

14

APPLYING SOCIAL PSYCHOLOGY TO THE ENVIRONMENT

ROBERT GIFFORD

Chapter Outline

Resource Dilemmas

A Family of Dilemmas

What Is a Resource Dilemma?

Studying Resource Dilemmas

The Built Environment

Social Design

Defensible Space

Epilogue

Summary

“A California student linked to a radical environmentalist group is being held without bail as he

faces charges for allegedly firebombing 125 sport utility vehicles [SUVs] last August [2003].... Human life is risked by the nature of these offences,” U.S. Magistrate Carolyn Turchin said during a hearing Wednesday as she decided not to release 23-year-old Billy Cottrell.

The Pasadena, California, man was arrested on March 9, 2004, and accused of damaging or destroying vehicles at car dealerships and homes in the Los Angeles area. The bill for the property damage was an estimated \$2.3 million. At the time, Cottrell was a second-year graduate student in physics at the California Institute of Technology, and e-mails from computers at that school had claimed responsibility for the SUV mayhem on behalf of the extremist Earth Liberation Front. On its website, the Earth Liberation Front called Cottrell “an environmental campaigner.”

Federal Bureau of Investigation (FBI) officials said in an affidavit that Cottrell was also involved in a plot to plaster SUVs with 5,000 bumper stickers that read “My SUV Supports Terrorism.” Many environmentalists disapprove of SUVs because of their high gas consumption. If convicted, Cottrell could spend 40 years behind bars. One charge that he faces, using a destructive device during a violent crime, carries a minimum sentence of 30 years in federal prison (“Suspected SUV Bomber,” 2004).

One might ask the following questions:

- Why is gas consumption such a contentious issue?
- If SUVs consume so much gas, what interventions can be implemented to discourage people from buying them?
- As more people drive SUVs, does that encourage still more people to purchase them?

“Wherever you go, there you are.” This old saying is another way of conveying the idea that no matter what you do—whether you are interacting with others or are alone, and no matter what

behavior or thought you are engaged in—you do it *somewhere*. This somewhere is the physical environment, and it is often a crucial influence on our actions, thoughts, and well-being. But our actions, both individually and collectively, also have an enormous impact on the physical environment—sometimes beneficial, but sometimes harmful.

The task of psychologists interested in the environment is to examine a great variety of topics besides the issues involved in extreme actions aimed at defending the natural environment. Environmental psychologists study not only how the physical environment (e.g., buildings, weather, nature, noise, pollution, street arrangements) affects our behavior, thinking, and well-being but also how our behavior (e.g., energy conservation, vandalism, activism, automobile use, recycling, water use) affects the environment (climate change, water shortages, pollution, and reduced biodiversity)

There are social psychological aspects to many topics examined by environmental psychologists such as violence in jails; weather and altruism; the design of the built environment in relation to crime, privacy, crowding, and territoriality; the effects of noise and lighting on interpersonal relations; spatial arrangements in offices and schools; and social aspects of managing natural resources and our role in climate change (Gifford, 2008).

It is not possible to describe everything that environmental psychologists do in one chapter. One recent textbook (Gifford, 2007) describes more than 3,000 published studies in environmental psychology, and even that represents only a fraction of the field's research literature. However, to give you a taste of environmental psychology, including the contributions of social psychology, this chapter focuses on two major topics that should give you a good sample of the field as a whole.

The first topic is **resource dilemmas**, which are sometimes called commons dilemmas. These

are situations in which individuals must choose between self-interest (taking or using unsustainable amounts of a natural resource such as water or fish) and the interests of the community or environment (taking a sustainable share, or less, of the resource). Which social factors do you think might come into play as individuals make these decisions? Given that no one person is likely to be given control of an entire water supply or fishing grounds, how might you conduct some research to understand what causes greed or cooperation in these situations?

Second, environmental psychologists work to improve the physical environment. Two ways in which they do so are called social design and defensible space. **Social design** is a process by which any building (e.g., office, school, residence, factory, retail store, prison) may be designed in collaboration with those who will actually use that building so that they are more user-friendly, as opposed to being designed solely by an architect who will never use the building. Outdoor spaces, such as streets and plazas, can also be designed either to support human interaction or to ignore it. What social factors might be important in a process like this? Have you ever worked, gone to school, or visited a building that did not facilitate your work, your purpose for using the building, or your social life? Social design could have helped.

Defensible space represents a way of fighting crime through careful arrangement of the physical aspects of communities, retail buildings, and residences. The way in which a building or community is designed can encourage or discourage burglars, robbers, and vandals. What could those design factors be? How could social psychology be a part of this kind of research?

Like the efforts of other psychologists, the work of those who study environmental issues may be grouped into two complementary branches: experimental and applied. Nearly all of environmental psychology is applied in the broad sense that its efforts are stimulated by the recognition of problems in interactions between individuals and their built and natural settings.

Virtually all environmental psychologists hope to help solve these problems eventually. Even the most experimental of environmental psychologists hope that the results from their studies will be considered in the design of offices, factories, homes, streetscapes, and/or parks (even parks have some buildings and trails) or in programs designed to improve environment-related behaviors such as recycling, energy conservation, and reductions in car use.

Environmental psychologists have learned an enormous amount about person–environment relations during the 40 years the field has formally existed. They know much about social environmental dynamics such as how typical interpersonal distances change with different situations, which social factors are likely to improve or inhibit pro-environmental attitudes, how interpersonal relations lead to water conservation, how crowding affects social interaction, how noise influences helping behavior, and how temperature is related to interpersonal violence. Many have designed behavioral interventions to change and improve behavior toward more sustainable practices.

As discussed in Chapter 1, however, good social scientists also want to understand *why* people act the way they do. Therefore, psychologists who focus on the physical environment have developed interesting theories to help explain things such as who will cooperate and who will not when resources are scarce, how cultures vary in seeking privacy, the cultural meanings conveyed by building facades, the strategies residents use for dealing with spatial conflicts within their homes, how children learn to find their way around their neighborhoods, and which furniture arrangements encourage social interaction (Gifford, 2007).

However, as mentioned earlier, this chapter considers only a small sample of these efforts: resource dilemmas, social design, and defensible space.

RESOURCE DILEMMAS

As environmental problems and concerns grow, social scientists must learn more about individual and small-group contributions to ecological degradation. As humans who dwell in societies, we extract, refine, use, and dispose of many natural resources. However, societies are composed of individuals, and ultimately people make these choices *as individuals and small groups* in their homes, at work, and during their leisure hours.

The crucial aspect of resource management decisions by each of us is that they sum, from person to person, across billions of individuals' actions to large-scale effects on the environment in ways that are partly rational, partly irrational, and yet all-important. Mundane everyday choices to turn on the air-conditioning, drive the car a short way instead of walking or riding a bike, or take a 15-minute shower instead of a 5-minute shower add up to resource depletion on a larger scale.

Once the macroenvironment is affected (e.g., less forest cover, depleted aquifers, more landfills, more pavement), it affects us in return. Most of us realize that we should waste less, but we are tempted to lead lives that use many natural resources (e.g., water, oil, wood). Our divided goals lead us to experience this as a dilemma, one or another of a family called *social dilemmas*.

A Family of Dilemmas

The focus of this section is on resource dilemmas, which represent one of several kinds of dilemma situations that fall under the general category (family) of social dilemmas. **Social dilemmas** are a group of situations in which individuals face important choices. Sometimes individuals do not realize how important their choices are—or even that they are making

choices—but that is a separate problem. In social dilemmas, the rewards to the individual for noncooperation are greater than the rewards for cooperation no matter what others do; however, if most individuals involved fail to cooperate, then everyone receives lower rewards (Dawes, 1980). A simple example would be a person washing a car during a dry spell. This person gains a clean car by using scarce water—the reward (a clean car) seems greater than having no reward (an unclean car)—and this clean car reward occurs, in the short term, regardless of what other community residents do. If this person is one of very few people washing their cars, a clean car reward is gained with little loss to the community water supply. However, if many persons wash their cars, serious damage might be done to the water supply and everyone receives a lower reward—having no water, or perhaps muddy water, from the community supply—and this consequence is worse than merely having a dirty car.

Three main forms of social dilemma are recognized: public goods problems, social traps, and resource (or commons) dilemmas. **Public goods problems** involve dilemmas about whether to contribute (e.g., time, effort, money) to a project that would benefit everyone when such a contribution is voluntary. For example, one may decide to help (or not help) build a neighborhood children's playground. The dilemma is that contributing costs something (in this case, one's money or time devoted), but if not enough others contribute, the playground project will not be successful.

A person is tempted to *avoid* contributing to the public good (to not cooperate) for two reasons. First, if enough others contribute their time and/or money so that the public good succeeds, the person benefits (gets a neighborhood playground) without having to contribute anything. Second, contributing is risky in that a person might donate money or time, only to find that not enough others do so; if this happens, the project fails and the person's contribution is

wasted.

Of course, the ideal outcome is that everyone helps and the project succeeds. Unfortunately, there are usually some who do not help, leaving the outcome uncertain, and then each person begins to wonder whether participation is a good idea (and this is precisely the public goods dilemma). Public goods dilemmas are surprisingly common in our lives (just look around with the concept in mind). Unfortunately, many worthwhile projects fail.

Social traps are a second form of social dilemma. They involve short-term pleasure or gain that, over time, leads to pain or loss (Platt, 1973). Some classic social traps include smoking, overeating, and using pesticides. They are dilemmas because individuals must choose between an immediate reward (e.g., the pleasure of smoking, the pleasure of eating an extra dish of ice cream) and the long-term negative outcome to which the reward can lead (e.g., lung cancer, obesity) versus short-term deprivation (e.g., quitting smoking, refusing to eat the extra dish of ice cream) and the long-term positive outcome to which the deprivation can lead (e.g., a longer life, a slimmer build).

Two problems create the dilemma in a social trap. First, the long-term outcome usually is not certain (e.g., not every smoker dies of smoking-related disease, nor does every person who abstains from smoking live a long time). In the case of the environment, the long-term uncertainty makes it easier to rationalize choosing the environmentally damaging option (e.g., using excessive water in the spring when the state of the community reservoir later in the summer is not yet known). Second, individuals tend to *discount* (i.e., downplay) the negative outcomes; for example, pesticide users usually do not think about how their pesticide use can lead to ecological problems in the future, or they believe that their own small contribution does not matter all that much.

Public goods problems and social traps are important social dilemmas that clearly are pertinent to the well-being of the physical environment. All of us must deal with these two forms of dilemma in our lives. However, as noted previously, the focus in this chapter is on a third form of social dilemma, the resource dilemma, which is sometimes called the commons dilemma, a term first used by Dawes (1973).

What Is a Resource Dilemma?

