CHAPTER 4

EDUCATIONAL INTERVENTIONS: CHANGING ATTITUDES AND PROVIDING INFORMATION

CHAPTER PROLOGUE

This chapter begins with brief passages from two of the best-known and most widely read books ever written about environmental problems. The books were written to educate people about the problems and, thereby, change their behavior toward the environment. Such efforts to educate usually have two main thrusts, which the passages below illustrate: changing people's attitudes and providing them with information.

The first passage comes from Rachel Carson's classic book on the dangers of pesticide use, *Silent Spring* (1962):

> *[Insecticide and herbicide] sprays, dusts, and aerosols are now applied almost universally to farms, gardens, forests, and homes—nonselective chemicals that have the power to kill every insect, the "good" and the "bad," to still the song of birds and the leaping of fish in*

streams, to coat the leaves with a deadly film, and to linger on in the soil—all this though the intended target may be only a few weeds or insects. Can anyone believe it is possible to lay down such a barrage of poisons on the surface of the earth without making it unfit for all life? They should not be called "insecticides," but "biocides."

> *. . . Future historians may well be amazed by our distorted sense of proportion. How could intelligent beings seek to control a few unwanted species by a method that contaminated the entire environment and brought the threat of disease and death even to their own kind? (pp. 7–8)*

> *[Carson goes on to argue for the use of biological pest control, a system that controls pests with predators, diseases, and other natural enemies.]*

Carson wrote *Silent Spring* to change attitudes about pesticides. She tried to alert people to an envi-

ronmental problem and convince them that the problem was so important it needed urgent action—either by the reader or by government agencies, industrial organizations, or others in a position to do something. Carson tried to develop in readers strong beliefs about the seriousness of threats to the environment and a strong attitude about the pesticide problem in question—a predisposition to do something about it or to encourage others to do something. She was part of a growing movement of scientists who sought to alert the public to threats to the environment resulting from human actions.

The second passage is from the popular book *50 Simple Things You Can Do to Save the Earth* (Earth Works Group, 1989), published in connection with the U.S. observance of Earth Day 1990. The passage is part of a discussion of water-saving shower heads from number 24 of the 50 things.

Shower Facts:

- *Showers usually account for a whopping 32% of home water use.*

- *A standard shower head uses about 5–7 gallons of water per minute (gpm)—so even a 5-minute shower can use 35 gallons!*

- *"Low-flow" shower heads reduce water use by 50% or more. They typically cut the flow rate to just 3 gpm—or less. So installing one is the single most effective water conservation step you can take inside your home.*

- *. . . [In addition, with] a low-flow shower head, energy use (and costs) for heating hot water for showers may drop as much as 50%. (pp. 50-51)*

    [The section goes on to explain how to tell if the shower head in your bathroom is a standard or a low-flow model, how low-flow models work, and where they can be purchased.]

The passage above from *50 Simple Things . . .*—and the entire book—aims to change the way people treat the environment by *providing information.* The authors don't try to change attitudes; they assume that the reader already wants to save the earth. The authors believe, however, that the reader needs to know exactly what to do and how to do it in order to take effective action.

INTRODUCTION

The books *Silent Spring* and *50 Simple Things You Can Do to Save the Earth* were written on the assumption that educating people—changing their attitudes and beliefs and providing them with information—would change their actual behavior. The kinds of educational efforts we discuss in this chapter are much more focused than the kinds of moral and ethical-religious appeals we discussed in Chapter 3. This is because people's beliefs about particular environmental issues, such as the effects of pesticides on bird populations, and their related attitudes, such as about the widespread use of pesticides, are much more specific and less deeply rooted than their morals and basic values (such as a religious reverence for nature) or their general ideas about how the environment responds to human intervention.

The assumption about the efficacy of education that underlies *Silent Spring* and *50 Simple Things* is not one confined to environmentalists who write books. It is shared by many public officials, doctors, educators, and ordinary citizens who are concerned about societal problems. Indeed, it is almost common sense that education is essential for solving a wide range of social problems, and many also believe that a good educational effort will be sufficient to do the job. Consider, for example, this brief quotation from the Saline, Michigan, hospital newsletter: "Today, marijuana use is not uncommon in junior high schools, and is creeping into elementary schools. How can it be stopped? As with any behavior, the most effective way. . .is through education." Following the same logic, people propose sex education as the way to prevent the spread of AIDS and other sexually transmitted diseases, education on smoking and diet as ways to prevent heart disease, and environmental education as the way to get people to be more respectful of wilderness areas and other fragile environmental systems (see Figure 4-1).

Behavioral and social science research, however, indicates that this conventional wisdom—that education is enough to solve social problems—is oversimplified and misleading. The research shows that education can help but that education is rarely sufficient. For example, decades of careful study of health
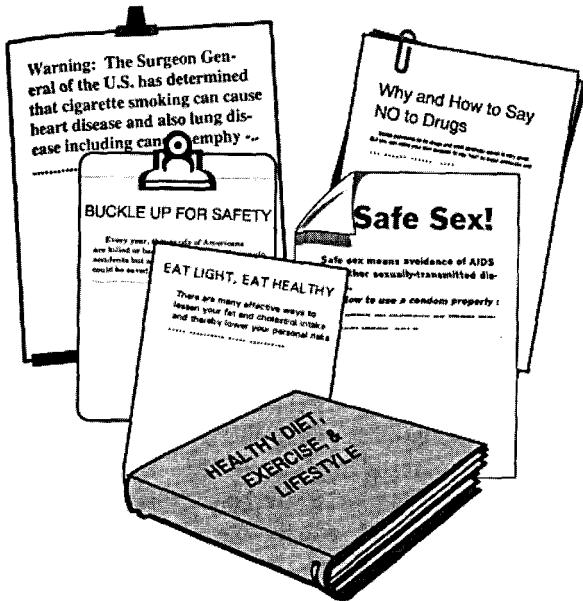
FIGURE 4-1   Some Written Educational Materials Intended to Promote Healthy Behavior

promotion campaigns show that it is possible to get people to stop smoking tobacco or to eat healthier foods, but not with education alone. In the 1960s and 1970s, a large number of programs were conducted in schools to keep children from developing the smoking habit. These programs, which operated mainly by providing information on why smoking is bad for health, changed some of the students' beliefs and attitudes, but rarely reduced the onset of smoking behavior (Thompson, 1978). Other educational programs for health promotion—to improve eating habits, cut alcohol consumption, and the like—have been plagued by problems of limited success and frequent relapses into old behavior patterns.

Clearly, there have been major strides in health promotion in the United States over the past 30 years. Since the 1950s, when the link between cigarette smoking and cancer first came to light, the proportion of American adults who smoke has decreased, and

after decades of publicity about the health effects of fiber and cholesterol in the diet, sales figures have shown increased consumption of whole grains and fresh produce and decreased consumption of red meat. But these successes are based on more than just education. We identify the other key elements of success later in the chapter.

Chapter Overview.   We devote this chapter to a careful examination of efforts to encourage proenvironmental behavior via education. We focus on interventions that aim to change people's behavior in the relatively short run. (We do not address general environmental education programs, such as those in some schools, targeted specifically at children, that attempt to produce changes in the long run by changing children's basic environmental understanding so they will believe differently as adults. The long-term effects of such education are very difficult to measure, but we believe that these effects can be significant, and we return to this theme at the end of the chapter.)

We find that, as with health promotion, education is helpful but not sufficient for promoting the desired behaviors. We look first at educational efforts that try to change fairly specific environmental attitudes and beliefs and then at efforts that offer information about how to act on proenvironmental attitudes. We see that education can change attitudes and beliefs, but that many barriers, both within individuals and in their social and economic environments, can keep proenvironmental attitudes from being expressed in action. Some internal barriers can be overcome with informational programs, but only if the programs are carefully designed to take advantage of psychological principles of communication. The chapter presents those principles and some illustrative examples of successful and unsuccessful information programs. But even the best educational programs cannot overcome external barriers to action, such as financial expense or serious inconvenience. The chapter details what environmental education can and cannot accomplish, and tells what must be done to take the educational strategy as far as it can go. In later chapters, we show how even greater success can be achieved by combining education with other approaches.

EDUCATION TO CHANGE ENVIRONMENTAL ATTITUDES AND BELIEFS

Education can change attitudes and specific environmental beliefs, but it cannot quickly or easily change ethics or values. Furthermore, education is not likely to work if it promotes attitudes that clash with people's basic ethics or values. Educators like Carson know this. If an educator tells people that in order to have a clean environment they must sacrifice financial security, fresh food, or time with their families, people who value those things highly will reject the educator's message. But if the message is that environmental quality does not require people to reorder their basic values, it will go down easier. Carson's message can work partly because she explains how giving up pesticides does not mean giving up fresh food. It is not necessary to choose between environmental values and fresh produce, because one can have both by rejecting pesticides in favor of biological controls. (Of course, major shifts in Western values may also be needed to permanently solve environmental problems, as we discussed in Chapter 3.)

