Gateway THEME

Psychological principles can be used to solve practical problems in a variety of settings.
Laptops, smartphones, MP3 players, gaming consoles, tablet computers. By now, we’re all used to the seemingly inevitable explosion of digital technologies. But it’s not so easy to ignore their impact. Consumers have bought hundreds of millions of these devices. Digital gaming, social networking, the music business, the movie industry, and even book publishing will never be the same.

The success of these technologies almost always depends on engineers and psychologists coming up with ever more usable technical designs. The invention of the mouse and computer icons revolutionized personal computing. Much of the iPod’s early success hinged on (rotated around?) a tiny device called a click wheel. This touch-sensitive ring lay at the heart of users’ ability to quickly locate that one desired song among thousands. More recent touch-based devices use a multi-touch interface to allow easy access to the full range of available digital materials. And now, gaming systems like the Wii and Kinect can be controlled through gesture alone.

Whether it is the computer mouse, click wheel, multi-touch sensing, gestural sensing, voice-activation or computerized systems that disabled users can control with mind power alone, human factors psychologists depend on understanding human behavior to help design better computer tools.

Applied psychology refers to the use of psychological principles and research methods to solve practical problems. Designing computer interfaces is only one way to apply psychology. The largest applied areas are clinical and counseling psychology, but there are many others, such as community psychology, educational psychology, military psychology, consumer psychology, health psychology (discussed in Chapter 13), and space psychology. In this chapter we will focus on the application of psychology in six diverse areas: business, the environment, education, law, sports, and human factors.

**Gateway QUESTIONS**

18.1 How is psychology applied in business and industry?
18.2 What have psychologists learned about the effects of our physical and social environments?
18.3 How has psychology improved education?
18.4 What does psychology reveal about juries and court verdicts?
18.5 Can psychology enhance athletic performance?
18.6 How are tools designed to better serve human needs?
Gateway Question 18.1: How is psychology applied in business and industry?

Do you believe you should live to work or work to live? Whatever your attitude, the simple fact is that most adults work for a living. Whether you are already employed or plan to begin a career after college, it helps to know something about the psychology of work and organizations.

Industrial/organizational (I/O) psychologists study the behavior of people at work and in organizations (Aamodt, 2010; Cascio & Aguinis, 2008). Very likely, their efforts will affect how you are selected for a job and tested, trained, or evaluated for promotion. Most I/O psychologists are employed by the government, industry, and businesses. Typically, they work in two major areas: (1) studying jobs to identify underlying skills, which can then guide efforts to select people and train them for those jobs (the industrial part); and (2) studying organizations to understand how to create structures and company cultures that will improve worker performance (the organizational part). To get a better idea of what I/O psychologists do, look at Table 18.1. As you can see, their interests are quite varied.

A key person in any organization is its leader (Hodson & Sullivan, 2010). Family therapist and rabbi Edwin Friedman once remarked, “Leadership can be thought of as a capacity to define oneself to others in a way that clarifies and expands a vision of the future.” How do great business leaders inspire their followers?

Theories of Leadership

During many lunch hours at a major computer game developer, most of the employees, including the top executives, eat together while playing computer games (and no, the “bosses” don’t always win), talking, and joking. To say the least, these are unusual working conditions. To understand the rationale behind them, let’s consider two basic theories of leadership.

Theory X and Theory Y Leadership

One of the earliest attempts to improve worker efficiency was made in 1923 by Frederick Taylor, an engineer. To speed up production, Taylor standardized work routines and stressed careful planning, control, and orderliness. Today, versions of Taylor’s approach are called scientific management (also known as Theory X leadership, for reasons explained shortly). Scientific management uses time-and-motion studies, task analysis, job specialization, assembly lines, pay schedules, and the like to increase productivity (Bobic & Davis, 2003; Crowley et al., 2010).

It sounds like scientific management treats people as if they were machines. Is that true? To some extent it is. In Taylor’s day, many large companies were manufacturers with giant assembly lines. People had to be efficient cogs in the manufacturing machinery. Leaders who follow Theory X have a task orientation, focusing on the work to be done, rather than a person orientation, focusing on the people doing the work. As such, they tend to assume that workers must be goaded or guided into being productive. Many psychologists working in business, of course, are concerned with improving work efficiency (defined as maximum output at lowest cost). As a result, they alter conditions they believe will affect workers (such as time schedules, work quotas, bonuses, and so on). Some might even occasionally wish that people would act like well-oiled machines.

