- biophilia
- built environment
- control theories
- crowding
- deep ecology
- density
- ecocritical theories
- ecofeminism
- ecotherapy
- evidence-based design
- natural environment
- personal space
- place attachment
- place identity
- primary territory
- privacy
- programs
- public territory
- secondary territory
- sociofugal spaces
- sociopetal spaces
- staffing
- stimulation theories
- technology
- territoriality

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Active Learning

1. Take a walking tour of your neighborhood. Do you see any signs of stimulus overload or restricted environmental stimulation in the physical environment? What signs do you see of people engaging in territorial behavior? Do you see any behavior settings in which specific programs are enacted? How well do people seem to be caring for the natural environment? Are there features of the natural environment that seem particularly appealing to you? Are there places in the neighborhood to which you have a strong attachment bond? Do you note any of the design features to improve accessibility for persons with disabilities noted in Exhibit 7.7? What effects do you think the physical environment of the neighborhood might have on children, adolescents, and elderly adults?
2. Sitting with a small group of classmates, make a list of all the communication technology devices you make use of. Make another list of the uses you have made of these devices in the last 2 days. Discuss your relationship to these devices: how attached you are to them, how big a part of your life they are, and how you feel when you don't have access to them. How do you see these devices making your life better? What, if any, are their ill effects on your life? Finally, make a list of the benefits these devices provide to society. Make another list of the downside of these devices for society. What have you heard other people say about the benefits and downside of these technological devices?

3. Sitting with a small group of classmates, imagine that Ben Watson is visiting your community for the weekend. Your group would like to take him out to dinner. Working together, develop a list of questions that you will want to ask of restaurant managers about their accessibility for Ben to dine there. Now, each of you get out your cell phone and call one of your favorite restaurants and go through your list of questions. What did you learn?

**Web Resources**

**Academy of Neuroscience for Architecture:**
www.anfarch.org

Site maintained by the Academy of Neuroscience for Architecture contains information about the academy and its projects, upcoming workshops on neuroscience and specific design environments, and links to neuroscience and architecture organizations.

**American Association of People with Disabilities:**
www.aapd.com

Site maintained by the American Association of People with Disabilities, a national nonprofit cross-disability organization, contains information on benefits, information on disability rights, news, and links to other disability-related sites.

**Center for Health Design:**
www.healthdesign.org

Site maintained by the Center for Health Design, a research and advocacy organization committed to using architectural design to transform health care settings into healing environments.

**Environmental Justice in Waste Programs:**
www.epa.gov/oswer/ej

Site maintained by the U.S. Environmental Protection Agency contains basic information about environmental justice, action plans, contacts, publications, and laws and regulations.

**Job Accommodation Network:**
www.askjan.org

Site maintained by the Job Accommodation Network of the Office of Disability Employment Policy of the U.S. Department of Labor contains ADA statutes, regulations, guidelines, technical sheets, and other assistance documents.

**National Alliance to End Homelessness:**
www.endhomelessness.org

Site maintained by the National Alliance to End Homelessness contains basic facts about homelessness; facts and policy issues related to homeless families, chronic homelessness, rural homelessness, homeless youth, homeless veterans, domestic violence, and health care; and suggested solutions for ending homelessness.

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