Changing environmental attitudes can make a difference. It is no coincidence that the increased awareness and concern about environmental problems in U.S. public opinion beginning in the 1960s was followed by a burst of new legislation in the 1970s. And many scholars and writers believe that this shift in opinion was strongly influenced by Carson's *Silent Spring*. Also, when the word first came out in the mid-1970s that the chlorofluorocarbon propellants used in aerosol cans might harm the earth's ozone layer, Americans quickly reduced their purchases of the cans and the government instituted a ban (Morrisette, et al., 1990). This could not have happened without widespread public concern. People who strongly favor environmental protection are more likely to join environmental movement organizations (Mitchell, 1979) and vote for environmental protection in public referenda (Gill et al., 1986), so attitudes can lead to action. But environmental attitudes are not always correlated with behavior, and attitude change does not always lead to behavioral change. These facts greatly limit what the attitude-change strategy alone can accomplish.

Controlled studies show that educational efforts to change environmental attitudes and beliefs generally have little effect on behavior. The most careful studies focus on consumer behaviors—recycling, energy conservation, and other things individuals can do on their own to directly change how environmental resources are used. (Researchers have not conducted experiments on changing people's political attitudes and beliefs—what *Silent Spring* tried to do—probably because doing this as an experiment poses serious ethical questions.) The following examples are typical. They focus on energy conservation in the home, an important way of reducing environmental problems such as air pollution and global warming and one on which there is considerable research.

In 1977, a year when natural gas shortages caused some businesses and schools to close down to preserve heating fuel, state agencies in Virginia conducted three-hour workshops in various communities to educate people about energy conservation in the home. The workshops, which consisted of lectures, slide shows, discussions, and demonstrations, were designed to convince people that they could save substantial amounts of energy in their homes and to show them how. Scott Geller and his colleagues at the Virginia Polytechnic Institute and State University evaluated the effects of the workshop approach with surveys and follow-up visits to participants' homes to look for behavioral change (Geller, 1981). The workshops were effective in changing attitudes and beliefs, as measured by before-and-after surveys. After the workshop, participants expressed increased concern about the energy crisis, increased awareness that simple changes in the home can yield substantial energy savings, and stronger beliefs that they could do something about the energy crisis and that they had not yet done enough to insulate their homes. The surveys also revealed stronger expressed commitment to change "residential lifestyle for energy conservation." But these attitudes, beliefs, and commitments did not translate into behavioral change. Follow-up visits to participants' homes six weeks after the workshop revealed that only one of forty workshop participants had lowered a water heater thermostat, as the workshop had recommended, and that the only two with insulated water heaters (another workshop rec-

ommendation) had insulated them before the workshop. The only behavioral change was in installing low-flow shower heads. Eight of forty workshop participants had installed them, compared with two of forty nonparticipants in nearby homes. But this change was not produced by education alone. The workshop leaders also gave participants water-flow restrictors and explained how to use them. By doing this, they removed a barrier to energy conservation—the effort of obtaining the flow restrictor people may have come to want as a result of the workshop. Such barriers between attitudes and behavior impede educational efforts, as we see throughout this chapter. In sum, although the workshops changed people's attitudes, beliefs, and even their plans to act (at least for a while), education alone did not lead to any observable action.

A similar result was observed in a government pilot program conducted in 1977 in Denver, Colorado. The purpose of this program was to change people's attitudes about appliance purchases so that instead of trying to get the lowest price, they would want the model with the lowest "energy cost of ownership." This concept is that the true cost of a household appliance such as a refrigerator includes not only the purchase price but also the cost of the energy used to operate it. The U.S. Department of Energy believed that if consumers developed energy-wise attitudes about appliance purchases, they would begin to buy models that achieve great energy savings, even if they cost a bit more to buy. The program used paid radio, television, and newspaper advertisements, as well as signs in appliance stores, using the slogan, "Products That Save Energy Pay for Themselves." In addition, displays were placed in shopping malls and in bank lobbies to show how much could be saved, carrying the message, "Products That Save Energy Finance Themselves." The program, which ran for seven
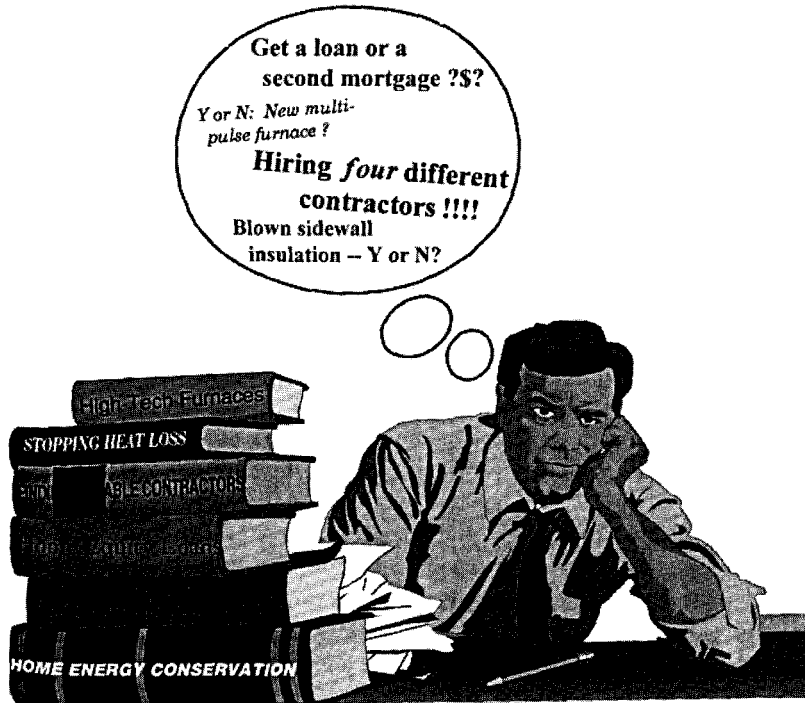

FIGURE 4-2   Some Barriers to Making Major Energy-Conserving Home Improvements

months, produced increased awareness and some attitude change. At the end of the project, people knew more about the cost and expected savings from specific conservation measures and were more likely to believe they could personally help solve the energy problem. They also expressed greater willingness to pay 10 to 15 percent more for energy-efficient appliances. But their actual behavior changed very little (Hutton, 1982).

Why did these efforts fail? One likely explanation is the gap between attitudes and behavior. There are many good reasons people may not take actions that reflect their values and attitudes. Consider the example of someone who wants to cut his energy bills. He may not know how much he can save in his particular home by upgrading insulation or installing an energy-efficient furnace, may not have the necessary money or credit, may not want to change a heating system that is functioning adequately, may want to spend the money on something else, may not trust a local contractor to do the work, or may be unable to act because, as a renter, he does not have the right to alter the building (see Figure 4-2). The more of these barriers that exist, the less difference a strong attitude in favor of saving energy will make in terms of behavior. Box 4-1 reports the results of a statewide survey of Massachusetts households that demonstrates this point. It shows that attitudes predict simple, low-cost energy-conserving behaviors such as resetting thermostats, but the more difficult or expensive the behavior, the weaker the relationship to energy attitudes.

Barriers to action also prevent other kinds of environmentally responsible behavior. Raymond DeYoung (1989) interviewed thirty-two participants and fifty-nine nonparticipants in a long-established community recycling program in Ann Arbor, Michigan, to try to understand their behavior. He found that the groups had about equally strong prorecycling attitudes. On a scale that represented strong antirecycling attitudes as 1 and strong prorecycling attitudes as 5, recyclers' responses averaged 4.13 on items such as "I like it when stores carry recycled products" and "recycling is good because it helps reduce imports." Nonrecyclers' attitudes were not significantly different at 4.02. What differentiated the groups was their beliefs about barriers to recycling, particularly diffi-

culty. The two groups were a full half-point apart on these items: "It's a big nuisance to keep everything separated for recycling," "A problem with recycling is finding a place to put the stuff," and "I'm never exactly sure what I'm supposed to do to recycle." Recyclers' opinions were about neutral at 3.14, but nonrecyclers, who averaged 2.65, saw significant difficulties with recycling.

In a similar vein, Georg Prester and his colleagues (1987) examined the differences between participants and nonparticipants in a local political debate about extending a high-speed railroad line in a residential area of Mannheim, Germany. People who became politically active in the controversy had a slightly higher level of general environmental awareness and were more likely to believe that the project would decrease local environmental quality. However, two of the strongest determinants of political involvement were knowledge about how to participate and interest in politics. When it came to action, political skills—interest and know-how—were more important than environmental attitudes.