However, most recognize that psychological efficiency is just as important as work efficiency. Psychological efficiency refers to maintaining good morale, labor relations, employee satisfaction, and similar aspects of work behavior. Leadership styles that ignore or mishandle the human element can be devastatingly costly. Studies have consistently found that happy workers are productive workers (Lerner & Henke, 2008; Wright & Cropanzano, 2000).

The term Theory Y was coined by psychologist Douglas McGregor (1960) as a way to distinguish the leadership style...
From Glass Ceiling to Labyrinth

 Aren’t women more people-oriented than men? And doesn’t that imply that women would make better Theory Y leaders?

Good thinking. As person-oriented Theory Y leadership styles have become more popular, women are slowly gaining acceptance as leaders (Ayman & Korabik, 2010; Eagly, 2007). Nearly a quarter of all American organizations have female CEOs (Martin, 2007). Studies have even shown that companies with more women in leadership roles perform better financially (Carter, Simkins, & Simpson, 2003; Krishnan & Park, 2005).

And yet, according to psychologist Alice Eagly, women continue to face unique challenges. Increasingly, cracks are appearing in the glass ceiling, the invisible barrier that has prevented women from moving into leadership positions. But the glass ceiling is being replaced by a labyrinth created by a clash between leadership stereotypes and stereotypes of women (Brescoll, Dawson, & Uhlmann, 2010; Eagly & Carli, 2007). On the one hand, most people expect good leaders to be agentic: independent, confident, ambitious, objective, dominant, and forceful. On the other hand, they expect women to be more communal: dependent, caring, nurturing, tender, sensitive, and sympathetic. According to traditional gender role stereotypes (see Chapter 11), it is men who are agentic and, therefore, better leaders, despite evidence to the contrary (Eagly, 2007).

What does this mean for a woman who moves into a leadership role? If she practices communal, Theory Y leadership, she is seen as weak. She is “not tough enough” or does not “have the right stuff” to be a leader. Yet, if she acts more assertively and confidently, she is scorned for “trying to be a man” (Kark & Eagly, 2010). This conflict has been perfectly expressed by Carly Fiorina, former CEO of Hewlett-Packard, who wrote, “In the chat rooms around Silicon Valley…I was routinely referred to as either a ‘bimbo’ or a ‘bitch’—too soft or too hard, and presumptuous, besides” (Fiorina, 2006).

As traditional gender stereotypes fade, and as Theory Y styles gain wider acceptance, perhaps women will add escaping the leadership labyrinth to their many other successes.

As the CEO of Hewlett-Packard Carly Fiorina constantly faced the incongruity between leadership stereotypes and stereotypes of women (Fiorina, 2006).

Associated with scientific management from Theory Y, a newer approach, which emphasizes human relations at work.

How is this approach different? Theory Y leaders have a person orientation rather than a task orientation and tend to assume that workers enjoy autonomy and are willing to accept responsibility. They also assume that a worker’s needs and goals can be meshed with the company’s goals, and that people are not naturally passive or lazy. In short, Theory Y assumes that people are industrious, creative, and rewarded by challenging work.

It appears that given the proper conditions of freedom and responsibility, many people will work hard to gain competence and use their talents. This is especially true for knowledge workers (Marks & Baldry, 2009). These are people who add value to a company by creating and manipulating information and who usually think of their work as a career rather than as a job. Some examples are bankers, teachers, lawyers, computer engineers, writers, and scientists. Over the last 50 years, manufacturing has declined in North America whereas knowledge companies have become much more common. Today in North America, 4 of every 5 persons in the workforce are knowledge workers (Drucker, 1993).

Consider Armando, who is a software engineer. He has been working long hours trying to develop a new way to more quickly predict hurricane activity for a satellite weather system. The work efficiency of Armando’s job cannot easily be measured or improved. Instead, his success depends on his own initiative, creativity, and commitment to his work. Armando quit his last job because the leaders of that company made him feel like he was “punching the clock,” which is something Armando does not want to do. The woman who is the chief executive officer of his current company impresses Armando. In fact, he wonders whether women might not make better business leaders (see “From Glass Ceiling to Labyrinth”).
A Honda plant at Marysville, Ohio, illustrates many features of Theory Y. As you may already know, the automobile industry has a long history of labor-management clashes and worker discontent. In fact, outright sabotage by assembly line workers is not uncommon. To avoid such problems, Honda initiated a series of simple, seemingly successful measures. They include the following practices.

- Regardless of their position, all employees wear identical white uniforms. This allows workers and supervisors to interact on a more equal footing and builds feelings of teamwork.
- To further minimize status differences, all employees hold the title associate.
- Private offices, separate dining halls, and reserved parking spaces for executives were abolished.
- Employees work alongside company executives, to whom they have easy access.
- Every employee has a say in, and responsibility for, quality control and safety.
- Departmental meetings are held daily. At this time, announcements are discussed, decisions are made, and thoughts are freely shared.