Early perspectives on resource dilemmas. The car-washing example given earlier is a specific form of resource dilemma. For a more general understanding, let us start with a little background based on an allegory told long ago by William Lloyd. In some older societies, “the commons” referred to a central open space in the heart of a village. By mutual understanding, this commons was jointly owned by all citizens in good standing without any borders or fences inside it. All citizens were allowed to use its grass and open space to graze their animals. The unwritten rule was that each family could have one cow. There was enough grass for all of the citizens’ animals, and the commons worked well for many years (Lloyd, 1837/1968).

However, the day eventually came when one citizen decided to make a little extra money by having a second cow, from which more milk could be produced and sold. There is nothing wrong with “getting ahead,” is there? (Another possibility is that more families moved to the village, and each family wanted to add one more cow. Everyone is entitled to one cow, right?) The problem is that the amount of available grass remained the same; the alternative is to cut down more of the forest surrounding the village, but that is just another form of resource dilemma. Whether someone wanted to get ahead or the number of shareholders in the commons grew, there was more use of the same amount of grass. As demand for a limited resource increases, the

issue becomes one of *freedom in the commons*, according to Garrett Hardin. Do citizens have the right to take what they want (individual freedom to get ahead) or to increase the number of families, all of whom want equal grazing rights, or should there be restrictions so that the commons is protected (Hardin, 1968)?

When the supply of a resource seems large or nearly limitless, individuals seem to feel free to exploit the resource as much as possible. One reason for this was advanced by the famous 18th-century economist Adam Smith. Smith (1776/1976) argued that in exploiting resource for one's own benefit, an individual allegedly is guided by an "invisible hand" to benefit the whole community. For example, a whaler who becomes rich would employ people, buy equipment, and donate to social, educational, and charitable causes—and would generally aid the economy. At one time, the supply of whales seemed nearly endless.

Lloyd (1837/1968), a 19th-century economist, appears to have been the first (in relating the preceding village allegory) to see a fundamental problem with Smith's logic. Lloyd recognized that many resources are, in fact, finite and limited. When that is the case, a big problem arises. In a limited commons consisting of some desirable resource, individuals acting in self-interest might lead to a process called the **tragedy of the commons**, which occurs when "each [person] is locked into a system that compels him to increase his [harvesting] without limit—in a world that is limited. Ruin is the destination toward which all [persons] rush, each pursuing his own best interest" (Hardin, 1968, p. 1244).

The classic example of a commons dilemma is grazing land (as in the commons example), but the extreme importance of resource dilemmas is that many other resources are limited and essentially held in common—fresh water, forests, habitat, and even our one and only atmosphere. Resource dilemmas are a matter of life and death for all life on the planet.

The conclusion to Lloyd's allegory was that once the commons was overused, the grass ran out and so the cows perished, and then the villagers did not have enough to eat and so they too died. Lloyd's story was an amazingly prescient vision of our modern notion of the limited "spaceship earth" given that he first presented the story more than 165 years ago.

The nature of the dilemma itself. What is a resource dilemma? One occurs each time you want to do something that uses a limited natural resource (e.g., fresh water, oil or gas, wild fish) that would make your life easier, more fun, or more comfortable. Some resources regenerate relatively quickly (e.g., grass for grazing, water in reservoirs), others regenerate not so quickly (e.g., fish, trees), and some regenerate very slowly or not at all (e.g., oil, endangered species). When resources regenerate more slowly than people can harvest them, the danger of resource exhaustion arises. Users of such resources face a choice: either get ahead quickly at the expense of the commons (the resource and/or the environment) and other harvesters or restrain harvesting to preserve the commons and increase one's contentment or wealth more slowly. The radical environmentalist Billy Cottrell apparently believed that oil, from which gas is produced, is a natural resource that is being harvested too quickly.

Not all natural resources are in short supply, even those that are created very slowly (e.g., sand). But when people are able to harvest a desirable resource faster than it can regenerate through improved technology or sheer person power, the potential dilemma becomes an actual dilemma. Harvesters must choose between rapid, resource-destructive, short-term, self-interested harvesting ("get it while you can") and restrained, long-term, community-, and resource-oriented harvesting.

The consequences of resource dilemmas. Hardin's (1968) article in the journal *Science* on the ultimate consequences of resource dilemmas has been very influential. He concluded that

commons dilemmas probably would be fatal to the entire planet eventually. However, environmental psychologists have not accepted without question Hardin's tragedy of the commons argument that most (too many) individuals will act in their short-term self-interest. They believe that the issue of how individuals will behave in a limited commons is an open question that will be resolved through empirical research. Hardin was a biologist and had a fairly pessimistic outlook on the future, based on some clear examples of nonhuman animal populations that followed a tragedy of the commons path to destruction. There is no doubt that the growth of the earth's human population, over the long term, resembles the same pattern observed in some instances of animal populations that collapsed after extremely rapid growth. The explosive growth of the population of humans is depicted in Figure 14.1.

However, humans have greater cognitive capacity than do animals, and they can anticipate difficulties and solve problems—usually. Can our species do better, or are we just another animal in the sense that we will not be able to escape the tendency to greed that will eventually destroy us? Social scientists have pursued this question and created sizable bodies of work in their attempts to try to answer it (e.g., Gardner, Ostrom, & Walker, 1990; Gifford, 2007, chap. 14; Komorita & Parks, 1994).

Insert Figure 14.1 Here

Figure 14.1 The Growth of the Human Population on Earth

The case of water: A dose of reality. One of the most important resources in the world is fresh water, and it is bound to become more important in the future. You will recall that Lloyd pointed out a flaw in Smith's 18th-century influential economic theory that was based on the assumption that natural resources are essentially unlimited. It was acceptable—even admirable—for entrepreneurs to use them at will to create wealth because others in society also would benefit.

This rationale still is used today to justify the “necessary” growth of business and the economy.

We now know well that at least some natural resources are not unlimited and that people have been fighting over limited natural resources for centuries. In his book *Resource Wars*, Michael Klare recalled the biblical accounts of the Israelites’ drive from the desert into the “Promised Land,” that is, the fertile valleys of the Jordan River basin that contained good supplies of water (Klare, 2001). This drive involved a successful invasion (led by Moses) of these lands that were held by several groups that the Israelites expelled from the fertile region (e.g., Canaanites, Amorites, Hittites).

Klare (2001) argued that the 1967 Arab–Israeli war essentially was a modern repetition of the same struggle. He quoted former Israeli Prime Minister Yitzhak Rabin, who once said, “If we solve every other problem in the Middle East but do not satisfactorily solve the water problem, our region will explode.” Ancient and modern Egyptian rulers likewise have struggled to control the waters of the Nile, which during modern times flows through nine countries. Boutros Boutros-Ghali, the former Egyptian minister of state for foreign affairs, said, “The next war in our region will be over the waters of the Nile, not politics.”

Today’s natural resource struggles are over oil, fish, and trees as well as water. The ancient legacy of war and armed conflict in the Jordan and Nile regions could well be repeated as sources of water, fish, oil, and trees recede. Indeed, there have already been many oil wars and fish wars during recent times. Thus, cooperation in the use and management of natural resources is not some kind of academic parlor game; it is of vital importance in the real world of politics and war. Lives depend on finding ways of sharing natural resources in equitable ways.

To summarize, we all play a part in the management of a steady stream of natural resources (e.g., fresh water, oil, wood, fish) that have been converted into products that we use every day.

Some of these resources come from limited sources. Commons dilemmas occur when improved technology or increased person power enables the harvesting of resources faster than the resource can regenerate.

All of us who use natural resources or products derived from them (i.e., everybody) must decide whether to maximize our own gain in the short term or, instead, to help maximize the gain over the long term for everyone, including ourselves (and, in the course of so doing, to preserve the resources themselves rather than wiping them out). The crucial aspect of all these individual decisions is that they add up to society's success or failure in managing natural resources.

Studying Resource Dilemmas

For environmental psychologists, two important questions are as follows. First, under which conditions will individuals act in self-interest to the detriment of others and the resource? Second, under what conditions will individuals not act in self-interest and, thus, act to the benefit of others and the resource? The first question concerns understanding the problem, whereas the second question relates to addressing the problem. Often it is easier or more rewarding, at least in the short run, to engage in self-serving behavior than to behave in the public interest. In a limited commons, the cooperative or public-spirited act often is more expensive, difficult, and/or time-consuming and less immediately rewarding than is the self-serving act. As we will see, social factors are among the most important in answering these questions.

More than 100 recent scientific studies have examined many influences on the choices that individuals and groups make in these resource dilemmas. In a typical study, several participants (fishers) might see, in a computer-simulated fishery called a microworld, that a lake contains 100 fish. They are told that they will receive \$5 for each fish they catch, and that they can catch as

many as they wish. The fish spawn at the rate of two between seasons (that is, the number of fish left after all the fishers have caught as many fish as they want for that season double before the opening of the next season). However, the lake's resources cannot support more than 100 fish, so the spawning can never result in the lake having more than 100 fish. If all the fish are ever taken, they obviously cannot spawn, and the fishery is dead. If you were one of 4 fishers in this situation, how many fish would you catch in the first season? Do you wonder how many fish the other three fishers might take? Will the four of you manage this resource in a sustainable way, so that the fishery continues indefinitely—or will the four of you extinguish the fish population?

Altogether, perhaps 35 different factors have been found to influence whether harvesters tend to be greedy or cooperative in resource dilemmas (Gifford, 2007, chap. 14; Komorita & Parks, 1994). These studies have, in general, focused on three kinds of influence on cooperation in the commons. The first is the nature of the resource itself (e.g., how much of it is available, how much of it is certain to exist). For example, what if, in the typical study above, the lake contained 1000 fish, or 25 fish instead of 100? What if, in the case of a real lake, counting the fish is difficult, so scientists must estimate the fish population. Their best estimate is that the lake contains 50-150 fish. How would that affect the fishers' harvesting? A second factor involves the social conditions or rules surrounding the harvesting (e.g., how well the harvesters know and trust each other; whether a leader exists, is elected, or acts in a certain way). What if the four fishers are all good friends, versus the four fishers are all strangers? What if the four have a boss, or they know that a game warden is nearby? The third factor is the characteristics of the harvesters themselves (e.g., their values, their needs, or their experience as fishers). What if one of the fishers has four children and another has none, or two fishers are very aware of the concept of sustainability and two others have never heard of the idea?

Each study typically examines two or three specific variables at a time. As an example, our own recent research has focused on the thinking processes of participants as the dilemma evolves over time (Hine & Gifford, 1997) and on the attributions made about the actions of the self and other harvesters (Gifford & Hine, 1997; Hine & Gifford, 1996). Decision making and behavior in resource dilemmas depend, in part, on what we think about the other harvesters and *their* choices.

Typically these studies are done in laboratories, in order to test hypotheses in a scientifically correct way, but the findings do apply to the real world. Not only fish, but water, trees, many species of animals and plants, and other natural resources are valuable but in short supply. Clearly, the basic idea of the resource dilemma is tied to the fate of many important resources and therefore, ultimately, to our own fate.