The studies of environmental attitudes and behavior indicate that although the right attitudes are conducive to environmental action, they are only predictive of action under certain conditions. Attitudes are more likely to lead to behavior when strong barriers to action are removed. (A recent study of recycling attitudes and behavior suggests that attitudes have their strongest effects when external conditions—barriers or inducements—have moderate strength, and that both strong barriers and strong inducements limit the effects of attitudes [Guagnano, Stern, & Dietz, 1995].)

The conceptual framework of Table 4-2, which is based on an analysis of numerous studies of proenvironmental behavior, makes clearer what the barriers are. The table shows a long causal chain of factors influencing environmentally relevant behavior, which is at the bottom of the chain (level 1). Note that any variable at a higher level in the chain is able to influence any variable at a lower level. For example, owning one's own home rather than renting (level 6 in the table) may affect one's attitudes toward energy efficiency (level 4). This is because, to a homeowner, an energy-efficient furnace and well-insulated attic mean

Box 4-1 _____

Attitudes versus Barriers to Action:
Energy Conservation in Massachusetts, 1980

In the summer of 1980, a period of serious national concern about energy conservation and rapidly rising energy prices, one of the authors and his colleagues conducted a statewide survey of energy conservation activities in Massachusetts (Black, Stern, and Elworth, 1985). We surveyed a random sample of the households served by the state's five major electric utility companies, and received responses from 478 households across the state. We tried to explain why households differed in what they had done to conserve energy and particularly, to see how much internal psychological factors, such as attitudes and beliefs, mattered in comparison with external factors such as income, home ownership, household size, and the like. We examined four classes of energy-saving activities: major investments (such as insulating walls and ceilings, adding storm windows, or making improvements to furnaces), low-cost investments (such as caulking, weather stripping, or fixing leaky hot water faucets), minor curtailments (such as turning off heat in unoccupied rooms or lowering the temperature of home hot water), and changes in indoor temperature. Households were asked which energy-saving activities they had undertaken, and they also responded to numerous questions about their energy attitudes and beliefs, household composition, income and energy expenditures, and the structures of their homes and heating systems (such as number of rooms, heating fuel used, and ability to control heat room-by-room). The attitude questions tapped respondents' feelings of personal obligation—given U.S. energy problems at the time—to use less energy and to use it more efficiently.

When we analyzed our results statistically, this is what we found: Generally speaking, as the kind of energy-saving activity went from easy and inexpensive (changing temperature settings) to difficult and expensive (insulation and major furnace repairs), attitudes and beliefs became less and less important as

predictors of behavior. The key results are shown on the bottom line of Table 4-1 on page 78. The numbers are based on a statistical technique known as regression analysis, the details of which are beyond the scope of our discussion here. In intuitive terms, however, the numbers on the bottom row indicate the strength of the relationship between people's proconservation attitudes and the number of conservation actions they took (technically, the boldface entries are the percentages of total explained variance in conservation actions accounted for by attitudes and beliefs). A high number indicates that respondents who had strong proconservation attitudes tended to take more energy conservation actions than respondents with weaker proconservation attitudes; a low number indicates little relationship between the strength of respondents' proconservation attitudes and the number of conservation actions they took. As the bottom row of the table shows, strength of proconservation attitudes correlated highly with the number of temperature-change actions taken, less highly with the number of minor curtailments made, less still with the number of low-cost investment actions taken, and least with the number of major investments made in energy efficiency. Relevant attitude and belief items from our survey are shown on the second row of the table. To restate our main findings: The more difficult and expensive the conservation action, the less people's attitudes and beliefs related to whether or not they performed the action.

These findings strongly suggest that external barriers and constraints set limits on what can be accomplished by changing peoples' attitudes. The higher the barriers—expense, inconvenience, technical difficulty, and so on—the less effect proenvironmental attitudes have on behavior. It follows that inducing proenvironmental attitudes will have little effect on expensive or difficult behaviors unless the external barriers can be lowered.

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more than just lowered utility expenses. Having an efficient, modern furnace and good insulation may be an important part of a homeowner's attitudes about taking good care of her home. For this reason also,

homeowners may become more knowledgeable than renters about how to install insulation (level 3), and more committed to making this kind of home improvement (level 2). Note that it is possible for factors

TABLE 4-1   Factors Most Closely Associated with Four Types of Energy-Saving Actions Among Massachusetts Households, 1980

	TYPE OF CONSERVATION ACTION			
	TEMPERATURE CHANGES	MINOR CURTAILMENTS	LOW-COST CAPITAL IMPROVEMENTS	MAJOR INVESTMENTS IN ENERGY EFFICIENCY
External factors involving home and household	Some residents are home during the day Number of rooms in home Elderly in household	Number of rooms in home Residents own the home	Residents pay heating bill Winter heating cost	Residents own the home Number of people in household
Attitudes and beliefs	Feel personal obligation to cut back energy use	Feel personal obligation to cut back energy use Feel personal obligation to use energy efficiently	Feel personal obligation to use energy efficiently	Expect family to benefit from efficiency
Percent of explained variation in energy-saving action attributable to attitudes and beliefs (see text)[a]	59%	50%	44%	25%

Source: Black et al., 1985. The table lists only those external factors and only those attitudes and beliefs most closely associated with each type of conservation action. See text of box for further explanation.

a. External factors, attitudes, and beliefs together could explain more of the total variation in behavior for temperature settings than for the more difficult or expensive actions. For the four types of behavior listed, the total percentage of variation explained was 17%, 8%, 9%, and 8%, respectively.

lower on the chain in Table 4-2 to influence those higher up. For example, behavior (level 1) can change attitudes and knowledge (levels 4 and 3) through a process of learning from experience or a psychological process of justifying one's past efforts by adopting attitudes consistent with them—the phenomenon of cognitive dissonance reduction.

The framework shown in Table 4-2 indicates that there are two main types of barriers that can keep people from acting on proenvironmental attitudes. First, the framework implies that any break in the chain between attitudes (level 4) and behavior (level 1), such as absence of appropriate knowledge (level 3) or of attention or commitment (level 2), can keep proenvironmental attitudes from generating action (see examples in the table). Such barriers exist *within individuals,* so they can be addressed with interventions aimed at individuals. Information programs, which we discuss in the next section, are designed to remove knowledge barriers at level 3. Other programs

can increase levels of attention and commitment, as we discuss in a later section.

Second, the framework in Table 4-2 identifies barriers that lie *outside the individual.* These external barriers, which appear at levels 7 and 6—the individual's socioeconomic background, available technology, social and political institutions, economic forces, and inconvenience—precede attitudes in the causal chain and so can prevent proenvironmental attitudes from forming. For example, opinion polls show a weak but consistent relationship between socioeconomic factors such as level of education (level 7), and concern with the environment (level 4) (Hines, Hungerford, and Tomera, 1987). External barriers can also inhibit the expression of proenvironmental attitudes. Attitudes in favor of recycling produce no action when recycling is too inconvenient, and attitudes favoring energy conservation lead nowhere when action is costly, difficult, or blocked by the rules of property ownership.

TABLE 4-2   A Causal Model of Resource-Consumption Behavior with Examples from Residential Energy Conservation

LEVEL OF CAUSALITY	TYPE OF VARIABLE	EXAMPLES
7	Household background	Income, education, number of household members
6	External incentives and constraints	Energy prices, size of dwelling, owner/renter status, available technology, difficulty and cost of energy-conserving action
5	Values and worldviews	New Environmental Paradigm, Biospheric-altruistic values, Postmaterialism (see Chapter 3)
4	Attitudes and beliefs	Concern about national energy situation, belief households can help with it, belief neighbors expect you not to waste
3	Knowledge	Knowing that water heater is a major energy user, knowing how to upgrade attic insulation
2	Attention, behavioral commitment, etc.	Remembering to install weather stripping before heating season
1	Resource-using or resource-saving behavior	Decreased use of air conditioner, purchase of high-efficiency furnace, lowering winter thermostat setting

Source: Adapted from Stern and Oskamp, 1987.
Note: For practical purposes, it is important to remember that resource-using behavior does not completely determine resource use. For example, someone who buys a high-efficiency air conditioner may take advantage of it by keeping the home cooler, so some of the benefit in energy savings may be lost.

As we mentioned in Chapter 3, external barriers can also impede the expression of values (level 5). The proenvironmental values of Indian Hindus and Chinese Taoists were not strong enough to overcome the pressures of poverty, tyranny, and competition for scarce resources (factors at level 7). As we noted in Chapter 3 and see again in this chapter, such external factors are very difficult to change at the individual level. In Chapters 5, 6, and 7, we examine the effects on individual behavior of interventions that alter some of the external economic and social forces shaping people's treatment of the environment.