### Leadership Strategies

Two techniques that make Theory Y leadership methods effective are shared leadership and management by objectives. In shared leadership (participative management), employees at all levels are directly involved in decision making (Pearce, Manz, & Sims, 2009). By taking part in decisions that affect them, employees like those at the Honda factory come to see work as a cooperative effort—not as something imposed on them by an egotistical leader. The benefits include greater productivity, more involvement in work, greater job satisfaction, and less job-related stress (Kim, 2002; Pearce, Conger, & Locke, 2007).

*What is “management by objectives”?* In management by objectives, workers are given specific goals to meet so they can tell whether they are doing a good job (Antoni, 2005). Typical objectives include reaching a certain sales total, making a certain number of items, or reducing waste by a specific percentage. In any case, workers are free to choose (within limits) how they will achieve their goals. As a result, they feel more independent and take personal responsibility for their work. Workers are especially productive when they receive feedback about their progress toward goals. Clearly, people like to know what the target is and whether they are succeeding (Horn et al., 2005; Lefrançois, 2006).

Many companies also give groups of workers even greater freedom and responsibility. This is typically done by creating self-managed teams. A self-managed team is a group of employees who work together toward shared goals. Self-managed teams can typically choose their own methods of achieving results, as long as they are effective. Self-managed teams tend to make good use of the strengths and talents of individual employees. They also promote new ideas and improve motivation. Most of all, they encourage cooperation and teamwork within organizations (Woods & West, 2010). Workers in self-managed teams are much more likely to feel that they are being treated fairly at work (Chansler, Swamidass, & Cammann, 2003) and to develop a positive team atmosphere (Zárraga & Bonache, 2005).

How can workers below the management level be involved more in their work? One answer is the use of quality circles. These are voluntary discussion groups that seek ways to solve business problems and improve efficiency (Aamodt, 2010). In contrast to self-managed teams, quality circles usually do not have the power to put their suggestions into practice directly. But good ideas speak for themselves and many are adopted by company leaders. Quality circles have many limitations. Nevertheless, studies verify that greater personal involvement can lead to better performance and job satisfaction (Beyer et al., 2003).

### Job Satisfaction

It often makes perfect sense to apply Theory X methods to work. However, doing so without taking worker needs into account can be a case of winning the battle but losing the war. That is, immediate productivity may be enhanced as job satisfaction is lowered. And when job satisfaction is low, absenteeism skyrocket, morale falls, and there is a high rate of employee turnover, leading to higher training costs and inefficiency (Wright & Bonett, 2007).

Understandably, many of the methods used by enlightened Theory Y leaders ultimately improve job satisfaction, or the degree to which a person is pleased with his or her work. Job satisfaction is well worth cultivating because positive moods are associated with more cooperation, better performance, a greater willingness to help others, more creative problem solving, and less absenteeism (Bowling, 2010; Brief & Weiss, 2002).
**Under what conditions is job satisfaction highest?** Basically, job satisfaction comes from a good fit between work and a person’s interests, abilities, needs, and expectations. The major factors determining job satisfaction are listed below. Think of a job you have held. It’s likely that the more these factors were present, the higher your job satisfaction was (Aamodt, 2010; Landy & Conte, 2007):

1. My job meets my expectations. Y or N?
2. My needs, values, and wants are met by my job. Y or N?
3. The tasks I have to do are enjoyable. Y or N?
4. I enjoy my supervisors and coworkers. Y or N?
5. My coworkers are outwardly happy. Y or N?
6. I am rewarded fairly for doing a good job. Y or N?
7. I have a chance to grow and be challenged. Y or N?

We should note that job satisfaction is not entirely a matter of work conditions. Anyone who has ever been employed has probably encountered at least one perpetually grumpy coworker. In other words, workers don’t leave their personalities at home. Happy people are more often happy at work, and they are more likely to focus on what’s good about their job rather than what’s bad (Brief & Weiss, 2002). Understandably, the most productive employees are those who are happy at work (Aamodt, 2010; Elowainio et al., 2000). This connection can be seen clearly when employees are allowed to participate in various forms of flexible work.

**Flexible Work**

If you’ve ever worked “9 to 5” in an office, you know that traditional time schedules can be confining. They also doom many workers to a daily battle with rush-hour traffic (Lucas & Heady, 2002). To improve worker morale, I/O psychologists recommend the use of a variety of flexible work arrangements, of which the best known is flextime, or flexible working hours (Kossek & Michel, 2011). The basic idea of flextime is that starting and quitting times are flexible, as long as employees are present during a core work period. For example, employees might be allowed to arrive between 7:30 A.M. and 10:30 A.M. and depart between 3:30 P.M. and 6:30 P.M. In a variation called a **compressed workweek**, employees might work fewer days but put in more hours per day.