Insert Figure 14.2 Here

Figure 14.2 Screen Shot from FISH 3

A microworld. When you think about it, no government or corporation is likely to give anyone, including a social scientist, complete control over any large real resource merely to conduct an experimental study. Thus, we scientists sometimes use **microworlds**, that is, dynamic, computer-based, virtual environments that exist in laboratories but reasonably simulate real-world conditions (DiFonzo, Hantula, & Bordia, 1998). It is tempting to think that participants in these simulated environments do not respond in the same way as they do in everyday life, but there is good evidence that a well-constructed microworld will elicit strong emotions that seem to indicate that the participants are taking the microworld as seriously as they would a full-scale resource.

One such microworld is FISH 3 (Gifford & Gifford, 2000), which recreates in the laboratory

the situation faced by real fishers as they choose how much of a fish stock to harvest. The program creates a context that includes many of the essential elements of a real resource dilemma. If you were a participant fisher, you would be able to choose, if you wish, to catch fish more quickly than they can spawn. In fact, you could catch all the fish at any time. But if you (or another fisher) do that, the fish will not exist to reproduce in the future, so the quick gain comes at the expense of any future harvests. So, you may also choose to restrain your harvests in the interest of conserving the stock of fish. Each fisher in a fleet (group) has equal and full access to the resource. Thus, one big concern is what the other fishers will do; can they be trusted to restrain their harvests? Figure 14.2 shows a screen shot from FISH 3.

FOCUS ON RESEARCH

Experimental research on resource dilemmas has been very productive and has generated a number of important findings (Komorita & Parks, 1994). Most such studies set up various conditions for their participants and then observe the resulting behaviors. However, more might be learned by examining the “inner” process by which harvesters make their decisions. An approach that seeks to “get into the heads” of participants, **grounded theory analysis** (Glaser & Strauss, 1967), is useful for this purpose. (Grounded theory analysis was discussed in Chapter 3 as an example of qualitative methods.)

Grounded theory analysis is a sophisticated way of learning how people think about particular issues by asking them what they are doing, and why, *as* they are considering something such as making a decision about using some resource. It uses the **think-aloud procedure**, in which individuals explain their decisions moment by moment as they make them. This procedure enables the researcher to track online cognitive processing as it naturally occurs. As noted earlier,

in most resource dilemma studies, researchers simply impose a set of conditions on the harvesters and then observe their resultant decisions. This tells us little about exactly how the decision makers arrived at their decisions because it ignores what goes on in the “black boxes” of the people’s minds.

One resource dilemma study used this grounded theory approach to find out what goes on in harvesters’ heads (Hine & Gifford, 1997). In this microworld study of fishing, one real participant (at a time) was seated in front of a personal computer and a tape recorder to collect his or her thoughts. Two computer-simulated fishers also harvested fish, and their harvesting behavior was programmed to range from quite cooperative to quite greedy. The real fishers were faced with a harvest choice: to take fish for which they receive payment or to leave the fish in the water to reproduce.

Before the fishers fished, and as they fished, the think-aloud technique was used to gather the fishers’ action strategies, heuristics, and cues that triggered their decisions of whether to take fish or not. The results showed that several main *action strategies* were employed by harvesters, including the following:

- Close monitoring of others’ harvest practices
- *Imagining the future harvests of others*
- Trying to avoid overuse of the resource
- Attempting to influence the harvests of others through one’s own harvest practices (strategic harvesting)

Notice that three of these goals were social; they related to what other fishers were doing. This shows that social interaction, whether direct or indirect, is an important part of decisions about whether to use natural resources. Interestingly, two of these social strategies—imagining

the future harvests of others and strategic harvesting—had received little or no attention previously in the general experimental research literature. By uncovering them, the study helped to point the way toward a fuller understanding of harvesters' decision making, which in turn leads toward improved policymaking in real resource dilemmas. The results suggest that when policymakers consider strategies to encourage conservation of natural resources, they should be aware that people do try to imagine or guess what other harvesters might choose to do (a very social factor) and that people use their own harvests to send messages to others (another very social act). How would you turn this knowledge into concrete policy?

A real-world study illustrates both the research process and effective policy-making (Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, (2007). Household energy use is, of course, one kind of resource dilemma. Utility customers in California received information about their household energy use, and some also received a “smiley” face if they used less energy than their neighbors or a “frowney” face if they used more energy than their neighbors. Among those who received only information (no face), those who had been using *more* energy than their neighbors began to use less energy, presumably influenced by social norms (“my neighbors can get along with less, so I suppose I should use less, too.”) However, research does not always go as hoped. Customers who received only information and used *less* than their neighbors were also influenced by the norm, but in a negative way—they began to use *more* energy, apparently to be more like their neighbors (“Well, if the Jones’ are using more, I guess I can, too.”). Fortunately, this tendency was greatly reduced simply by the presence of the faces (what the researchers call an injunctive norm). Customers who had used more energy and received information plus a “frowney” face began to use less energy, as expected. Fortunately, those who used less energy *and* received a “smiley” face did not significantly increase their energy use.

This is an example of a field study, which is a strategy that will be described more broadly next.

Field studies of strategies for inducing pro-environment behavior. Psychologists who are interested in environmental issues also study other uses and abuses of resources such as pollution, the rate of energy use in households and work organizations, recycling, and transportation. Usually they consider the potential power of a few factors that they think might influence people to engage in a more pro-environment behavior such as to reduce their use of some resource, to pollute less, or to recycle more.

Some of the main factors include the following: appeals from authorities, improvements in educational campaigns, goal setting and public commitment by individuals to change their behavior, feedback, modeling, and norm activation (Gifford, 2007; Schultz, 1998). The first two of these have not been found to be particularly effective in changing behavior. This might be surprising in the case of educational campaigns given that they represent a widely used strategy and cost considerable sums to implement. The value of educational campaigns lies in their *priming ability*; that is, they get people *ready* to make a change rather than actually *get* them to change.

The goal-setting and public commitment strategies work better. If a person decides, for example, to reduce household energy use by a specified and reasonable amount (say, 10%) and also announces this goal to family and friends, actual behavior change is more likely. The change has become a personal “item” that the individual “wears around” like a new coat, whereas a plea from the mayor or president, or a television ad, are easy to listen to or look at without becoming incorporated in the person’s identity.

The use of role models has proven to be effective in facilitating the increase in pro-environment behavior. We learn from watching others. This basic principle of **social learning**

theory (Bandura, 1977b) has been shown to increase energy conservation behaviors in studies of university students' showering practices and to improve home energy conservation (Aronson & O'Leary, 1977). In the shower study, despite signs imploring them to do so, only 6% of students soaped up while the water was off and took short showers. A larger sign increased compliance to 19%, but the sign became a target for hostile remarks and minor vandalism. But when a confederate model displayed the desirable behaviors, roughly half of the students followed suit, and when two confederates did so, roughly two thirds of the students followed suit. The confederates changed an environmentally important behavior without saying a word about it; that is an excellent example of social influence. Also, recall that Chapter 3 reported that cognitive dissonance theory has been applied successfully in reducing shower water use (Dickerson, Thibodeau, Aronson, & Miller, 1992).

Modeling can be used to encourage other environmentally conscious behaviors as well. Kahle and Beatty (1987) demonstrated that recycling will increase when significant others are depicted as recycling. A similar strategy combining role models and persuasion is to identify individuals in a neighborhood (e.g., block leaders) who can encourage their neighbors to recycle (Hopper & Nielsen, 1991).

FOCUS ON INTERVENTION

In 1998, Wesley Schultz examined the effectiveness of several interventions designed to promote recycling among the residents of a California community of 32,000. Schultz's (1998) idea was to capitalize on using norms to produce changes in people's recycling behavior. As you may recall from Chapter 4, norms are shared beliefs about what behaviors are and are not acceptable for group members. Schultz attempted to increase residents' recycling behavior by making norms

about their own and others' recycling behavior salient to them, thereby highlighting existing discrepancies between the norm (i.e., "I should be recycling every week") and a resident's actual level of recycling.

During the first stage of this field experiment, Schultz and his colleagues spent 8 weeks observing the levels of recycling among a large number of households. These data served as a baseline measure of recycling behavior. The households (actually small groups of houses that bordered each other) were randomly assigned to the experimental conditions (see below), with approximately 120 houses per condition.

During the second stage (9 weeks after the baseline period), a green door hanger was placed on the front doorknob of every household in the study. The door hangers indicated to the residents that their households had been chosen to be part of a study of recycling and that they should recycle as much as possible. Some households were not contacted any further. These households constituted the *plea to recycle condition*. The households in the other three conditions were contacted on one occasion during each of the next 4 weeks.

On one morning each week, participants' recycling materials were collected by truck. For each of the remaining treatment conditions, door hangers were placed on household doorknobs within 24 hours after recycling materials were collected. In the *information condition*, the hangers had printed information about recycling (e.g., what materials were recyclable, the recycling process). The information on the hangers changed each week. Households in the *individual feedback condition* received door hangers that provided feedback about the level of recycling (i.e., recycle or not, amount of material) at their houses for the previous week, for the current week, and for the course of the study. Participants in the *group feedback condition* received feedback about the level of recycling in their entire residential area for the previous

week, for the current week, and for the course of the study.

Schultz's research team systematically observed and recorded levels of household recycling for all of the households during the 4-week intervention period and also during the 4 weeks following the intervention period. Based on theory and evidence regarding the effects of activating norms by providing feedback, Schultz predicted that feedback of either kind (individual or group) would be more effective in promoting recycling than would either merely providing information or simply making a plea.

Schultz's predictions were supported. During the intervention period, the households receiving individual feedback increased their frequencies of recycling relative to the baseline period. Attesting further to the power of the norm manipulations, those receiving either individual or group feedback continued to show higher frequencies of recycling relative to the baseline during the postintervention period. Neither the plea condition nor the information condition showed significant increases. Also, households in the individual feedback and group feedback conditions increased the *amount* of material they recycled relative to the baseline during both the intervention and postintervention periods. Again, there were no significant effects for either the information condition or the plea condition.

Schultz's experimental intervention was by no means a simple field study. Imagine the amount of time and money required to carry out the project. The two norm-based interventions worked, but were they too costly? Schultz took his research a step further by conducting a cost-benefit analysis. He calculated the costs involved in implementing the interventions (e.g., cost of door hangers, labor to record recycling materials and to distribute feedback, preparation of intervention materials) and the short-term financial benefits (e.g., monies received for recycling materials, reduction in funds needed to pay for trash disposal). Schultz determined that if the

interventions were implemented on a citywide basis, the savings to the city for either feedback intervention would be \$23,000 or more. He further noted that the implementation procedures could be streamlined (reducing costs substantially and further increasing savings) and that the very important environmental benefits (e.g., conservation of resources, reduced pollution) had not been factored into the benefits of the interventions but clearly add to their value.