To summarize: When can one expect attempts to change attitudes and beliefs to induce proenvironmental behavior? The simple answer is: When the barriers to action are low. In the case of consumer behaviors, barriers are low for inexpensive actions that are ready at hand. These include participating in well-designed, convenient recycling programs, making simple and low-cost changes in household energy use, and the like. The barriers are higher when the actions are inconvenient, complex, or when they have costs to the individual in terms of money, time, or opportunities foregone. Note further that some political actions are relatively easy to take. The most obvious one—voting—is the one where attitude-behavior relationships are easiest to demonstrate. In contrast, joining organizations takes more time and sometimes money, and becoming an environmental activist, which takes considerable effort, requires much more than just a proenvironmental attitude.

What can educational efforts aimed at attitude change accomplish when the external barriers to action are high? In the short run, they can do very little

by themselves. But interventions need not be restricted to attitude change. As a few of the examples above have already shown, efforts to change attitudes and beliefs, combined with a lowering of the external barriers to action (for example, providing a flow-restricting shower head to install), have real potential. We discuss combination approaches to behavior change later in the book, especially in Chapter 7. In the short run, the most promising role for education is to help overcome internal barriers to action, particularly the barriers of ignorance and misinformation. We turn now to this use of education.

EFFORTS TO CHANGE BEHAVIOR WITH INFORMATION

Lack of information can be a serious internal barrier to action because it is not always obvious to an individual how to act effectively on his or her attitudes. This is especially the case for environmental protection, because the connections between behavior and its environmental effects can be impossible to discern from personal experience. Only expert analysts can tell which behaviors have the greatest effect on global warming or the extinction of species in distant tropical forests, so nonexperts cannot be expected to know what to do without some assistance. Even with a relatively simple problem, such as reducing energy use in the home, many people do not know which conservation actions are most effective, as we show in Chapter 10.

How much can be done to protect the environment by informing consumers? The best evidence comes from careful studies of deliberate interventions—studies that compare the behavior of people who have been informed with similar people who serve as a comparison group. In this section, we review several of these studies. We find first that simply providing straightforward information can make a difference, but mainly with easy, low-cost actions. We then look at other ways of providing information, methods based on principles of psychology and communication. These methods are much more successful, and illustrate what can be accomplished by information

alone. We begin with studies involving simple, straightforward information, starting again with energy conservation examples.

Information, Plain and Simple

In the 1970s, in the early days of excitement of the modern environmental movement, researchers and governments began to put "conventional wisdom" into practice: They assumed that if concerned people were only told what to do, they would act to preserve the environment. This approach had very limited success, as the following examples illustrate.

Shortly after the Arab oil embargo of 1973 shook the faith of many Americans in the perpetual availability of fossil fuels, a number of U.S. gas and electric utility companies began preparing and distributing glossy informational brochures on how to save energy in the home. Some of these brochures targeted relatively simple, cost-free measures such as resetting thermostats on furnaces and air conditioners to use less energy in winter, and setting them even lower at night and when the home is unoccupied. The companies typically distributed the brochures by inserting them in the envelope along with the regular utility bill, a so-called bill stuffer. Note that there are few external barriers to making these simple changes, and that the American public in the late 1970s had a positive general attitude toward energy conservation. Thus, the main barrier to action seemed to be lack of information about which behaviors effectively save energy—the barrier that bill stuffers attempted to overcome.

Despite all this, the few reported studies of the effects of these bill stuffers on actual energy use yielded disappointing results. Thomas Heberlein (1975) conducted a small experiment just before the 1973 energy crisis in which he mailed a utility-produced brochure on electricity conservation to fifteen households in a Wisconsin apartment complex. His research team read electric meters throughout the complex for about twelve days before and after the brochures were received and found no change in electricity use by the control households and a small *increase* in use, though not a statistically significant

one, among households that received the brochure. In a larger study, Samuel Craig and John McCann (1978) monitored the effect of a utility-produced pamphlet on how to cut electricity use by air conditioners. In early August of 1977, they sent pamphlets to about 800 apartments in New York City where the pattern of electricity bills indicated that air conditioners were in use. By 1977, energy was a national concern, so a strong effect might be expected. Nevertheless, a month later, the apartments that received the brochure along with a letter from Consolidated Edison, the local utility that produced the brochure, showed no change in their energy use compared to a control group that received no information.

The study also had a curious and more hopeful finding. Other apartments, randomly chosen to receive the same brochure along with a letter from the commissioner of the state's public utility regulatory commission, cut electricity use by 7 percent compared to the controls and the Con Edison group. Since air conditioners use only about 40 percent of household energy in the summer, the savings in terms of air-conditioning use was approximately 17 percent. This study shows that something in addition to the information itself—something about the way information is provided—can determine whether information works. In the next section, we return to the question of what makes some information programs effective when so many others are not.

Some information programs, carried out both by gas and electric utilities and by government agencies, targeted much more difficult-to-take conservation actions, such as adding insulation to attics and walls or replacing energy-inefficient heating equipment. Such actions are often costly and many require major modifications to one's home. Put another way, these are actions for which there are major external barriers (limitations outside the individual). But there are also internal barriers, because people do not always know which actions are most important or how to take them.

Some of these information programs featured bill-stuffer brochures, while others featured home "energy audits." As an example of the latter, consider a program started in 1977 by the Canadian government. The program, called ENER$AVE, offered all home-

owners a free computerized "energy audit." Participants filled out a questionnaire about their home, giving its age, size, form of construction, and other information. By return mail, each received a computer analysis with recommendations for home insulation, weather stripping, and other energy-saving actions, complete with estimates of the cost of each action, the energy and money that would be saved, and the "payback period"—the time it would take for the savings to repay the cost.

In late 1980, a group of Canadian professors of business administration (McDougall, Clayton, and Ritchie, 1983) surveyed a sample of homeowners, most of whom had completed the ENER$AVE survey about two years before. They asked whether the household had undertaken any of six energy-saving actions that were sometimes recommended by the ENER$AVE program: adding insulation in attic, walls, basement, or over unheated areas, installing weather stripping and caulking, or installing storm windows. If the household had taken any of these actions, the respondent was asked whether the action occurred within the past two years. The researchers assumed that if ENER$AVE was effective, the households that had participated would have taken more of these actions in the last two years than the comparison households. After excluding actions that people reported they had done more than two years before, and which would therefore probably not have been recommended by the ENER$AVE audit, they found that households that had not participated in ENER$AVE reported having taken 45 percent of the energy-saving actions over the previous two years. The households who participated said they had taken 46 percent of the actions.

This is not much of a difference, and is too small to be statistically reliable. Of course, the study is not definitive. The ENER$AVE participants may have been more likely to have forgotten what changes they made in their homes (although there is no particular reason to expect this), and it is possible that the people who participated in the program—or their homes—differed from nonparticipants in some important respect that the study did not measure. However, this study finds about the same thing as studies of other

computerized home-energy audits that used different research methods and asked different questions. This sort of information program appears to have little overall influence on how people use energy at home.

Why did ENER$AVE's computerized energy audits have so little effect? One possible answer that occurred to many conservation advocates was that the audits did not offer good enough information. When a homeowner says there is insulation in the attic, the computer cannot tell how much. Neither can it tell how well caulking or weather stripping has been applied. But if the energy audit is done personally, by a trained energy analyst, the computer can get better information. Moreover, the analyst can explain the recommendations and answer the homeowner's questions.

Following this logic, in the late 1970s U.S. gas and electric utility companies began offering customers free or low-cost on-the-spot energy audits. Soon afterward, the federal Residential Conservation Service program required the states to see that these audits were available to households at a minimal cost. Were these programs effective? Table 4-3 reports the results of two early evaluations.

These two programs appear to have been partially effective. They increased the frequency of a few energy-saving actions, but had no effect on most of them. More specifically, the energy audits increased the frequency of relatively low-cost behaviors (caulking, weather stripping, and modifying water heaters), but not expensive ones (insulating walls, ceilings, and floors). Apparently, the energy audits removed the information barrier to action, but not the external barriers that prevent householders from taking expensive energy-saving actions. Consequently, the only behaviors that changed were the ones for which information was the only significant barrier. The conclusion is hopeful in that it shows that detailed, accurate information can make a difference. But it is also discouraging in a larger sense. Success was only partial, and it required a significant investment of money and the time of trained personnel in interacting one-on-one with householders. Moreover, this effort failed to change the behaviors that have the greatest energy-

TABLE 4-3 Actions Reported by Participants and Nonparticipants in Two On-the-Spot Energy Audit Programs, about 1979

ACTION		SEATTLE (WASHINGTON) CITY LIGHT	NORTHERN STATES POWER (MINNESOTA)
Caulk and/or	Participants	18%	55%
weatherstrip	Nonparticipants	18%	45%
Insulate and/or reduce temperature of water heater	Participants	30%	N/A
	Nonparticipants	20%	N/A
Install attic	Participants	7%	34%
insulation	Nonparticipants	7%	35%
Install wall and/or	Participants	9%	14%
floor insulation	Nonparticipants	6%	18%
Install storm windows	Participants	20%	27%
and/or doors	Nonparticipants	14%	28%

saving potential, because these were precisely the ones with major external barriers (see Chapter 10).