A different approach to flexible work involves working at home. In knowledge companies, employees are often allowed to **telecommute**, by using a computer to remain connected to the office throughout the work day (Lautsch, Kossek, & Eaton, 2009; Golden, Veiga, & Simsek, 2006).

**Is flexible work really an improvement?** Generally speaking, yes (Yang & Zheng, 2011). For example, flextime typically has a positive effect on workers’ productivity, job satisfaction, absenteeism, and comfort with their work schedules (Baltes et al., 1999). Similarly, telecommuting is especially effective when it allows valued employees to maintain their homes in other cities (Atkin & Lau, 2007). Psychologists theorize that flexible work lowers stress and increases feelings of independence, both of which increase productivity and job satisfaction.

Of course, not everyone wants a compressed workweek or to work from home. Ideally, flexible working arrangements should fit the needs of employees (Rothbard, Phillips, & Dumas, 2005). Regardless, most large organizations now use flexible work arrangements. Perhaps we can conclude that it is better, when possible, to bend working arrangements instead of people.

**Job Enrichment**

For years, the trend in business and industry was to make work more streamlined and efficient and to tie better pay to better work. There is now ample evidence that incentives such as bonuses, earned time off, and profit sharing can increase productivity. However, far too many jobs are routine, repetitive, boring, and unfulfilling. To combat the discontent this can breed, many psychologists recommend a strategy called **job enrichment**.

**Job enrichment** involves making a job more personally rewarding, interesting, or intrinsically motivating. Large corporations such as IBM, Maytag, Western Electric, Chrysler, and Polaroid have used job enrichment with great success. It usually leads to lower production costs, increased job satisfaction, reduced bore-
Like road rage on the highways, “desk rage,” or workplace anger, is a frequent occurrence and, at times, erupts into workplace violence (Martin, Douglas, & Harvey, 2006). It’s not difficult to understand the common triggers for workplace anger: intense anger triggered by job-related stresses (such as feeling that one has been treated unfairly), perceived threats to one’s self-esteem and work-related conflicts with others (Einarsen & Hoel, 2008; Glomb, 2002; Spector, 2005).

What can be done about anger and aggression at work? Most larger companies now offer mental health services to troubled employees and trauma counseling if violence erupts in the workplace. More importantly, healthy organizations actively promote the well-being of people. They do this by openly confronting problems, empowering employees, and encouraging participation, cooperation, and full use of human potential. Healthy organizations also support well-being in the following ways (Fuqua & Newman, 2002; Hodson, & Sullivan, 2010):

- Rather than always complaining and blaming, group members express sincere gratitude for the efforts of others.
- Everyone makes mistakes. The culture in caring organizations includes a capacity to forgive.
- Everyone needs encouragement at times. Encouragement can inspire workers and give them hope, confidence, and courage.
- Showing sensitivity to others can dramatically change the work environment. Sensitivity can take the form of expressing interest in others and in how they are doing. It also includes respecting the privacy of others.
- Compassion for others is a good antidote for destructive competitiveness and petty game playing.
- People have very different needs, values, and experiences. Tolerance and respect for the dignity of others goes a long way toward maintaining individual well-being.

The economic pressures that organizations face can lead to hostile and competitive work environments. However, even in economically difficult times, productivity and quality of life at work are closely intertwined. Effective organizations seek to optimize both (Fuqua & Newman, 2002). For example, companies who pay more attention to the quality of life at work generally suffer fewer productivity losses if they are forced to downsize (reduce the size of their workforce; Iverson & Zatzick, 2011).

Organizational Culture

Businesses and other organizations, whether they are large or small, develop distinct cultures. Organizational culture refers to a blend of customs, beliefs, values, attitudes, and rituals. These characteristics give each organization its unique “flavor” (Chamorro-Premuzic & Furnham, 2010). Organizational culture includes such things as how people are hired and trained, disciplined, and dismissed. It encompasses how employees dress, communicate, resolve conflicts, share power, identify with organizational goals and values, negotiate contracts, and celebrate special occasions.

People who fit well into a particular organization tend to contribute to its success in ways that are not specifically part of their job description. For example, they are helpful, conscientious, and courteous. They also display good sportsmanship by avoiding pettiness, gossiping, complaining, and making small problems into big ones (see “Desk Rage and Healthy Organizations”). Like good citizens, the best workers keep themselves informed about organizational issues by attending meetings and taking part in discussions. Workers with these characteristics display what could be called organizational citizenship. Understandably, managers and employers highly value workers who are good organizational citizens (Woods & West, 2010).