Schultz's (1998) results demonstrate that interventions designed to promote recycling can be productive in changing people's behavior. They also highlight the usefulness of using theory in the development of effective interventions. It is interesting to consider how Billy Cottrell might have used norm-based interventions to try to change the purchasing behavior of SUV buyers.

Let us consider one other approach to ameliorating resource dilemmas—*environmental audits*. Energy utility companies and governments have tried to provoke conservation through programs in which a company representative visits a household and examines its energy-wasting capacity. Typically, the auditor points out problems, suggests repairs, offers an attractive grant or loan for major refits, and suggests reputable contractors for doing the needed work. The success of such programs has been variable. For instance, Gonzales, Aronson, and Costanzo (1988) reported that the U.S. national average was approximately 15% of household residents going on to make at least some of the necessary changes to their residences.

The environmental audit program, which on the surface might not seem to have anything to do with social psychology, actually does. Gonzales and colleagues (1988) improved the 15% success rate by training auditors how to communicate more effectively with household residents. Drawing on several established social psychological techniques of persuasion, they instructed auditors to use *vivid examples*, for example, "If you were to add up all the cracks under these doors, it's the same as if you had a hole the size of a basketball in your wall." Also, they told the

auditors to *focus on loss rather than gain*, for example, “If you don’t fix cracks, it’s your hard-earned cash going right out the window.” The auditors also were trained to induce residents to invest in the audit process by getting them to follow the auditors around the house, help take measurements, and actually look at the cracks. The researchers reasoned that household residents who personally took part in locating cracks in their homes and realized that they were playing a role in wasting energy would experience *cognitive dissonance*. They predicted that the residents would be motivated to increase their energy conservation behavior (e.g., fill the cracks) so as to reduce dissonance. Together, the changes to the auditors’ social influence strategy produced a cooperation rate of approximately 60%, roughly four times the usual rate and a truly impressive outcome. Imagine the overall impact that the improved communication and persuasion processes could have if that fourfold improvement were applied to residences on a large-scale basis.

In conclusion, Hardin (1968), whose famous article in *Science* stimulated monumental modern debate and study on resource dilemmas, was not optimistic that humans can avoid the tragedy of the commons, that is, the complete collapse of our resources and, therefore, life as we know it. However, environmental and social psychologists have not accepted without question Hardin’s argument that individuals will always act in their short-term self-interest. They consider the issue of how individuals behave in a limited commons to be an open question that will be resolved through empirical research, including implementing and evaluating interventions designed to induce people to put aside self-interest so as to preserve scarce and essential resources before they are destroyed. The material covered in this section has suggested that interventions that draw on social psychological theory and evidence show promise with respect to helping to counter Hardin’s very pessimistic position.

THE BUILT ENVIRONMENT

Many aspects of the physical environment have been shown to influence behavior, including lighting, noise, and temperature. This section considers the behavioral effects of the physical design and layout of buildings and neighborhoods. Have you ever had to study, live, or work in a school, home, or workplace that just did not work well and foster the types of behavior the situation called for? Certainly, some parts of the built environment need much improvement. One well-known example is a large apartment complex in St. Louis, Missouri, that was completed in 1954. The Pruitt–Igoe project was designed with the admirable intention of replacing deteriorating inner-city housing. The design for this complex, which contained 43 eleven-story buildings to house 12,000 people, was praised in an architectural journal for having vandal-resistant features, individualistic design, and no wasted space (“Slum Surgery in St. Louis,” 1951).

The Pruitt–Igoe design saved space in part by having elevators stop only at every third floor, so that most residents would walk up or down one flight of stairs to their apartments. Pruitt–Igoe cost much less per unit than did comparable buildings. The design changes were considered so admirable that the architect even applied for a patent on the design.

But problems appeared soon after Pruitt–Igoe opened. The failure to carefully examine its design in relation to human social behavior contributed to high rates of fear, vandalism, serious crime, and vacancy. A particular problem was crime in the stairwells that residents were forced to use caused by the “innovative” elevator savings plan. The situation was so bad that, after only 18 years, the city began to demolish the entire complex. In this example, insufficient consideration of how the physical structure would influence social behavior led to the ultimate failure of the

project. Whether the architect ever received his patent is unknown.

Pruitt–Igoe is the most dramatic example of building design failure, but many other buildings also pose problems for their users. Take a look at Figure 14.3 for a different example of architecture that fails to suit human needs. *Hard architecture* is aimed at preventing vandalism but goes so far toward that goal that it is uncomfortable and, therefore, rarely used.

Insert Figure 14.3 Here

Figure 14.3 Hard Benches

Social Design

There is a way to design more humane buildings. This process, developed over the past four decades, is called social design (Sommer, 1972, 1983) or social design research. In general, it involves studying how settings can best serve human desires and requirements. It must be distinguished from **technical design**, that is, the engineering aspects of the building such as the performance of building materials. Robert Sommer, a social design pioneer, characterized social design as follows:

Social design is working with people rather than for them; involving people in the planning and management of the spaces around them; educating them to use the environment wisely and creatively to achieve a harmonious balance between the social, physical, and natural environment; to develop an awareness of beauty, a sense of responsibility, to the earth's environment and to other living creatures; to generate, compile, and make available information about the effects of human activities on the biotic and physical environment, including the effects of the built environment on human beings. Social designers cannot achieve these objectives working by themselves. The goals can be realized only within the structures of

larger organizations, which include the people for whom a project is planned.

(Sommer, 1983, p. 7)

Social design also may be distinguished from formal design, which is the traditional approach (Sommer, 1983). **Formal design** favors an approach that may be described as large scale, corporate, high cost, exclusive, authoritarian, tending to high-tech solutions, and concerned with style, ornament, the paying client, and a national or international focus. In contrast, social design favors an approach that may be described as small scale, human oriented, low cost, inclusive, democratic, tending to appropriate technology, and concerned with meaning and context, the occupant or paying client, and a local focus. Although large building projects lend themselves more naturally to formal design, social design approaches certainly can be employed on an area-by-area approach within a large project. These two approaches to design lead to the construction of buildings that differ dramatically, with important implications for human behavior and welfare inside them.

A growing collaboration. Design education and design competitions often encourage designers to emphasize the aesthetic dimension of architecture at the expense of the setting's functional value. Environments should, of course, be both beautiful and functional for their occupants. Unfortunately, attempts to create fashionable works of art dominated architecture for a long time—and still do. Architectural magazines still use expensive photography and glossy paper to show off buildings, but often no people are even visible in the scenes.

It is tempting to conclude that these “unpeopled buildingscapes” accurately reflect many designers' interests. One of the most influential architects in the world, Philip Johnson, said,

“The job of the architect is to create beautiful buildings. That’s all” (quoted in Sommer, 1983, p. 4). Where in this view is consideration of the residents’ social lives and interpersonal relations? Who will live, work, and learn in the building—the architect or people like you?

But times are changing. Many architects and designers now recognize the importance of designing for the human use of buildings (without sacrificing technological or aesthetic considerations). For example, decades ago the American Institute of Architects sponsored a conference that served as an early summit meeting between social scientists and designers (Conway, 1973). This conference outlined several key roles that social scientist consultants might play, including evaluating building habitability, defining the psychological needs of occupants, and training occupants in the optimal use of buildings.

Actually, an early form of social design had been practiced long before, at least in one project, although perhaps it had been forgotten by many. Back in 1914, one office design team “spent several months in consultation, asking advice, and studying the needs of every department and of every individual” (Dempsey, 1914), although these consultations primarily concerned one elemental aspect of social design, that is, the physical distance between employees.

Nevertheless, even now, many architects are still mesmerized by the aesthetic properties of geometric space, and mainstream psychology largely neglects the physical context of behavior. However, when architects and social designers do collaborate, they begin to think of architecture as **placemaking**, that is, real people imagined in real spaces (Sime, 1986; Schneekloth & Shibley, 1993). To “make a place,” architects and social designers work together to create an “envelope for behavior,” meaning that they think mainly about what people actually do in a building rather than think of the building mainly as a sculptural object without much regard for the people who will be using it.

An example of social design may be offered (Gifford & Martin, 1991.) A building that serves people with multiple sclerosis (MS) was to be renovated. The social designers interviewed 80 MS patients, their families (who also used the building as visitors), caregivers, and building staff. This resulted in dozens of design recommendations that never would have been incorporated in the renovations had the people who used the building every day not been interviewed. Many of the recommendations were included in the renovation, and an evaluation of the building months later showed that it was greatly appreciated for the way it reduced physical pain for the people with MS and made their use of the building much more convenient and comfortable. The same approach can be used for any group of people, in offices, industrial worksites, public buildings, and even residences.

The social versus formal design dispute need not be adversarial. If formal designers try to make beautiful buildings for the multisensory pleasure of the building's *users*, aesthetic pursuits serve at least part of the social designer's goals (Stamps, 1989). Beautiful buildings may improve our perceptions of each other, facilitate social interaction, and assist occupants in some less direct ways such as enhancing tourism or a city's reputation.

When and how social design helps. Social design is not *always* needed in the design process. It is not required, for example, in times, places, and cultures where buildings are constructed by small communities in which everyone works together in accordance with a time-tested architectural tradition. These traditions, called **preindustrial vernacular** (Rapoport, 1969), evolved an architecture that already fits community and cultural norms, individual interests, local climate, geography, and building materials quite well. When community members are both

builders and occupants, the design process does not need separate financiers, architects, boards of directors, and construction firms (for an example of vernacular architecture, see Figure 14.4).

In the developed nations of the world, division of labor has produced material benefits for all of us. However, in the design professions (as in other occupations), it has produced considerable role specialization. Because the work of designing and constructing buildings is split more narrowly and each person's entire career is reduced to just one phase of it, there is a tendency for communication among the *principal players* in the process to diminish. The principal players in building design include the client (who puts up the money), the designer (architect and/or planner), the engineer (on larger projects), and (most important) the everyday building resident, customer, worker, or visitor.

Therefore, social design research has become necessary in industrial and postindustrial societies. Two of its major roles are to both reestablish and facilitate communication among the principal players in the design process. A third role is to remind everyone involved that the everyday building user *is* one of the principal players.

After the rise of industrialism and before the advent of environmental psychology, the building user was nearly forgotten in architecture. The dazzling technology produced by the industrial revolution provided a vast array of design possibilities—in building materials, construction principles, and international communication among designers. Today, the design of some buildings requires so much attention to technical factors that the future occupants are completely forgotten.

Insert Figure 14.4 Here

Figure 14.4 Vernacular Architecture

Six goals of social design. Social design researchers and practitioners have six main goals, with some being broader than others and some overlapping with others (Steele, 1973):

1. Create physical settings that match the needs and activities of their occupants. This goal is probably the most important one of all.
2. Satisfy building users. Occupant satisfaction is important because occupants must spend significant parts of their lives working, residing, or relaxing in the setting.
3. Change behavior. Such changes might include increasing office worker productivity, enhancing social ties among institutionalized elderly people, reducing aggression in a prison, or increasing communication among managers in an administrative office. As we will see, the behavior change goal can be both difficult to attain and controversial.
4. Enhance the building users' personal control (Holahan, 1983). The more building users are able to alter the setting to make it suit their needs, the less stressful that setting will be.
5. Facilitate social support (Holahan, 1983). Designs that encourage cooperation, assistance, and support are desirable primarily for building occupants who are disadvantaged in one way or another but also for active and successful individuals.
6. Employ "imageability." This refers to the ability of the building to help occupants, and (especially) visitors and newcomers, to find their way around without getting lost or confused.