Better Ways to Provide Information

We have seen that simply providing people with straightforward information has weak effects on only a limited set of behaviors. This section shows that behavior-change programs can be much more successful if they pay attention to the way they provide the information. The successful programs we describe in this section found ways to deliver information that caught people's attention and made the information credible.

Feedback.   One approach to making information more effective is to tie it directly to people's behavior. Beginning in the 1970s, psychologists began experimenting with a method that, instead of telling people what to do to save energy, offered higher quality information about how much they were already using. The experiments provided regular, usually daily, feedback on how much energy a household was using and on what that rate of energy use would cost by the end of a month. Some studies used simple technology, for example, students reading electric or gas meters every day and leaving a note on the front door. Other studies used electronic monitoring devices, installed in a prominent place in the home such as on a wall near the kitchen sink, with the information made available automatically. Such devices are capable of providing feedback by the hour, minute, or second, but most of the early devices were not so advanced. Feedback systems provide information much more easily than reading a utility meter, and in a form that is personalized and easy to understand.

The theory of feedback is a simple application of operant learning theory from psychology (Skinner, 1938). If people are motivated to save energy, or to lower their energy bills, they will repeat whatever behaviors produce that reward. But it is difficult for people to tell which behaviors work because energy savings are not directly visible, and money savings are only realized once a month when the utility bill arrives—much too infrequently to help them learn

what they have done to lower the bill. Feedback devices let people teach themselves how to save energy. In terms of learning theory, feedback acts as a signal of a reinforcer—financial savings—that is slow in coming. Feedback provides much more specific and valid information than a general brochure or even an expert's energy audit because it is directly related to the householders' actual behavior and because it tells what people actually *have* saved, not only an estimate of what they might expect to save.

The effect of energy-use feedback depends on several factors. To change everyday behavior, it needs to be sufficiently frequent, and it is probably most effective if it is available immediately before and after people have done something to try to save energy (Seligman et al., 1981; Shippee, 1980). It must be related to behavior in understandable ways. For example, feedback about energy used for home heating and cooling should be corrected for variations in weather (Winett and Neale, 1979). Otherwise, the large, weather-related changes in the need for heating or cooling can hide the effects of people's actions. It should also use units of measurement the householders can easily understand, such as dollars saved. And feedback is more effective when it concerns an energy source that is a large portion of the household budget (Winkler and Winett, 1982). That is, information works better when people have a strong financial motive to learn from it.

Overall, feedback experiments demonstrate under controlled conditions that real households during the late 1970s cut their energy use by around 10 percent immediately after feedback started and that the savings continued for at least several months, with feedback still being provided. The immediate savings indicate that the change was accomplished by altering behavior rather than by installing energy-saving equipment such as more fuel-efficient furnaces or appliances.

Although frequent feedback works, its effect is of limited magnitude and staying power. Because it operates mainly by getting people to use less, rather than by encouraging people to install equipment that can give the same comfort for less energy, the energy savings from feedback will sooner or later be per-

ceived as sacrifices. (An argument has been made that annual or semiannual feedback may encourage people to install energy-efficient equipment, whose benefits can be seen most easily if they are averaged over a long period of time [Layne et al., 1988].) And feedback only works if the participants are strongly motivated. If the experiments were repeated in the mid-1990s, when there is no talk of a national energy crisis and when energy prices are no longer such a large portion of most people's incomes, feedback might be much less effective than it was in the late 1970s.

Modeling.   One can also make information more effective by using a presentation that combines concepts from behavioral psychology and communication research. Richard Winett and his colleagues (1982) demonstrated a program that effectively reduced people's energy use without having them invest in new equipment or sacrificing comfort. The program featured twenty-minute videotapes of a young couple, much like most of the people in the Virginia apartment and townhouse complex where the experiment was conducted, demonstrating ways to save energy. For example, the tape on saving energy in the summer showed how to use fans and natural ventilation in the evening to save on air-conditioning, how to dress in lightweight clothing, how to shift the time and place of eating and cooking, and so forth. The script was carefully designed to present energy saving as a positive action. It used the visually compelling medium of television to demonstrate the desired behavior, and it employed the behavioral technique of modeling: the demonstrations were by people the audience could readily identify with and imitate. Participants in both the experimental and control groups in the study by Richard Winett and his colleagues (1982) also attended a forty-five-minute meeting in which they were instructed on the proper use of window fans, the insulating value of different items of clothing, and how to use a hydrothermograph installed in their homes to monitor temperature and humidity. Some of the participants were also given daily energy-use feedback for thirty days.

Compared with the group that only attended the meeting, the group that saw the videotape used 10 percent less household electricity immediately, and 19 percent less three weeks later. The savings for air-conditioning, which was the target of the program but is only a fraction of household energy use, were obviously much larger. Participants who also received feedback saved even more. The savings were accomplished with little or no change in indoor temperature, and the participants in the different groups reported the same levels of comfort. A companion experiment in the winter produced similar results. People saved more than 25 percent of the electricity used for heating. They did this mainly by lowering indoor temperatures, but because they were instructed in how to make the change slowly and to adapt with warmer clothing, they reported a level of comfort equal to that of the comparison group.

Winett's experiment demonstrates energy savings of over 20 percent from a carefully constructed information program. It is reasonable to ask, though, whether this sort of intensive effort, with meetings, feedback, and a specially created videotape with demonstration by models, is cost-effective. To answer this question, Winett's research group conducted another experiment in July 1982, this time using a local-access television channel to broadcast twenty-minute videotapes (Winett et al., 1985). People in the experimental groups were telephoned and asked to watch the program, which was broadcast four times over a five-day period. Their energy reduction was around 10 percent for the rest of the summer, compared to control groups (a reduction of about 23 percent of the energy estimated to be used for cooling). In a follow-up the next summer, the experimental group was still using 5 percent less energy, compared with the controls. The researchers concluded that this method could be cost-effective on a large scale, because once the videotape had been paid for (about $40,000), the cost of the program would be about $1 per household, for the telephone contact. If one million households could be reached and each saved $14 in a summer, as these households did, a $1 million program would save $14 million in energy.

As with feedback, this program achieves reductions in energy use by behavioral change rather than by improving technology, so the results may be hard to duplicate when people have lower levels of motiva-

tion, such as when energy prices or environmental concern are low or people are affluent enough to use electricity rather than sweaters to keep warm at home.

"Framing" Messages. Another way to make information more effective involves paying close attention to how proenvironmental behaviors are described. The program developed by Richard Winett's group provides an example: It referred to energy "efficiency" instead of "conservation" because Winett and his colleagues believed that their audience would perceive energy conservation as sacrifice, but would think of efficiency as a desirable goal. Another example is the experiment Suzanne Yates (1982) conducted in Santa Cruz, California, for her Ph.D. dissertation in psychology. She provided householders with information about the benefits of insulating their water heaters. When she presented the information in terms of how much money they were wasting by *not* insulating them, people became much more willing to insulate them than when she presented the information in terms of how much money could be saved. Of course, the two amounts were the same. Yates's experiment was based on the principle developed by Kahneman and Tversky (1979) that people are more sensitive to the prospect of losing something than to the prospect of gaining something of equal value. We discuss these ideas further in Chapter 9.

What the methods of feedback, videotaped modeling, and framing have in common is that they present information in ways that are particularly personalized, attention-getting, or motivating for the audience. Such methods can make educational programs appreciably more powerful. But even these methods do not overcome all the internal barriers that can prevent the expression of proenvironmental attitudes. The next section describes ways to tighten the links among attitudes, information, and behavior in order to make education yet more effective.

TIGHTENING THE LINKS
FROM ATTITUDES TO BEHAVIOR

Table 4-2 shows that even in the presence of favorable attitudes, knowledge does not lead directly or automatically to proenvironmental behavior. People do not always do what they are predisposed to do, even if they know how and there are no external barriers. An example is people who save recyclables for a long period but never "get around to" taking them to the recycling center. Another example: Homeowners who want to use the city's collection service for compostable yard wastes but forget to put the wastes near the curb on the proper day. Or shoppers who prefer environmentally friendly products but feel too preoccupied with getting through their shopping lists to fully attend to their environmental concerns. We are referring here to level 2 of the table—"attention, commitment, etc." In order for people to express their proenvironmental attitudes in actual behavior, they must pay attention to environmental issues in their everyday lives, overcome the laziness or "behavioral inertia" that tends to oppose any new behavior, make a commitment to act even in the face of competing demands on their time, and remember to take action at the proper moment. In this section, we discuss ways of promoting proenvironmental behavior that remove these internal barriers to action. These methods remind people to do what they are predisposed to do or encourage them in various ways to act on proenvironmental attitudes or information they already have. Such methods can help get the most out of the educational strategy.