Personnel Psychology

Companies can also enhance their chances of success by hiring the right employees in the first place. Personnel psychology is concerned with testing, selection, placement, and promotion of employees (Woods & West, 2010). At present, 9 out of 10 people are or will be employed in business or industry. Thus, nearly everyone who holds a job is sooner or later placed under the “psychological microscope” of personnel selection. Clearly, there is value in knowing how selection for hiring and promotion is done.
Job Analysis

How do personnel psychologists make employee selections? Personnel selection begins with job analysis, a detailed description of the skills, knowledge, and activities required by a particular job (Dierdorf & Wilson, 2003; Stetzer, Burton, & Porr, 2009). A job analysis may be done by interviewing expert workers or supervisors, giving them questionnaires, directly observing work, or identifying critical incidents. Critical incidents are situations with which competent employees must be able to cope. The ability to deal calmly with a mechanical emergency, for example, is a critical incident for airline pilots. Once job requirements are known, psychologists can state what skills, aptitudes, and interests are needed (Figure 18.1). In addition, some psychologists are now doing a broader “work analysis.” In this case, they try to identify general characteristics that a person must have to succeed in a variety of work roles, rather than in just a specific job (Sackett & Lievens, 2008).

Selection Procedures

After desirable skills and traits are identified, the next step is to learn who has them. Today, the methods most often used for evaluating job candidates include collecting biodata, conducting interviews, giving standardized psychological tests, and employing the assessment center approach. Let’s see what each entails.

Biodata As simple as it may seem, one good way to predict job success is to collect biodata (detailed biographical information) from applicants (Schultz & Schultz, 2010). The idea behind biodata is that looking at past behavior is a good way to predict future behavior. By learning in detail about a person’s life, it is often possible to say whether the person is suited for a particular type of work (Sackett & Lievens, 2008).

Some of the most useful items of biodata include past athletic interests, academic achievements, scientific interests, extracurricular activities, religious activities, social popularity, conflict with brothers and sisters, attitudes toward school, and parents’ socioeconomic status (Woods & West, 2010). It is worth pointing out that there are civil liberty and privacy concerns around the collection of sensitive biodata. Such facts tell quite a lot about personality, interests, and abilities. In addition to past experiences, a person’s recent life activities also help predict job success (Schmidt, Ones, & Hunter, 1992). For instance, you might think that college grades are unimportant, but college grade point average (GPA) predicts success in many types of work (Sackett & Lievens, 2008).

Interviews The traditional personal interview is still one of the most popular ways to select people for jobs or promotions. In a personal interview, job applicants are questioned about their qualifications. At the same time, interviewers gain an impression of the applicant’s personality (Chamorro-Premuzic & Furnham, 2010). (Or personalities—but that’s another story!)

As discussed in Chapter 12, interviews are subject to the halo effect and similar problems. (Recall that the halo effect is the tendency of interviewers to extend favorable or unfavorable impressions to unrelated aspects of an individual’s personality, such as his or her appearance.) In addition, interviewees actively engage in impression management, seeking to portray a positive image to interviewers (Ellis et al., 2002; see “Surviving Your Job Interview”).

It is for reasons like these that psychologists continue to look for ways to improve the accuracy of interviews. For instance, recent studies suggest that interviews can be improved by giving them more structure (Sackett & Lievens, 2008; Tsai, Chen, & Chiu, 2005). For example, each job candidate should be asked the same questions (Campion, Palmer, & Campion, 1998). However, even with their limitations, interviews can be a valid and effective way of predicting how people will perform on the job (Landy, Shankster, & Kohler, 1994).

Psychological Testing What kinds of tests do personnel psychologists use? General mental ability tests (intelligence tests) tell a great deal about a person’s chances of succeeding in various jobs (Aamodt, 2010; Schmidt & Hunter, 1998). So do general personality tests (described in Chapter 12; Sackett & Lievens, 2008). In addition,
personnel psychologists often use vocational interest tests. These tests assess people’s interests and match them to interests found among successful workers in various occupations (Van Iddekinge, Putka, & Campbell, 2011). Tests such as the Kuder Occupational Interest Survey and the Strong-Campbell Interest Inventory probe interests with items like the following:

I would prefer to
a. visit a museum
b. read a good book
c. take a walk outdoors

Interest inventories typically measure six major themes identified by John Holland (Table 18.2). If you take an interest test and your choices match those of people in a given occupation, it is assumed that you, too, would be comfortable doing the work they do (Holland, 1997).