Let us examine each of these goals more closely by considering the design of buildings.

Matching. How well the occupants' activities and needs are met by the setting is called **matching**. An example of poor matching might be a gymnasium when it is used for final examinations. It is done, but gyms are not very well suited to that task. Ideally, of course,

buildings should match their occupants' needs and behaviors perfectly. However, whether the degree of match is high or low sometimes depends in part on whose viewpoint is considered (Michelson, 1976). For university administrators' purposes, the gym might seem to be a fine way in which to manage a space problem during final examinations; for students taking exams in the gym, the noise and distractions might seem to be quite inappropriate for an exam atmosphere.

The personality theorist Henry Murray and his collaborators distinguished between two forms of **press**, which refers to properties or characteristics of environmental features that shape behavior (Murray, 1938). **Alpha press** refers to actual reality that can be assessed through objective inquiry. **Beta press** refers to people's interpretation of external reality. For example, a person may act toward a conversation partner in an objectively neutral fashion (alpha press) but be perceived by the partner as aggressive (beta press). Similarly, there are alpha and beta forms of matching.

Alpha matching, or **congruence**, refers to how well the setting fits the person from an objective point of view. For example, there is a good (objective) height for kitchen counters for persons of different heights. Beta matching, or **habitability**, is "environmental quality as perceived by occupants of buildings or facilities" (Preiser & Taylor, 1983, p. 6). Some kitchen workers might not think that a certain counter height is good for them, even if experts claim that the existing counter height *is* correct.

All of the principal players in the design process hope, of course, that both perceived and actual matches are good. The possibility remains, however, that a team of design experts could *declare* that matching has been achieved when the occupants believe that it has not. Unfortunately, significant disagreements between experts and users have indeed been demonstrated in several studies of residential environments. For example, one study found that

professional planners believed that a high-quality neighborhood was related to how open, interesting, and pleasant it was, whereas neighborhood residents believed that high quality was related solely to how pleasant it was (Lansing & Marans, 1969). Such clashes mean that efforts must be made not only toward improving the fit between users and their environments but also toward reducing differences between designer and occupant definitions of good design.

When alpha and beta matching are the same, such as when a building user has an objective need on which everyone agrees, the design implications are clear but the design still does not always meet this need. For example, persons with physical disabilities often have obvious clear-cut needs such as smooth ramps for those in wheelchairs. Yet there are still many buildings that lack ramps even though they are used by people in wheelchairs. Similarly, aged people whose perceptual and cognitive abilities have declined markedly have specific design needs that are often not provided for (Christenson, 1990; Cohen & Weisman, 1990; Rule, Milke, & Dobbs, 1992).

Nevertheless, building design guidelines for individuals with specific characteristics are a good idea, and many lists of guidelines have been prepared. For example, some have considered the proper design for relatively able-bodied older people (Hunt, 1991). Recommended design features for mental patients were among the first to receive attention from social designers (Osmond, 1957), and new ones continue to be issued (e.g., Gulak, 1991; Remen, 1991). Another setting that has been the focus of many recommendations is the children's day care center (Kennedy, 1991; Striniste & Moore, 1989). A set of design guidelines has been created to reduce a drastic behavior—suicide—among jail inmates (Atlas, 1989).

Satisfaction. Habitability (beta matching) corresponds to occupant satisfaction; congruence (alpha matching) is the expert's opinion that the occupants are satisfied. But principal players

other than the occupants may or may not be satisfied with the project. Some architects, for example, hope that their buildings will work as statements of certain aesthetic design principles. The paying client (the building's developer) might be primarily satisfied if the project is completed within its budget. Most social designers would be happy if their work contributed to a habitable structure.

Change behavior. Many projects implicitly or explicitly embody people's hope that occupant behavior will change for the better. When all principal players, including occupants, agree that a certain pattern of behavior needs encouragement or discouragement from the design, the design process may steam merrily ahead. In a New York psychiatric hospital, the violent behavior of some severely regressed psychotic patients was one target when renovation designs were considered (Christenfeld, Wagner, Pastva, & Acrish, 1989). The new design, which basically made the surroundings more home-like, with shaded lighting, lowered ceilings, and pleasant wallcoverings, significantly reduced the incidence of violence. In another study, museum visitors paid more attention to exhibits after careful design changes designed to increase the visitor's sense of immersion in the exhibit by making the exhibits more dynamic, multisensory, and interactive (Harvey, Loomis, Bell, & Marino, 1998).

Sometimes rather simple design modifications can change behavior. For instance, by merely adding tabletop partitions between pairs of students with profound retardation, researchers increased the amount of on-task behavior of the students (Hooper & Reid, 1985).

Unfortunately, principal players sometimes disagree about who should change which behaviors. Clients who pay for new or renovated workplaces, for example, often expect that the new designs will increase employee productivity. When faced with this expectation, the social researcher is in the uncomfortable position of being asked to use the environment to squeeze

productivity out of employees. The very thought of attempting to manipulate employees for the benefit of an organization is unpleasant for many social design practitioners. (Recall the discussion in Chapter 1 of the role of personal values in applied psychology.)

Occupant satisfaction, on the other hand, is usually the goal of social design practitioners and other principal players who are particularly sympathetic to the needs of the building users. Some social designers see the process as part of a worldwide concern for human rights; social design began with attempts to provide the benefits of design to the unfortunate (e.g., mental patients) and to the poor (Sommer, 1983). This activist tradition still fuels the efforts of many social designers.

Let us consider a couple of examples of how social design can influence performance and behavior in the college classroom. Wollin and Montagne (1981) changed a typical plain introductory psychology classroom into one with softer lighting, plants, posters, cushions, and rugs. Student exam scores after 5 weeks in the room were higher than exam scores of students who spent 5 weeks in a similar room that had not been modified. The renovations cost only a few hundred dollars and appear to have produced improved learning for many.

Around the same time, Robert Sommer and Helge Olsen redesigned a plain, 30-seat college classroom (Sommer & Olsen, 1980). With a very small budget, they changed it into a *soft classroom* with semicircular, cushion-covered bench seating, adjustable lighting, a small carpet, and some mobiles. Compared with traditional classrooms of similar size, student participation increased markedly in the classroom. The number of statements per student tripled, and the percentage of students who spoke in class doubled. Besides the dramatic increase in participation, students using the soft room wrote many glowing comments about it in a logbook placed in the classroom. The room was still producing more student participation 17 years later

(Wong, Sommer, & Cook, 1992). That represented a lot of added discussion considering the hundreds of students who had used the room over those years. The research of Sommer and his associates, together with Wollin and Montagne's (1981) work, suggests a tentative conclusion: College classrooms need not be plain and hard; inexpensive changes to make them more pleasant can have very tangible benefits, including better grades, better discussions, and occupant satisfaction (habitability).

Personal control. Good social design will provide building occupants with real options to control their proximate environment. What does this mean in specific terms? Consider, for example, children in hospitals. It is unpleasant enough being in a hospital, but if all of the furniture and equipment are adult-sized, the place is that much more intimidating. To increase children's independence and sense of control, one researcher published body measurement data for people from 0 to 19 years of age in the hope that hospital designers would use it for things such as beds, furniture, and bathrooms (Mirrer, 1987).

A second example is publicly funded residential space for students (dormitories) and poor people (housing projects). Some buildings, high-rises in particular, seem designed to overload residents with social stimulation. Too few elevators and long, narrow hallways, for example, result in the sense that people are everywhere and inescapable. Residents may develop the feeling that they cannot control the number of social contacts—especially unwanted social contacts—they must face daily. This loss of control can negatively affect feelings of security and self-esteem.

Two other common examples of low-control settings are crowded retail stores and traffic jams. **Crowding** refers to the feeling that there are too many people around; it may be distinguished from **population density**, which is an objective measure of persons per unit area.

High density does not always lead to crowding, and crowding is not always the result of high density. Crowding is caused, in part, by social overload and informational overload, which in turn lead to the sense that one has lost control. Designing *against* crowding is, in part, designing *for* personal control. Again, simple design changes can be effective. By merely adding a few entrances to a mental health center, clients' sense of freedom (and thus control) was increased. Furthermore, the various treatment units within the center experienced a greater sense of identity because therapists felt as though they had their "own" entrances (Gutkowski, Ginath, & Guttman, 1992).

Stress is often related to lack of personal control over physical and social input. Noise, unwanted social contact, congestion, and a lack of places of refuge are examples of primary sources of stress (Evans & McCoy, 1998). Good social design can anticipate and attempt to overcome such sources or at least buffer the user from them.

Social support. Personal control is an individual phenomenon, whereas social support is a group phenomenon. **Social support** is a process in which a person receives caring, kind words, and helpfulness from those around him or her. Many social problems would be eased if more and better social support were available (Holahan, 1983). Common psychological problems, such as depression and anxiety, have been shown to increase when social support is absent or inadequate. Social support may be seen as an anti-stress process (Moos, 1981).

What can social design do to facilitate social support? On a small scale, furniture can be arranged in a sociopetal fashion instead of a sociofugal fashion. **Sociopetal arrangements** are those that encourage social interaction (e.g., when people sit facing each other), whereas **sociofugal arrangements** discourage social interaction (e.g., when people sit in rows or even facing away from one another) (Mehrabian & Diamond, 1971). At the building level, open-

space areas may be arranged to facilitate social interaction (Holahan, 1972). Of course, if the personal control goal, as well as the social support goal, is to be met, the increased social interaction must be controllable; occupants should be able to find social interaction when and if they want it but should not be faced with unwanted social encounters.

In office buildings, social support may be fostered through the provision of high-quality lounge space for employees. The mere existence of such space does not guarantee that valuable social support will be available, but with inadequate space for employees to share coffee and conversation, the likelihood of supportive social networks declines.

Finally, in some cases social support may result from a design that provides optimal privacy (being able to filter one's interactions). Consider shelters for victims of domestic violence. A study of alternative designs for such shelters showed that designs characterized by anonymity and safety were most preferred (Refuerzo & Verderber, 1990). Sometimes social support is maximized when a person simultaneously can be near a helper and far from an abuser. The difference in helpfulness and caring is especially large when the contrast is between a residence that is full of hostility and violence and one that is dominated by caring and understanding.

Imageability. Buildings should be **imageable** (i.e., clearly understandable or legible) to the people who use them (Hunt, 1985). When you walk into a building, you should immediately be able to find your way around or, in more technical terms, be capable of **purposeful mobility**. In simple terms, you should not get lost.