Reminders and Prompts. The simplest way to get people to act out their attitudes is to ask them. All of us are familiar with environmental slogans and reminders, such as "Only You Can Prevent Forest Fires," "Keep America Beautiful," "Every Litter Bit Helps" (on a trash can), and the like. These messages are designed neither to change attitudes nor to give information, but simply to remind readers and listeners to do things that they presumably are already predisposed and knowledgeable enough to do. These messages are intended to overcome internal barriers to action such as laziness or forgetting.

Research indicates that nonspecific reminders like these generally have very little effect on actual behavior. But timely and specific reminders can be effective. For example, Scott Geller and his colleagues (1971) handed out one-page flyers outside grocery stores asking customers to purchase their soft drinks

in returnable bottles and giving reasons for the request. They counted the proportion of customers purchasing most of their soft drinks in returnables when they were or were not distributing the flyers. At the two large supermarkets that were leafleted, the request—what behavioral psychologists call a *prompt*—had no effect; but at the one small convenience store, the percentage of returnable-bottle customers increased 32 percent when leaflets were handed out. A likely inference, which is supported by other studies, is that to be effective, a request must be very close in space and time to the behavior people are being asked to perform. If you want people to turn out lights on leaving a room, it is most effective to put the message near the door; if you want people to invest in insulating their homes, it makes sense to have posters or flyers available in offices where people apply for home-improvement loans. Similarly, in the convenience store, people bought their soft drinks soon after receiving the flyer, whereas in the supermarket, they did so, on the average, only after many other purchases.

In another experiment on resource recovery, Harvey Jacobs used *reminders* to improve participation in a residential recycling program in Tallahassee, Florida (reported in Geller et al., 1982). Four neighborhoods of different socioeconomic levels were monitored after the residents had been initially informed of a weekly curbside pickup of newspapers and cans. The level of participation correlated strongly with socioeconomic level. It was 3 percent in the lowest social class neighborhood and 25 percent in the highest. After four to six weeks, all the residents were given a flyer reminding them of the program, to see if this would increase their participation. This prompt added no new information, but only reminded people of past information. In the middle and upper-middle income neighborhoods, where participation was already higher, participation immediately increased by ten to twelve percentage points—but there was no change in the lower and lower-middle class neighborhoods. This finding again demonstrates that a request—or, for that matter information such as the initial notice about the recycling program—can help, but it also suggests that messages must be designed to fit the audience. A message that is delivered in the wrong way or by the wrong messenger is likely to be ignored or even mistrusted. Numerous studies on energy conservation as well as recycling show that written communications tend to be ineffective with U.S. audiences of lower socioeconomic status.

Public Commitment.   It is also possible to increase proenvironmental behavior by getting people to make a public or quasi-public commitment to taking an action. A public commitment appears to strengthen people's private, personal commitment to the action. Recall that in the framework in Table 4-2, a personal commitment to take action despite competing demands on one's time is part of level 2—a main link between attitude and behavior; therefore, a publicly made commitment, freely given, should make a proenvironmental attitude lead more reliably to action by creating a personal commitment. The principle, derived from cognitive dissonance theory (Festinger, 1957), is that when people undertake an action in the absence of any obvious external force or reward, they see that action as something they have chosen themselves. People who see their behavior as based on their own internal motives are likely to persist in the behavior even after the commitment has lapsed.

A simple experiment by Anton Pardini and Richard Katzev (1984) on recycling behavior shows the power of public commitment. Pardini and Katzev asked twenty-seven households in a middle-class neighborhood of Portland, Oregon, to participate in a feasibility study of neighborhood recycling. Nine households were asked impersonally: Informational brochures were left at their doors to explain how the program worked and give the dates of the first two weekly pickups. Another nine were asked in person to make a minimal public (or quasi-public) commitment. They were approached by one of the researchers, who explained the program, gave them a piece of paper listing the two pickup dates, and asked, "Will you commit your household to participating in this recycling project for two weeks?" All agreed. Nine were asked to make a "strong commitment." Instead of the oral commitment, they were asked to sign this statement: "In the interest of conservation, I commit my

household to participating in this newspaper recycling program for two weeks." Again, all agreed. After two weeks, all households were recontacted, and urged to participate for two more weeks. As Table 4-4 shows, public commitment was more effective than mere information, and stronger commitments led to more recycling than weaker commitments. Over the first two weeks, the two commitment groups recycled about three times as often, providing about three times as much paper as the households receiving only information. For the strong-commitment households, but not the weak-commitment households, the effect continued for two more weeks, after the commitment had ended.

Personal commitment—besides being a link between attitude and behavior—is also a link between knowledge and behavior (see Table 4-2). Therefore a stronger personal commitment caused by public commitment should make information more effective as well. An experiment on energy-use feedback by Lawrence Becker (1978) demonstrates this kind of effect. Becker asked participants in the experiment to make a quasi-public commitment to saving a specific amount of energy—either 2 percent of what they had been using, or 20 percent. In this experiment, what was stronger about the commitment was not the way it was made (e.g., on a signed document, or orally), but

the difficulty of the behavior people were committing themselves to. When people received feedback, those who made the stronger (20 percent) commitment used 9 percent less energy than those who made the weak (2 percent) commitment. When they did not receive energy-use feedback, commitment had essentially no effect. (For more detailed review of research on prompts, reminders, and commitment effects, see Katzev and Johnson, 1987).

Highlighting Attitudes and Norms. Yet another way to break down internal barriers to action is to call people's attention to attitudes and beliefs that they already have, but that they may not connect to the situation they are in. The following experiments show that people sometimes need to be reminded that they are in situations in which it is appropriate to exercise their proenvironmental attitudes or in which other people expect them to do so.

Robert Cialdini and his colleagues at Arizona State University (Cialdini, Kallgren, and Reno, 1991) conducted a series of experiments demonstrating that subtly calling people's attention to the social norm against littering decreased their littering behavior. In one study, visitors to a municipal library, on their way back to the parking lot, saw a passerby (who was in reality working for the researchers) do one of three

TABLE 4-4 Effects of Public Commitment on Participation and Paper Collected in an Experimental Recycling Program

CONDITION	NUMBER OF HOUSEHOLDS	FREQUENCY OF PARTICIPATION		POUNDS OF PAPER COLLECTED	
		FIRST 2 WEEKS	SECOND 2 WEEKS	FIRST 2 WEEKS	SECOND 2 WEEKS
Information	9	3	4	70	57
Minimal public commitment	9	10	4	210	54
Strong public commitment	9	13	11	247	166

Source: Pardini, A., and Katzev, R. The effect of strength of commitment on newspaper recycling. *Journal of Environmental Systems,* Volume 13, 245–254. Copyright 1984. The Baywood Publishing Co., Inc. Reprinted with permission.

things: put a fast-food restaurant bag in the trash can, *pick up* a littered bag and put it in the trash can, or simply walk by. On returning to their cars, they found a handbill on automotive safety attached to their windshields, and the researchers watched to see if they littered it.

The researchers reasoned that the passerby's simply depositing the trash in the can called attention to a "descriptive norm," that is, it told observers that people usually don't litter in the area. Picking up a littered bag called attention to an "injunctive norm," that is, it reminded the observers that others *disapprove* of littering. They predicted that reminding people of either norm would influence littering, but that the descriptive norm would influence behavior only in the location where people were reminded of it, while the injunctive norm would generalize outside the immediate geographical area. To test this prediction, they ensured that half the respondents in each group encountered the passerby on a grassy, landscaped section of the property while the others saw the passerby in the parking lot. The results confirmed the predictions (see Figure 4-3). The strongest effect, in fact, was observed when the injunctive norm was evoked in a different environment from the one where people were given the opportunity to litter.

What this experiment and the others in Cialdini's series imply is that behavior can be affected by efforts to bring into people's awareness things they already know about how people normally behave, what is expected of them, or (as another experiment in the series showed) what they themselves believe they should do. When people's attitudes and values, and the expectations of others, support protecting the environment, it helps to remind people of that fact. The experiments suggest that the reminders have to be subtle so as not to seem coercive. In particular situations, it is left to the ingenuity of those who would change behavior to find effective ways to implement the principle.

The results of a final study support the findings on reminders about attitudes, and also help clarify how several strategies for linking attitudes, information, and commitment can work together. Beginning in the summer of 1982, Joseph Hopper and Joyce McCarl Nielsen (1991) experimented with three strategies for increasing participation in an ongoing, but rather ineffective, residential recycling program in a stable, middle-class neighborhood of Denver, Colorado. They randomly assigned blocks in the neighborhood to one of four experimental conditions. One group received only information, in the form of a flyer that described how the program worked and what could be recycled, and that listed the next seven monthly pickup dates. The flyers were distributed twice over the seven-month study. The second group received the flyers plus a prompt, in the form of bright yellow flyer announcing each pickup date one to three days in advance. The third group received the information and the prompt, and in addition were contacted by volunteer block leaders who had been instructed to talk with every household on the block about the program and to encourage their neighbors to recycle. The fourth group, a control, was not contacted at all. All the households had been monitored over the previous seventeen months, and less than 1 percent of them had left recyclables for pickup in an average month. Over the seven months of the study, the participation rate rose to 2 percent for the control group, 10 percent for the information-only group, 21 percent for the group receiving information and monthly prompts, and 28 percent for the group with block leaders.