Aptitude tests are another mainstay of personnel psychology. Such tests rate a person’s potential to learn tasks or skills used in various occupations. Tests exist for clerical, verbal, mechanical, artistic, legal, and medical aptitudes, plus many others (Figure 18.2). For example, tests of clerical aptitude emphasize the capacity to do rapid, precise, and accurate office work. One section of a clerical aptitude test might, therefore, ask a person to mark all identical numbers and names in a long list of pairs like those shown here.

49837266
Global Widgets, Inc.
874583725
Sevanden Corp.
Cengage Publishing

Aptitude tests are related to intelligence tests. See Chapter 9, pages 304–305, to learn how they differ.

1. If the driver turns in the direction shown, which direction will wheel Y turn? A B
2. Which wheel will turn the slowest? Driver X Y
After college, chances are good that you will encounter an assessment center. Many large organizations use assessment centers to do in-depth evaluations of job candidates. This approach has become so popular that the list of businesses using it—Ford, IBM, Kodak, Exxon, Sears, and thousands of others—reads like a corporate Who’s Who.

How do assessment centers differ from the selection methods already described? Assessment centers are primarily used to fill management and executive positions. First, applicants are tested and interviewed. Then, they are observed and evaluated in simulated work situations. Specifically, situational judgment tests are used to present difficult but realistic work situations to applicants (Christian, Edwards, & Bradley, 2010; Lievens & Sackett, 2006). For example, in one exercise applicants are given an in-basket test that simulates the decision-making challenges executives face. The test consists of a basket full of memos, requests, and typical business problems. Each applicant is asked to quickly read all the materials and to take appropriate action. In another, more stressful test, applicants take part in a leaderless group discussion. This is a test of leadership that simulates group decision making and problem solving. As the group grapples with a realistic business problem, “clerks” bring in price changes, notices about delayed supplies, and so forth. By observing applicants, it is possible to evaluate leadership skills and to see how job candidates cope with stress (Chamorro-Premuzic & Furnham, 2010).

**How well does this approach work?** Assessment centers have had considerable success in predicting performance in a variety of jobs, careers, and advanced positions (Chamorro-Premuzic & Furnham, 2010; Landy, Shankster, & Kohler, 1994). Situational tests are also used to investigate personality differences. See Chapter 12, pages 429–432.

*Environmental Psychology—Life on Spaceship Earth*

**Gateway Question 18.2: What have psychologists learned about the effects of our physical and social environments?**

Where do you think it is more likely that a fistfight would occur: in a church or a country-western bar? If the answer seems obvious, it is because specific environments have a significant impact on...
behavior. The reverse is also true: People have a significant impact on environments, both natural and constructed. Because of this second possibility, environmental psychologists are concerned with some of the most serious problems facing humanity.

Environmental psychology is the specialty concerned with the relationship between environments and human behavior (Bell et al., 2006). Environmental psychologists are interested in both physical environments (natural or constructed) and social environments (defined by groups of people, such as a dance, business meeting, or party). They also give special attention to behavioral settings (smaller areas within an environment that have a well-defined use, such as an office, locker room, church, casino, or classroom). As you have no doubt noticed, various environments and behavioral settings tend to “demand” certain actions. Consider, for example, the difference between a library and a campus center lounge. In which would a conversation be more likely to occur?

Other major interests of environmental psychologists are personal space, territorial behavior (discussed in “Territoriality”), stressful environments, architectural design, environmental protection, and many related topics (Table 18.3).

Environmental Influences on Behavior

Much of our behavior is influenced, in part, by specific types of environments. For example, a variety of environmental factors influence the amount of vandalism that occurs in public places (Brown & Devlin, 2003). On the basis of psychological research,
many architects now "harden" and "de-opportunistize" public settings to discourage vandalism and graffiti. Some such efforts limit opportunities for vandalism (doorless toilet stalls, tiled walls). Others weaken the lure of likely targets. (Oddly enough, raised flowerbeds around signs helps protect them because people resist trampling the flowers to get to the sign.)

Similarly, many shopping malls and department stores are designed like mazes. Their twisting pathways encourage shoppers to linger and wander while looking at merchandise. Likewise, in every city more assaults and burglaries take place near the few restaurants or bars where likely offenders tend to hang out (Buchanan, 2008). Even public bathrooms influence behavior. Because the seating is limited, few people hold meetings there!

Given the personal impact that environments have, it is important to know how we are affected by stressful or unhealthy environments—a topic we will consider next.