It is astounding how often a person enters a building that is unfamiliar and is unable to figure out where to go next. Unless we realize that buildings *should* be imageable, there is a tendency to blame ourselves (e.g., "I never did have a good sense of direction"). Sometimes observation reveals that you are not the first to have problems. Perhaps you have seen hand-made signs that

occupants have made to be helpful and/or to save themselves from answering the same question about where such-and-such is “for the hundredth time.” Such signs represent a failure to make the building imageable, either through good signage or good and legible design of the building itself.

To conclude this section on building design, social design is architectural design that begins with the principle that the needs and preferences of those who will be working, living, or otherwise using a building are important or even paramount. If a building can also be beautiful, that is a wonderful bonus because people do also need beauty in their lives. By virtue of its effects on the way in which people feel and interact, social design is intimately related to applied social psychology. Slowly, for the past 35 years, social design has increasingly become the goal of most architects. However, goals and reality are not always compatible, and not all new buildings are models of successful social design.

Outdoor spaces. Many of the same social design ideas apply to outdoor public areas such as plazas, parks, and streets. In one of the most widely used changes wrought by environmental psychology principles, the very fabric of many cities has been changed by a concept called *density bemusing*, which can be traced to the pioneering work of William Whyte. Recognizing the need for some open space in the city core in 1961, the City of New York offered developers a deal: For every square foot of plaza they included in a new project, their new building could exceed normal zoning restrictions by 10 square feet. Developers liked the idea, and this deal certainly increased New York City’s supply of open space downtown.

Unfortunately, the new plazas tended to be vast empty spaces, with the developers doing the

least possible work to obtain their bonuses. Consequently, New York City revised its offers to developers. It would allow extra floors in new buildings only if developers offered plazas that included many of the amenities identified by Whyte (1980) that are associated with greater use and enjoyment of plazas such as “sittable space,” water (fountains and pools), trees, and accessible food outlets. New plazas based on Whyte’s ideas represent marked improvements over the alternatives, that is, cities with “canyons” but no open space, or empty concrete spaces. The new plazas have increased the pleasantness not only of New York City but also of many cities around the world.

A worthwhile exercise is to return to the six goals of social design and consider the extent to which they (some more than others) are served by the implementation of Whyte’s thinking. Do likewise with respect to the contributions of Brower (1988) reviewed in the following paragraphs.

Sidney Brower has spent years developing and testing ideas for enlivening urban neighborhoods in Baltimore. Two of his key guidelines that have been used to improve the quality of life on the residential streets of that city are (a) keeping the street front alive by encouraging residents to walk, stroll, and play on the sidewalks and (b) finding a legitimate use for every public space so that people routinely visit all areas of the neighborhood and there are no “dead” or unowned spaces. Once some residents are outside and using the public space, others will feel safe in doing so; security and socializing go hand in hand.

Brower has encouraged more use of the street front by giving residents things to do and places to be. For some, this might mean benches; for others, it might mean horseshoes, hopscotch, bocce, street vendors, and/or library vans. Recreation on public streets can be encouraged by blocking off streets, alleys, and parking lots to cars. Some areas, such as

sidewalks themselves, must be free of fast and rough play by young people so that older people can enjoy walking or watching. At the same time, young people need open space that *can* be used for fast and rough play.

Brower also has reduced the speed and number of cars with speed bumps or temporary barricades. This reduced accidents by up to 30% and accidents with injuries by roughly 25%. Residents tend to accept the barriers because they feel safer and the neighborhood is quieter and more suitable for walking (Vis, Dijkstra, & Slop, 1992; Zaidel, Hakkert, & Pistiner, 1992).

Defensible Space

As noted previously, in Baltimore the use of speed bumps and barriers has helped to promote feelings of safety among residents of neighborhoods. How might the physical setting influence the actual likelihood of crime? Most evidence bearing on this question has emerged from the observations and ideas of Jane Jacobs and Oscar Newman that led to **defensible space theory**, a theory that deals with both crime and the fear of crime (Jacobs, 1961; Newman, 1972). This theory proposes that certain design features will increase residents' sense of security and decrease crime in the territory. Some of the features include the use of real or symbolic barriers to separate public territory from private territory and the provision of opportunities for territory owners to observe suspicious activity in their spaces (surveillance).

Quite a number of field studies have tested defensible space theory, and most of them provide support for it (Brown & Altman, 1983; Schneekloth & Shibley, 1993). For example, one would expect more crime in areas that offer fewer opportunities for surveillance and do not appear to be controlled by anyone. A study of crime in university residence halls showed that halls with defensible space features (e.g., more areas over which residents could feel some control and exercise more "surveillability") suffered less crime than did halls on the same campus without

such features (Sommer, 1987). A survey of 16 well-conducted studies in which multiple design changes were made in accordance with defensible space theory found reductions in robberies of 30% to 84% (Casteel & Peek-Asa, 2000). In what follows, we consider the notion of defensible space in several settings.

Convenience stores and banks. Convenience stores have been frequent robbery targets. Those with smaller parking lots and those that do not sell gas, both of which decrease the surveillability of the stores' interiors, are held up more often (D'Alessio & Stolzenberg, 1990). A fascinating study of bank robberies found that several design features are related to increased chances of a holdup (Wise & Wise, 1985). Among these, more robberies occur when the bank has a smaller lobby, a compact square lobby (as opposed to a wide rectangular lobby), and larger distances between its teller stations. These features may be influential because they affect surveillability in the bank lobby.

Residences. In a study involving convicted burglars, convicts examined photos of 50 single-family dwellings and rated each one's likelihood of being burglarized (MacDonald & Gifford, 1989). The defensible space features of the houses were then assessed. As the theory predicts, easily surveillable houses were judged to be unlikely burglary targets. However, actual barriers (e.g., fences, visible locks) had no effect on the perceived vulnerability of the houses, although defensible space theory predicts that they should. According to defensible space theory, symbolic barriers, such as extra decorations and fancy gardens, are supposed to communicate to criminals

that the residents are especially concerned about their property and, therefore, are more likely to defend it; symbolic barriers should make burglars shy away. However, the burglars saw houses with symbolic barriers as *more* vulnerable to burglary (Figure 14.5).

Why? Interviews after the study revealed that burglars viewed actual barriers as challenges that they could overcome; most fences and locks were not seen as serious barriers to them. The symbolic barriers were interpreted not as signs that the residents were especially vigilant but rather as signs that the houses probably contained more than the usual amount of valuables; if the residents have the time and money to decorate their houses and gardens, the burglars reasoned, the houses are probably full of “goodies.” A study of apartment building burglaries confirmed that accessibility (actual barriers) made little difference but that surveillability reduced burglary (Robinson & Robinson, 1997).

Burglars cannot accurately pick out houses that have been burglarized from those that have not, but they do use social and physical cues in their guesses (Brown & Bentley, 1993). As discussed in the previous study, they do not see locks and bars as serious impediments, but they do worry about neighbors seeing them and about the residents’ territorial concerns.

Insert Figure 14.5 Here

Figure 14.5 An Undefensible House.

Interestingly, research has revealed that residents and police do not use the same house features as do burglars to infer that houses are vulnerable to burglary (Ham-Rowbottom, Gifford, & Shaw, 1999; Shaw & Gifford, 1994). These studies imply that residents and police need to understand burglars’ perspective before they can stop burglary through residential design.

As for other features of residences, more crime occurs in taller apartment buildings and in buildings with more than 5 units per floor or 50 total units (Rand, 1984). This probably occurs

because residents of larger buildings are less likely to know one another, tend to treat each other as strangers, and lose the ability to recognize who lives in the building and who does not. This makes entry by criminals easier.

Communities. Crime and vandalism are linked to, or facilitated by, certain aspects of the physical nature of a community. Many gated communities have sprung up, partly out of fears about crime. Residents do feel safer in gated communities, according to one study, but actual crime rates were no lower, and sense of community was lower, than in nongated communities (Wilson-Doenges, 2000). But perhaps residents do not need to completely cut themselves off from the rest of the world.

Defensible space theory asserts that the actions of both the resident and the criminal are affected by defensible space features. Certain streets in St. Louis have defensible space features, including gateway-like entrances, alterations that restrict traffic flow (through narrowing roads or using speed bumps), and signs that discourage traffic (Newman, 1980). Residents who live on such streets are more often seen outside their homes, walking and working in their yards. Such behaviors might not be overtly territorial; residents might not think of themselves as guarding the neighborhood, yet they seem to have the effect of discouraging antisocial activity. Presumably, intruders are discouraged by this naturally occurring surveillance.

Another neighborhood with a high crime rate—in Dayton, Ohio—incorporated some defensible space changes (Cose, 1994). Many entrances to the neighborhood were closed, speed bumps were installed to slow down traffic, gates with the neighborhood logo were installed, and the community was divided into five mini-neighborhoods with physical barriers. Two years later,

traffic was down 67%, violent crime was down 50%, and total crime was down 26%.

When an area seems more residential, with few through-streets and little public parking, it usually will experience less crime than will houses on the edges of such areas (Brantingham & Brantingham, 1977; Krupat & Kubzansky, 1987). The general principle is to reduce passage by strangers through the area, which increases bonds among residents and helps everyone to spot suspicious activity.

Blocks with houses that have been burglarized tend to have more street signs (Brown, 1980). It is possible that streets with more signs indicate a more public area with less control by residents and so may be attractive to criminals. Apartments nearer parking lots and recreation areas are burglarized more, as are stores and residences near corners. Somewhat contrary to this overall picture, streets with heavier traffic may experience less crime; perhaps more cars means more chance of being observed (Rand, 1984). This notion that areas that are more public are more vulnerable is confirmed by reports that more crimes are committed at the edges of central downtown districts (Rand, 1984). People go downtown, are not familiar with the darker areas near the main corners, and may be attacked as they leave or arrive for an evening's entertainment.

However, some areas that *have* defensible space characteristics still have serious crime problems. That is partly because *defensible* space (the physical layout) does not necessarily translate into **defended space** (i.e., residents actually acting against crime by keeping an eye out or reporting suspicious activity). This can happen, for example, if the neighborhood is not sufficiently cohesive for residents to act together against criminal elements (Merry, 1981). Defensible space *sets the stage* for crime reduction by making it easier—nearly automatic—for residents to fight crime through visual surveillance of outdoor areas, but if residents are unable or

unwilling to act on what they see, crime will not be deterred.

A second reason that defensible space does not guarantee a crime-free neighborhood is that not all criminals pay attention to the environment. Less experienced criminals who are motivated by thrill seeking or social approval use less rational criteria for choosing a target and may simply not pay attention to defensible space features of the setting (Rand, 1984). Also, some criminals are impaired by drugs or alcohol as they work and pay less attention to the environment.