These results show that lack of information was a barrier to participation in the program, and that forgetting was also a barrier (that the prompts helped overcome). In addition, the volunteer block leaders added something to the program. One thing they may have added is models whom their neighbors could imitate, as with Richard Winett's videotapes on energy conservation. But there is no evidence that the neighbors actually saw the block leaders demonstrate recycling. A second possibility is that by talking to every household on the block, they may have reminded people of their attitudes about recycling, with the result that prorecycling neighbors followed their attitudes more closely.

There is a third possibility that is even more promising for promoting proenvironmental behavior. It may be that information given in the course of social interaction in a community helps create a shared norm in favor of recycling that changes behavior both by creating perceived social pressure and by modifying
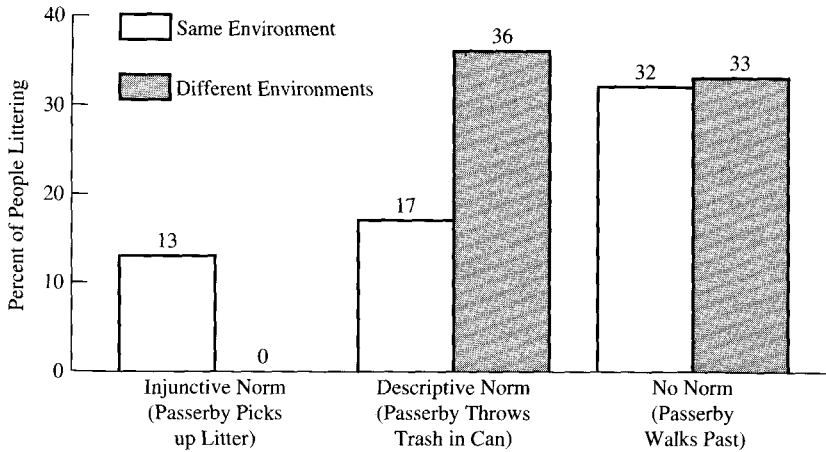
FIGURE 4-3 Percentage of People Littering as a Function of the Type of Norm Evoked and the Environment in Which It Was Evoked

Source: Cialdini, R., Kallgren, C., and Reno, R. A focus theory of normative conduct: A theoretical refinement and re-evaluation. *Advances in Experimental Social Psychology,* Volume 24, 201–234. Copyright 1991. Academic Press. Used with permission.

Shaded bars signify different environments for littering and evocation of the norm; white bars signify the same environment.

internal, personal motives so as to promote behavioral change. Hopper and Nielsen present some evidence that supports this interpretation. Participants in the experiment completed questionnaires both before and after the seven-month experimental period. Two sets of questions concerned norms. One set, about what Cialdini calls injunctive social norms (see above), asked whether people's friends and neighbors expected them to recycle and whether they expected their friends and neighbors to recycle. The other set concerned personal, internalized norms, that is, people's expectations for their own behavior. Hopper and Nielsen asked how much it bothered the respondent to throw away recyclables and how much personal obligation they felt to recycle. Over the course of the experiment, both types of norm became stronger in households living where there were block leaders, but not on other blocks in the neighborhood. The survey results thus suggest that talking with block leaders actually changed both social and personal norms. Going one step further, if this were true, one would expect groups with block leaders to continue recycling at a high level even after information and prompts are withdrawn. Although Hopper and Nielsen did not follow the experimental groups beyond seven months, they do report on four blocks in the neighborhood that had had block leaders for two years before the experiment began. People on those blocks were already recycling 21 percent of the time when the experiment started and over the next seven months, without experimental intervention, their recycling rate increased to 34 percent. It appears that information given in the right social context at the community level can change behavior more effectively, and maybe also more permanently, than information given to individuals without supporting social interaction. We examine this possibility in more detail in Chapter 6.

WHEN DOES INFORMATION WORK?

What makes some informational programs succeed where others fail? Successful programs are not necessarily ones that offer more or better information. Richard Winett's videotapes on energy conservation presented essentially the same information that the

participants could get from the meeting they attended, and daily energy-use feedback presents exactly the same information that people could get if they read their own utility meters. Similarly, when information programs use prompts or try to raise participants' commitment levels, they become more effective without adding new information. The success of information programs depends less on getting information presented than on getting it used. This section discusses what is critical for getting information used. The main keys are attracting people's attention, making the information credible to the audience, and increasing the participants' involvement.

Getting People's Attention.   People are inundated with information. They deal with this by ignoring most of what confronts them—by separating what is important to them from all the cognitive junk mail. This process may explain why some New York apartment dwellers ignored flyers on how to save electricity in the summer, while others cut their use of air-conditioning by 17 percent. The flyers that were ignored came from Consolidated Edison, the local electric utility. All these people had received mail from Con Edison before, so they knew what to expect. Most often, that mail contains a bill—sometimes along with other written material that most people ignore. They probably learned to operate under the rule that with mail from Con Edison, if it's not a bill, you can throw it out. But New Yorkers have much less experience getting letters from the state Public Service Commission. Most people probably opened these and many probably read them. The information worked only when it could get from the flyer into people's awareness.

There are many techniques to attract people's attention. One is with a personal approach, such as Pardini and Katzev used when they asked people to commit themselves to a recycling program and Hopper and Nielsen used with block leaders for recycling. Word of mouth has often proved the best form of advertising for energy conservation programs. Making the invisible visible also attracts attention, as shown by energy-use feedback programs, which convert electricity or gas use into a daily message. A compelling medium of presentation also helps—for

example, Winett's use of television. Video presentations, in addition to being inherently attention-getting, can use demonstrations, which present information more vividly than verbal descriptions can.

Careful message design can also help get people's attention. For example, energy-use feedback programs try to get attention by putting feedback devices in a prominent place in the home and by presenting the information in units people understand, such as dollars of saving per month, rather than in more abstract units such as kilowatt-hours. Also, the same information can become more effective if it is stated in compelling terms, as Suzanne Yates demonstrated by promoting water heater insulation as a way to stop wasting money.

As the studies of prompting show, it is important to place the message close in space and time to the behavior; otherwise, it may not be remembered when it would make a difference. This is part of the logic of attaching miles-per-gallon stickers to the windows of cars in dealers' showrooms and bright yellow labels to major household appliances to tell prospective buyers what energy costs to expect when operating them.

And as we have already noted, what gets people's attention depends on the audience. It may depend on socioeconomic differences, as Jacobs found with the Tallahassee recycling program, but there are many other variables. Evaluations of home insulation programs typically conclude that working with local groups—churches, neighborhood associations, and the like—is the best way to promote a program (Stern et al., 1986). As one example, when utility companies in Minnesota used their own personnel to conduct home energy audits, they reached 4 percent of the eligible homes; other utilities, which hired community groups to do the job, reached 15 percent of homes—and did it for one-third the cost (Polich, 1984)! The community groups were locally known and trusted, so messages from them got serious attention. Moreover, because of their commitment to helping their neighbors, they probably worked harder at marketing the program than the utility companies' employees did.

Credibility.   Information must be credible to be effective. Part of credibility lies in the source of infor-

mation. This may be why a message from the New York State Public Service Commission was more effective than one from the electric utility, and why community groups were more successful than utility representatives at encouraging people to have energy audits. Electric utilities may be highly credible for some purposes, but people may not take them seriously when they offer advice on how to use less of their product. By far the most important factor affecting the purchase of solar-powered equipment in a study of California homeowners in the late 1970s was the number of people they knew who already owned solar equipment (Leonard-Barton, 1980). This fact and other information from the study clearly suggest that the word of trusted friends and neighbors was more important in the decisions than the word of solar energy experts.

Credibility also depends on people's ability to validate the information they are given. With energy use, which is generally invisible, this can be a serious problem. It is nearly impossible to tell whether a home insulation contractor has done a thorough job inside one's attic or walls, so people are understandably suspicious. One or two horror stories in a community can kill a program, because people are more likely to trust a neighbor's experience than the word of someone who is promoting a product. For this reason, energy conservation programs have often provided independent inspections of contractors' work or even performance guarantees as a way to become more credible.

Involvement.   Information becomes more effective with people who have made a commitment to act on it. This has been demonstrated experimentally by studies of commitment such as those of Pardini and Katzev, Becker, and others. The block-leader approach also seems to depend on getting people involved by talking with their neighbors about recycling, and Cialdini's efforts to call people's attention to social or personal norms can also be considered a way of increasing involvement. Crisis can also increase involvement. For example, in periods of severe drought, people have made major efforts to conserve water simply on the basis of requests from local authorities and concern for the community (Agras, Jacob, and Lebedeck,

1980). Of course, it helps if the requests are made credible by photos of low water levels in the local reservoir.