**Stressful Environments**

Large cities are usually thought of as stressful places to live. Traffic congestion, pollution, crime, and impersonality are urban problems that immediately come to mind. To this list psychologists have added crowding, noise, and overstimulation as major sources of urban stress. Psychological research has begun to clarify the impact of each of these conditions on human functioning (Malan et al., 2008; Marsella, 1998).

**Crowding**

Overpopulation ranks as one of the most serious problems facing the world today. World population has exploded in the last 150 years (Figure 18.3). The world’s population is now more than 7 billion people and may exceed 10 billion by 2050 (UN, 2004).

How many more people can the forests, oceans, croplands, and atmosphere support? Experts estimate that the maximum sustainable population of the Earth is between 5 billion and 20 billion persons. This means the Earth has already entered the lower range of its carrying capacity. The most pessimistic experts believe we have already exceeded the number of people the Earth can sustain indefinitely (Global Footprint Network, 2010; Oskamp, 2000). Further population increases at the present rate could be disastrous.

Nowhere are the effects of overpopulation more evident than in the teeming cities of many underdeveloped nations. Closer to home, the jammed buses, subways, and living quarters of our own large cities are ample testimony to the stresses of crowding.

*Is there any way to assess the effect crowding has on people? One approach is to study the effects of overcrowding among animals. Although the results of animal experiments cannot be considered conclusive for humans, they point to some disturbing effects.*

For example? In an influential classic experiment, John Calhoun (1962) let a group of laboratory rats breed without limit in a confined space. Calhoun provided plenty of food, water, and nesting material for the rats. All that the rats lacked was space. At its peak, the colony numbered 80 rats. Yet it was housed in a cage designed to comfortably hold about 50. Overcrowding in the cage was heightened by the actions of the two most dominant males. These rascals staked out private territory at opposite ends of the cage, gathered harems of 8 to 10 females, and prospered. Their actions forced the remaining rats into a small, severely crowded middle area.

*What effect did crowding have on the animals? A high rate of pathological behavior developed in both males and females.*

**TABLE 18.3** Topics of Special Interest to Environmental Psychologists

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**Figure 18.3** Population growth has exploded since 1850 and already exceeds 6 billion. Overpopulation and rapid population growth are closely connected with environmental damage, international tensions, and rapid depletion of nonrenewable resources. Some demographers predict that if population growth is not limited voluntarily before it reaches 10 billion, it will be limited by widespread food shortages, disease, infant mortality, and early death (Global Footprint Network, 2010). Population Institute, 2006

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**Environmental psychology** The formal study of how environments affect behavior.

**Physical environments** Natural settings, such as forests and beaches, as well as environments built by humans, such as buildings, ships, and cities.

**Social environment** An environment defined by a group of people and their activities or interrelationships (such as a parade, revival meeting, or sports event).

**Behavioral setting** A smaller area within an environment whose use is well defined, such as a bus depot, waiting room, or lounge.
Females gave up nest building and caring for their young. Pregnancies decreased, and infant mortality ran extremely high. Many of the animals became indiscriminately aggressive and went on rampaging attacks against others. Abnormal sexual behavior was rampant, with some animals displaying hypersexuality and others total sexual passivity. Many of the animals died, apparently from stress-caused diseases. The link between these problems and overcrowding is unmistakable.

But does that apply to humans? Many of the same pathological behaviors can be observed in crowded inner-city ghettos. It is, therefore, tempting to assume that violence, social disorganization, and declining birthrates as seen in these areas are directly related to crowding. However, the connection has not been so clearly demonstrated with humans (Evans et al., 2010). People living in the inner city suffer disadvantages in nutrition, education, income, and health care. These, more than crowding, may deserve the blame. In fact, most laboratory studies using human subjects have failed to produce any serious ill effects by crowding people into small places. Most likely, this is because crowding is a psychological condition that is separate from density (the number of people in a given space).

How does crowding differ from density? Crowding refers to subjective feelings of being overstimulated by social inputs or a loss of privacy. Whether high density is experienced as crowding may depend on relationships among those involved. In an elevator, subway, or prison, high densities may be uncomfortable. In contrast, a musical concert, party, or reunion may be most pleasant at high density levels. Thus, physical crowding may interact with situations to intensify existing stresses or pleasures (Evans, Lercher, & Kofler, 2002). However, when crowding causes a loss of control over one’s immediate social environment, stress is likely to result (Pandey, 1999; Steiner & Woolredge, 2009).

Stress probably explains why death rates increase among prison inmates and mental hospital patients who live in crowded conditions. Even milder instances of crowding can have a negative impact. People who live in crowded conditions often become more aggressive or guarded and withdrawn from others (Regoezzi, 2003).