When the crime scene is a particular place (e.g., a convenience store) rather than an entire neighborhood, defensible space design principles may be more successful. One chain of stores incorporated a series of changes such as putting cash registers right in front of windows and removing window ads to make the interior more surveillable. Robberies declined by 30% relative to other stores that were not redesigned (Krupat & Kubzansky, 1987).

Researchers in The Netherlands have developed a checklist for assessing the crime vulnerability of neighborhoods (van der Voordt & van Wegen, 1990). This checklist consists of six main elements that discourage criminal behavior:

- The potential visibility of public areas (lines of sight)
- The actual presence of residents (to take advantage of these sight lines)
- Social involvement (residents caring enough to maintain buildings and act against criminals)
- Poor access and escape routes for criminals but good ones for potential victims
- Attractive surroundings that evoke care in residents (with decay informing criminals that residents are not vigilant)
- Structural safeguards or not (e.g., locks, presence of easily vandalized walls, phone booths)

The checklist's primary aim is to identify areas that are susceptible to vandalism, but it may be further developed as a tool against other crimes such as burglary and violent crime.

Vandalism is a widespread destructive behavior. Not every alteration of public territory is vandalism, of course. We can distinguish between vandalism and *people's art* (Sommer, 1972). Part of the distinction involves motive; the artist's goal is to beautify an ugly environment. Vandals are destructive or egocentric; instead of painting a mural that reflects a social concern, they break off a branch of a young tree or scrawl their own names on a subway wall. In contrast, public artists usually seek anonymity yet creatively enhance a bleak place.

Vandals' motive often may be revenge. **Equity theory**, emphasizes the idea that social and other behaviors are influenced by each person's perception that social (or other) rewards and costs should be fair. The theory suggests that vandals often are persons who feel they are dealt with unfairly (Baron & Fisher, 1984). Vandalism may be particularly likely when perceived unfairness is combined with a perceived lack of control, a feeling that the injustice cannot be rectified through normal channels. Whether or not potential vandals have role models who engage in vandalism may also be important (Baron, 1984).

CULTURE CAPSULE: CULTURAL DIFFERENCES IN PERSONAL SPACE

Environmental psychologists are acutely aware that human behavior varies considerably around the world. The ways in which people celebrate birth, teach their children, dress, get married, work, and are treated at death are like a colorful tapestry of swirling colors. Yet in another way, and at another level, people are the same everywhere. They celebrate births, teach their children, dress, get married, work, and recognize death in some kind of ceremony. Personal space is like that; the distance across which individuals interact with one another varies from culture to

culture. Yet in every culture, there are rules that govern the choice of those interactional distances.

Personal space has been described as hidden, silent, and invisible, yet everyone possesses and uses personal space every day. Personal space stretches and shrinks with circumstances. It is interpersonal, so it depends on with whom people are interacting. It refers to the distance people choose to stay from others, but social interaction, such as angle of orientation and eye contact, is also part of personal space. Finally, personal space can be invaded, although such invasions are a matter of degree (Patterson, 1975). In sum, **personal space** is the geographic component of interpersonal relations, that is, the distance and angle of orientation (e.g., side by side, face to face) between individuals as they interact (Gifford, 2007).

Beyond these within-culture variations, personal space is used differently around the world. In one study, for example, groups of four male students came to the laboratory and were told that they would be observed but were given no other instructions (Watson & Graves, 1966). Half of the groups were composed of Arabs, and half were composed of Americans. The average interpersonal distance chosen by Arabs was about the length of an extended arm, whereas the average interpersonal distance chosen by Americans was noticeably farther. The Arabs touched one another much more often, and their orientation was much more direct. In general, the Arabs were much more “immediate” (close) with one another than were the Americans.

Such findings might lead to overly simplistic generalizations or stereotypes about cultural differences, for example, that some cultures are “close” and others are “distant.” However, two studies (Forston & Larson, 1968; Mazur, 1977) revealed that students from supposedly close cultures (Latin America, Spain, and Morocco) chose seating positions that were farther apart from one another than did students from a supposedly distant culture (United States).

Furthermore, not all Latin Americans use the same amount of space (Shuter, 1976). Costa Ricans, for example, choose smaller interpersonal distances on average than do Panamanians and Colombians.

Despite some oversimplifications, personal space does vary with culture. In one study, for example, Japanese people used more distance in conversations than did Americans, who in turn used more than did Venezuelans. But when the same Japanese and Venezuelans spoke English instead of their first languages, their conversational distance moved toward that of the Americans (Sussman & Rosenfeld, 1982). Language, an important part of culture, can modify one's cultural tendencies to use more or less interpersonal distance.

The study of personal space is not merely academic; it also has important implications for cultural understanding and conflict. For example, a researcher taught some English students how to act more like Arabs in their nonverbal behavior (Collett, 1971). Arabs who interacted with the trained students liked them more than they did students who had not received such training. Consider the implications for diplomats or even ordinary tourists.

EPILOGUE

Psychologists have the most difficult scientific job in the world. Natural scientists, even those who study tiny particles or immense galaxies, have the advantage of investigating phenomena that are inherently less complex than they are. Therefore, they can—at least theoretically and at some future time—fully understand the phenomena they study. Psychologists have a more difficult task—to understand entities (people) at their own level of complexity. This is as difficult as frogs trying to understand how and why frogs operate. But beyond that, much of psychology

ignores or underplays the important dynamic interaction between people and their physical settings. Thus, environmental psychologists are like frogs trying to understand not only their fellow frogs but also the manner in which frogs fit into the pond's ecology. No other scientists are faced with a more daunting task.

Nevertheless, for a field of inquiry and action that is only roughly 35 years old, environmental psychology has made some very significant improvements in the world. One wonders whether other branches of psychology, or even other disciplines, have so positively affected the quality of life of so many people within their first 35 years. From ubiquitous transit maps to international diplomacy, from more humane city plazas to the widespread acceptance of social design principles, from encouraging more environmentally responsible behavior to fighting crime, and from saving lost hikers to facilitating better learning in classrooms, environmental psychology has much to be proud of and can truly say that it has made a difference in the quality of life for millions of people.

SUMMARY

This chapter began by discussing social dilemmas with a particular focus on resource dilemmas that occur in situations where a natural resource may be consumed at a nonrenewable rate, potentially leading to severe environmental and human consequences. The dilemma is that individuals must choose between self-interest (overconsuming the resource) and the interests of the community (cooperating by not overconsuming). Consideration was given to the factors that affect the decisions of people faced with resource dilemmas, with particular emphasis placed on factors, including intervention strategies, that lead people to avoid acting on the basis of self-

interest.

Next, the chapter explored issues related to the built environment. Social design, which involves the physical design of buildings and outdoor settings and places an emphasis on the needs and requirements of people as opposed to more technical and stylistic considerations. Social design has six goals: (a) matching the needs of occupants, (b) satisfying building users, (c) changing behavior, (d) enhancing control, (e) facilitating social support, and (f) employing imageability. Of particular importance is the significant role that architecture plays in shaping human behavior, performance, and feelings of well-being. Defensible space theory posits that certain physical design features influence the likely occurrence of crime and feelings of security. We considered the application of the theory to commercial enterprises, residences, and communities.

REFERENCES

- Aronson, E., & O'Leary, M. (1977). The relative effectiveness of models and prompts on energy conservation: A field experiment in a shower room. *Journal of Environmental Systems*, *12*, 219-224.
- Atlas, R. (1989). Reducing the opportunity for inmate suicide: A design guide. *Psychiatric Quarterly*, *60*, 161-171.
- Bandura, A. (1977). *Social learning theory*. Oxford: Prentice-Hall.
- Baron, R. M. (August, 1984). *A social-psychological perspective on environmental issues*. Paper presented at the annual meeting of the American Psychological Association, Toronto.
- Baron, R. M., & Fisher, J. D. (1984). The equity-control model of vandalism: A refinement. In C. Levy-Leboyer (Ed.), *Vandalism: Behavior and motivations*. Amsterdam: North Holland.

- Brantingham, P. S., & Brantingham, P. L. (1977). *A theoretical model of crime site selection*.
Presentation at the American Society of Criminology Meetings, Atlanta.
- Brower, S. (1988). *Design in familiar places: What makes home environments look good*. New York: Praeger.
- Brown, B. B. (1980). *Territoriality, defensible space, and residential burglary*. Master's thesis, University of Utah.
- Brown, B. B., & Bentley, D. L. (1993). Residential burglars judge risk: The role of territoriality. *Journal of Environmental Psychology, 13*, 51-61.
- Brown, B. B., & Altman, I. (1983). Territoriality, defensible space, and residential burglary: An environmental analysis. *Journal of Environmental Psychology, 3*, 203-220.
- Casteel, C., & Peek-Asa, C. (2000). Effectiveness of crime prevention through environmental design (CPTED) in reducing robberies. *American Journal of Preventive Medicine, 18*, 99-115.
- Christenfeld, R., Wagner, J., Pastva, G., & Acrish, W. P. (1989). How physical settings affect chronic mental patients. *Psychiatric Quarterly, 60*, 253-264.
- Christenson, M. A. (1990). Aging in the designed environment. *Physical and Occupational Therapy in Geriatrics, 8*, 3-133.
- Cohen, U., & Weisman, G. D. (1990). Experimental design to maximize autonomy for older adults with cognitive impairments. *Generations, 14*(Suppl), 75-78.
- Collett, D. (1971). Training Englishmen in the nonverbal behavior of Arabs. *International Journal of Psychology, 6*, 209-215.
- Conway, D. (1973). *Social science and design: A process model for architect and social scientist collaboration*. Washington, DC: American Institute of Architects.

- Cose, E. (1994, July 11). Drawing up safer cities. *Newsweek*, p. 57.
- D'Alessio, S., & Stolzenberg, L. (1990). A crime of convenience: The environment and convenience store robbery. *Environment and Behavior*, 22, 255-271.
- Dawes, R. M. (1973). The commons dilemma game: An n-person mixed motive game with a dominating strategy for defection. *ORI Research Bulletin*, 131-12.
- Dawes, R. M. (1980). Social dilemmas. *Annual Review of Psychology*, 31, 169-193.
- Dempsey, F. (1914). Nela Park: A novelty in the architectural grouping of industrial buildings. *Architectural Record*, 35, 469-504.
- DiFonzo, N., Hantula, D. A., & Bordia, P. (1998). Microworlds for experimental research: Having your (control and collection) cake, and realism too. *Behavior Research Methods, Instruments, & Computers*, 30, 278-286.
- Evans, G. W., & McCoy, J. M. (1998). When buildings don't work: The role of architecture in human health. *Journal of Environmental Psychology*, 18, 85-94.
- Forston, R. F., & Larson, C. U. (1968). The dynamics of space: An experimental study in proxemic behavior among Latin Americans and North Americans. *Journal of Communication*, 18, 109-116.
- Gardner, R., Ostrom, E., & Walker, J. (1990). The nature of common-pool resource problems. *Rationality & Society*, 2, 335-358.
- Gifford, R. (2007). *Environmental psychology: Principles and practice* (4th ed.). Colville, WA: Optimal Books.
- Gifford, R. (2008). Psychology's essential role in climate change. *Canadian Psychology/psychologie canadienne*, 49, 273-280.