These examples suggest some general rules about how to make information more effective; however, the specifics depend on the kind of behavior one intends to change. For informational approaches to reach their potential, they need to be designed creatively to maximize their credibility and the audience's attention and involvement. To do these things, it is important to make a concerted effort at the outset to understand the audience's perspective. This may be done either by systematically surveying the audience group or, what is often better, by involving representatives of the audience group in designing the program. The latter approach, one of *community* involvement, is suggested by the use of block leaders, and has been used successfully on a larger scale in a number of cities and towns, as we show in Chapter 6.

Using Social Networks to Diffuse Information. One of the most effective strategies for spreading information is to take advantage of existing networks of communication. The tendency of California homeowners to buy solar collectors if they knew other people who had it is an example of a broader principle, that innovations diffuse through a population along the lines of social influence. Agricultural extension programs have used this principle for generations to spread new and improved farming practices in farm communities. They identify individuals who are well known and respected in the community, and focus their efforts on getting a few such "opinion leaders" to adopt the new technology. Once they have benefited from it, the technology tends to spread with little additional effort.

It is easy to see why information coming from individuals someone knows and trusts is particularly effective. Such information automatically gets attention and has high credibility because of its source. And it tends to increase involvement as well, because whatever someone does with information from a trusted friend or neighbor is likely to be of subsequent interest to that person, and may affect the future relationship between the giver and receiver of the information. The experience of community energy

conservation programs has repeatedly validated the diffusion-of-innovation approach, which relies on sending information through existing social networks (Darley and Beniger, 1981; Stern et al., 1986). And as we will see in Chapter 6, diffusion of information is not the only important function that existing social networks can serve in promoting proenvironmental behavior.

SUMMARY AND CONCLUSION: WHAT CAN EDUCATION ACCOMPLISH?

We have discussed educational interventions aimed at promoting fairly specific proenvironmental attitudes and beliefs among individuals and overcoming internal barriers, such as lack of knowledge or commitment, that keep them from acting on those attitudes. Education can make a difference in people's behavior, but there are serious limits to what it can accomplish. The chapter supports the following general conclusions:

In the short term, educational approaches work only when the main barriers to action are internal to the individual. As we have seen, education is effective mainly with relatively simple, low-cost behaviors, such as depositing cans in curbside recycling bins or altering home thermostat settings. Such actions help, but they typically have smaller effects on the environmental problems they are meant to lessen than more permanent actions such as purchasing an energy-efficient vehicle or appliance (see Chapter 10). Information has also been effective in getting people to request home energy audits, an action that has the potential to lead to larger and more permanent energy savings and environmental benefits by changing heating and cooling equipment. Nevertheless, when protecting the environment requires great effort or expense, as it often does, there is no experimental evidence that education alone will do the job. Under such conditions, behavior change requires interventions to reduce the external barriers to action. We examine those interventions in the next chapters.

Education may have important indirect effects over the long term. Though external barriers to indi-

vidual action limit the effectiveness of education in the short run, education may have important positive, though indirect, effects in the long run. For example, the block-leader approach to recycling (discussed in Tightening the Links) had indirect beneficial effects by changing community norms. A longer-term and possibly more important indirect effect—one we have not yet discussed in this chapter—can occur when education changes people's political behavior; this behavior, in turn, changes government policy so as to lower the external barriers to proenvironmental behavior. The history of smoking reduction illustrates this process. Over the several decades since the health hazards of smoking became established and widely publicized, the proportion of smokers in the United States has slowly decreased. During that time, scientists, physicians, and other individuals who became convinced of the dangers became politically active and brought pressure on governments and other powerful actors to bring down the barriers to behavior change and alter some of the incentives that govern smoking. Since 1964, cigarette advertising has been restricted, tobacco taxes have been deliberately raised, no-smoking rules have been applied in airplanes and many public buildings, life insurance companies have made smokers pay more than nonsmokers for coverage, and employers have implemented antismoking programs. These changes are fair because governments, employers, and insurance companies incur higher costs for smokers than for nonsmokers. At the same time, these changes have made it easier for individuals to act on antismoking attitudes. People who intend to stop smoking find more justifications and social support, and nonsmokers find it easier to speak their minds to smokers. Some of these changes, of course, even influence people whose attitudes are not antismoking.

By a similar process, changes in environmental attitudes may come to affect behavior over the long term. A generation of voters and environmental activists, influenced by the writings of Rachel Carson (1962), Paul Ehrlich (1968), Barry Commoner (1970), and other scientist-educators, has pressed government agencies, corporations, and other important actors to implement new policies on air and water pollution, energy development, and land use, and thus

change the way they treat environmental resources. Some of these policies also remove barriers to individuals' acting on their own proenvironmental attitudes, and thus change individual behavior. For example, they have helped bring more energy-efficient automobiles and appliances to market, so that environmentally conscious consumers can buy them. If education about environmental problems has been indirectly responsible for these advances in environmental policy over the last few decades, this would be a highly significant accomplishment. Although it is difficult to conclusively demonstrate the causal role of education over such long time periods, improved public awareness and understanding are among the most plausible causes of the policy changes. This sort of long-term effect of attitude change provides a key rationale for environmental education programs in the schools.

Education is only likely to induce behavior that is compatible with people's deeper values. As we note above, environmental values and ethical beliefs are broader and more deeply rooted than environmental attitudes or the specific beliefs addressed in this chapter. They are also more difficiult to change. Therefore, educational efforts aimed at attitude change are unlikely to succeed if they go against people's ethics and values. An example may be the repeated efforts of a coalition of nuclear energy industries through the 1980s and early 1990s to change public attitudes toward nuclear power with multimillion dollar advertising campaigns emphasizing the benefits of the technology. After well over a decade, public opinion is even more strongly opposed than before. The bases for public opposition to nuclear power are discussed in detail in Chapter 9.

Educational programs are more effective when they are designed according to psychological principles of communication and also directly address the links between attitudes and behavior. As the chapter repeatedly shows, making information available is not the same as getting it used. Even when people are being asked to act according to their attitudes, and so are predisposed to use information, it is essential to make special efforts to get their attention, use infor-

mation sources the audience trusts, and involve the recipients of the information in the effort. It may also be necessary to remind people that their proenvironmental attitudes apply to the situation at hand, and to tell them what to do to enact the attitudes. These things need to be done in different ways for different behaviors and audiences, and the chapter illustrates a number of useful tools for the purpose.

Education works best when combined with other strategies of intervention. We have seen how external barriers such as cost and difficulty keep educational programs from reaching their goals. We have also seen that programs work best when they do more than just educate. For example, recall that when an energy conservation program provided water-flow restrictors along with information on how to use them and on what they could save, it achieved its only behavioral success (Geller, 1981). These observations support a more general conclusion, that education and other strategies can act in synergy: The effects of both together are greater than one would expect from their separate effects.

The general point has been demonstrated by decades of research on health promotion, showing that educational campaigns are not enough to change individuals' smoking, drinking, dietary, and exercise behavior without supplementary efforts. However, education plus other changes can make an important difference over time. In the words of one review of the literature (Green, Wilson, and Lovato, 1986):

> . . . [H]ealth promotion has been occurring and health practices have been changing. . . . The changes have been more notable since the advent of official policies supporting nonsmoking with more than information alone. . . . Organizational changes, such as smoking restrictions on airplanes, restaurants, and other public places have helped. Economic supports, such as excise taxes on tobacco and alcohol, insurance incentives for driver training, not smoking, and blood pressure control, have helped. Environmental supports for behavior conducive to health, such as regulations on marketing food products as healthful and availability of fitness facilities in worksites and public parks, have helped. The combination of these supports with health education appears to have made a substantial dent in social norms of health-related behavior (p. 513).

Green et al. (1986) then go on to point out the important role of education in helping to bring about the above supports and changes. They conclude:

> . . . *[F]ew of the organizational, economic, and environmental changes would have been possible without the support of an enlightened, or at least willing, public (p. 513).*

The experience with health promotion suggests that although education may look like an ineffective strategy if it is judged over the short term and in isolation, it can be an essential part of effective intervention. In fact, the next few chapters show that the success of incentives and other methods of changing environmentally relevant behavior sometimes depends critically on the quality of the information provided and on the level of public concern and willingness to support the incentives or other interventions. Short-term educational interventions are important sources of information, and long-term environmental education strategies can be critical in building the public support necessary for a variety of environmental policies to be effective. No single strategy is sufficient by itself. Thus, the key issue is not how much can be accomplished by education alone, but what the place of education is in a comprehensive strategy of behavior change. We return to this question in Chapter 7.