- Gifford, J., & Gifford, R. (2000). FISH 3: A microworld for studying social dilemmas and resource management. *Behavior Research Methods, Instruments, and Computers*, 32(3), 417-42.
- Gifford, R., & Hine, D. W. (1997). "I'm cooperative, but you're greedy": Some cognitive tendencies in a commons dilemma. *Canadian Journal of Behavioural Science*, 29, 257-265.
- Gifford, R., & Martin, M. (1991). A multiple sclerosis centre program and post-occupancy evaluation. In W. F. E. Preiser, & J. Vischer (Eds.). *Design innovation: The challenge of cultural change*. New York: Van Nostrand Reinhold.
- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Chicago: Aldine.
- Gonzales, M. H., Aronson, E., & Costanzo, M. A. (1988). Using social cognition and persuasion to promote energy conservation: A quasi-experiment. *Journal of Applied Social Psychology*, 18, 1049-1066.
- Gulak, M. B. (1991). Architectural guidelines for state psychiatric hospitals. *Hospital and Community Psychiatry*, 42, 705-707.
- Gutkowski, S., Ginath, Y., & Guttman, F. (1992). Improving psychiatric environments through minimal architectural change. *Hospital and Community Psychiatry*, 43, 920-923.
- Ham-Rowbottom, K. A., Gifford, R., & Shaw, K. T. (1999). Defensible space theory and the police: Assessing the vulnerability of residencies to burglary. *Journal of Environmental Psychology*, 19, 117-129.
- Hardin, G. (1968). The tragedy of the commons. *Science*, 162,1243-1248.
- Harvey, M. L., Loomis, R. J., Bell, P. A., & Marino, M. (1998). The influence of museum

- exhibit design on immersion and psychological flow. *Environment and Behavior*, 30, 601-627.
- Hine, D. W., & Gifford, R. (1996). Attributions about self and others in commons dilemmas. *European Journal of Social Psychology*, 26, 429-445.
- Hine, D. W., & Gifford, R. (1997). What harvesters really think about in commons dilemma simulations: A grounded theory analysis. *Canadian Journal of Behavioural Science*, 29, 179-193.
- Holahan, C. J. (1972). Seating patterns and patient behavior in an experimental dayroom. *Journal of Abnormal Psychology*, 80, 115-124.
- Holahan, C. J. (1983). Interventions to reduce environmental stress: Enhancing social support and personal control. In E. Siedman (Ed.), *Handbook of social interventions*. Beverly Hills, CA: Sage.
- Hopper, J. R., & Nielsen, J. M. (1991). Recycling as altruistic behavior: Normative and behavioral strategies to expand participation in a community recycling program. *Environment and Behavior*, 23, 195-220.
- Hooper, J., & Reid, D. H. (1985). A simple environmental re-design for improving classroom performance of profoundly retarded students. *Education and Treatment of Children*, 8, 25-39.
- Hunt, M. E. (1991). The design of supportive environments for older people. Special Issue: Congregate housing for the elderly: Theoretical, policy, and programmatic perspectives. *Journal of Housing for the Elderly*, 9, 127-140.
- Hunt, M. E. (1985). Enhancing a building's imageability. *Journal of Architectural and Planning Research*, 2, 151-168.

- Jacobs, J. (1961). *The death and life of great American cities*. New York: Random House.
- Kelley, H. H., & Thibault, J. W. (1978). *Interpersonal relations*. New York: Wiley.
- Kahle, L. R., & Beatty, S. E. (1987). Cognitive consequences of legislating postpurchase behavior: Growing up with the bottle bill. *Journal of Applied Social Psychology, 17*, 828-843.
- Kennedy, D. (1991). The young child's experience of space and child care center design: A practical meditation. *Children's Environments Quarterly, 8*, 37-48.
- Klare, M. (2001). *Resource wars: The New Landscape of Global Conflict*. New York: Henry Holt.
- Komorita, S. S., & Parks, C. D. (1994). *Social dilemmas*. Madison, WI: Brown & Benchmark.
- Krupat, E., & Kubzansky, P. E. (1987). Designing to deter crime. *Psychology Today, 21*, 58-61.
- Lansing, J. B., & Marans, R. W. (1969). Evaluation of neighborhood quality. *Journal of the American Institute of Planners, 35*, 195-199.
- Lloyd, W. F. (1837/1968). *Lectures on population, value, poor laws and rent*. New York: August M. Kelley.
- Macdonald, J. E., & Gifford, R. (1989). Territorial cues and defensible space theory: The burglar's point of view. *Journal of Environmental Psychology, 9*, 193-205.
- Mazur, A. (1977). Interpersonal spacing on public benches in "contact" and "noncontact" cultures. *Journal of Social Psychology, 101*, 53-58.
- Mehrabian, A., & Diamond, S. G. (1971). The effects of furniture arrangement, props and personality on social interaction. *Journal of Personality and Social Psychology, 20*,

18-30.

Merry, S. E. (1981). *Urban danger: Life in a neighborhood of strangers*. Philadelphia: Temple University Press.

Michelson, W. (1976). *Man and his urban environment: A sociological approach*. Don Mills, ON: Addison-Wesley.

Mirrer, S. B. (1987). Using anthropometric data in the design of children's health care environments. *Children's Environments Quarterly*, 4, 6-11.

Moos, R. H. (1981). A social-ecological perspective on health. In G. Stone et al. (Eds.) *Health psychology*. San Francisco: Jossey-Bass.

Murray, H. (1938). *Explorations in personality*. New York: Oxford.

Newman, O. (1972). *Defensible space*. New York: Macmillan.

Newman, O. (1980). *Community of interest*. New York: Anchor Press/Doubleday.

Osmond, H. (1957). Function as the basis of psychiatric ward design. *Mental Hospitals*, 8, 23-30.

Patterson, M. L. (1975). Personal space --Time to burst the bubble? *Man-Environment Systems*, 5, 67.

Platt, J. (1973). Social traps. *American Psychologist*, 28, 641-651.

Preiser, W. P. E., & Taylor, A. (1983). The habitability framework: Linking human behavior and physical environment in a special education. *EEQ: Exceptional Education Quarterly*, 4, 1-15.

Rand, G. (1984). Crime and environment: A review of the literature and its implications for urban architecture and planning. *Journal of Architecture and Planning Research*, 1, 3-19.

- Rapoport, A. (1969). *House form and culture*. Englewood Cliffs, NJ: Prentice Hall.
- Refuerzo, B. J., & Verderber, S. (1990). Dimensions of person-environment relationships in shelters for victims of domestic violence. *Journal of Architectural and Planning Research, 7*, 33-52.
- Remen, S. (1991). Signs, symbols, and the psychiatric environment. *Psychiatric Hospital, 22*, 113-118.
- Robinson, M. B., & Robinson, C. E. (1997). Environmental characteristics associated with residential burglaries of student apartment complexes. *Environment and Behavior, 29*, 657-675.
- Rule, B. G., Milke, D. L., & Dobbs, A. R. (1992). Design of institutions: Cognitive functioning and social interactions of the aged resident. *Journal of Applied Gerontology, 11*, 475-488.
- Schneekloth, L. H., & Shibley, R. G. (1993). The practice of placemaking. *Architecture et Comportement/Architecture and Behavior, 9*, 121-144.
- Schultz, P. W. (1998). Changing behavior with normative feedback interventions: A field experiment on curbside recycling. *Basic and Applied Social Psychology, 21*, 25-36.
- Schultz, P. W., Nolan, J., Cialdini, R., Goldstein, N., & Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms. *Psychological Science, 18*, 429-434.
- Shaw, K. T., & Gifford, R. (1994). Residents' and burglars' assessment of burglary risk from defensible space cues. *Journal of Environmental Psychology, 14*, 177-194.
- Shuter, R. (1976). Proxemics and tactility in Latin America. *Journal of Communication, 26*, 46-52.
- Sime, J. D. (1986). Creating places or designing spaces? *Journal of Environmental Psychology,*

6, 49-63.

Slum surgery in St. Louis. (1951). *Architectural Forum*, 94, 128-136.

Smith, A. (1976). *The wealth of nations. Book 1*. Chicago: University of Chicago Press.
(Originally published , 1776.)

Sommer, R. (1972). *Design awareness*. New York: Holt, Rinehart and Winston.

Sommer, R. (1983). *Social design*. Englewood Cliffs, NJ: Prentice-Hall.

Sommer, R. (1987). Crime and vandalism in university residence halls: A confirmation of
defensible space theory. *Journal of Environmental Psychology*, 7, 1-12.

Sommer, R., & Olsen, H. (1980). The soft classroom. *Environment and Behavior*, 12, 3-16.

Stamps, A. (1989). Are environmental aesthetics worth studying? *Journal of Architectural and
Planning Research*, 6, 344-356.

Steele, F. I. (1973). *Physical settings and organizational development*. Don Mills, ON: Addison-
Wesley.

Striniste, N. A., & Moore, R. C. (1989). Early childhood outdoors: A literature review related to
the design of childcare environments. *Children's Environments Quarterly*, 6, 25-31.

Sussman, N. M., & Rosenfeld, H. M. (1982). Influence of culture, language, and sex on
conversational distance. *Journal of Personality and Social Psychology*, 42, 66-74.

van der Voordt, T. J. M., & van Wegen, H. B. R. (1990). Testing building plans for public safety:
Usefulness of the Delft checklist. *Housing and Environmental Research*, 5, 129-154.

Vis, A. A., Dijkstra, A., & Slop, M. (1992). Safety effects of 30 Km/H zones in the Netherlands.
Accident Analysis and Prevention, 24, 75-86.

Watson, O. M., & Graves, T. D. (1966). Quantitative research in proxemic behavior. *American
Anthropologist*, 68, 971-985.

- Whyte, W. H. (1980). *The social life of small urban spaces*. New York: The Conservation Foundation.
- Wilson-Doenges, G. (2000). An exploration of sense of community and fear of crime in gated communities. *Environment and Behavior*, 32, 597-611.
- Wise, J. A., & Wise, B. K. (ca. 1985). *Bank interiors and bank robberies: A design approach to environmental security*. Rolling Meadows, IL: Bank Administration Institute.
- Wollin, D. D., & Montagne, M. (1981). College classroom environment: Effects of sterility versus amiability on student and teacher performance. *Environment and Behavior*, 13, 707-716.
- Wong, C. Y., Sommer, R., Cook, R. (1992). The soft classroom 17 years later. *Journal of Environmental Psychology*, 12, 337-343.
- Zaidel, D., Hakkert, A. S., & Pistiner, A. H. (1992). The use of road humps for moderating speeds on urban streets. *Accident Analysis and Prevention*, 24, 45-56.