Overload
One unmistakable result of high densities and crowding is a state that psychologist Stanley Milgram called attentional overload. This is a stressful condition that occurs when sensory stimulation, information, and social contacts make excessive demands on attention. Large cities, in particular, tend to bombard residents with continuous input. The resulting sensory and cognitive overload can be quite stressful.

Milgram (1970) believed that city dwellers learn to prevent attentional overload by engaging only in brief, superficial social contacts, by ignoring nonessential events, and by fending off others with cold and unfriendly expressions. In short, many city dwellers find that a degree of callousness is essential for survival.
In April 2010, an oil rig in the Gulf of Mexico exploded and burned, unleashing a major environmental catastrophe. In March 2011, a Japanese nuclear reactor suffered a catastrophic failure in reaction to a giant earthquake and tsunami. As the late Carl Sagan once said, “When you look closely, you find so many things going wrong with the environment, you are forced to reassess the hypothesis of intelligent life on Earth.”

Kind or Callous?

*Is there any evidence that such strategies are actually adopted?* A fascinating study suggests they are. In several large American cities and smaller nearby towns, a young child stood on a busy street corner and asked passing strangers for help, saying, “I’m lost. Can you call my house?” About 72 percent of those approached in small towns offered to help. Only about 46 percent of those who were asked for help in the cities gave aid. In some cities (Boston and Philadelphia), only about one third were willing to help (Takooshian, Haber, & Lucido, 1977). Numerous studies confirm that country people are more likely to help than city people (Steblay, 1987; Wilson & Kennedy, 2006). The least helpful city tested was New York, where the crime rate is high and people are densely packed together (Levine, 2003). Thus, a blunting of sensitivity to the needs of others may be one of the more serious costs of urban stresses and crowding. As described next, noise also contributes to the sensory assault many people endure in urban environments.

The High Cost of Noise

How serious are the effects of daily exposure to noise? A classic study of children attending schools near Los Angeles International Airport suggests that constant noise can be quite damaging. Children from the noisy schools were compared with similar students attending schools farther from the airport (Cohen et al., 1981). The comparison students were from families of comparable social and economic makeup. Testing showed that children attending the noisy schools had higher blood pressure than those from the quieter schools. They were more likely to give up attempts to solve a difficult puzzle. And they were poorer at proofreading a printed paragraph—a task that requires close attention and concentration. Other studies of children living near other airports or in noisy neighborhoods have found similar signs of stress, poor reading skills, and other damaging effects (Evans, 2006; Sörqvist, 2010).

The tendency of the noise-battered children to give up or become distracted is a serious handicap. It may even reveal a state of “learned helplessness” caused by daily, uncontrollable blasts of sound. Even if such damage proves to be temporary, it is clear that noise pollution (annoying and intrusive noise) is a major source of environmental stress (Staples, 1996).

**BRIDGES**

Learned helplessness is described in Chapter 13, pages 458–459.

**Human Influences on the Environment**

Human activities drastically change the natural environment (Miller & Spoolman, 2011). We burn fossil fuels, destroy forests, use chemical products, and strip, clear, and farm the land. In doing so, we alter natural cycles, animal populations, and the very face of...
the Earth. The long-range impact of such activities is already becoming evident through global warming, the extinction of plants and animals, a hole in the ozone layer, and polluted land, air, water, and oceans (Oskamp, 2002; Winter & Koger, 2010).

On a smaller scale there is plenty of evidence that unchecked environmental damage will be costly to our children and descendants. For example, exposure to toxic hazards, such as radiation, pesticides, and industrial chemicals, leads to an elevated risk of physical and mental disease (Evans, 2006).

**Sustainable Lifestyles**

A worldwide ecological crisis is brewing, and humans must change course to avoid vast human misery and permanent damage. Of course, corporations and governments do much environmental damage. Thus, many of the solutions will require changes in politics and policies. Ultimately, it will also require changes in individual behavior. Most of the environmental problems we face can be traced back to the human tendency to overuse natural resources (Global Footprint Network, 2010; Huang & Rust, 2011).

**Wasted Resources**

The rapid worldwide consumption of natural resources is a devastating social problem. Resource consumption can be measured as an ecological footprint, the amount of land and water area required to replenish the resources that a human population consumes. According to the Global Footprint Network (2010), humans are already consuming more than the Earth can regenerate. Industrialized nations, in particular, are consuming world resources at an alarming rate. North America, for instance, has an ecological footprint about 10 times higher than that of Asia or Africa. In the face of projected shortages and squandered resources, what can be done to encourage conservation on a personal level?

**Conservation**

Try as you might to reduce your use of resources (electricity, for instance), you may find it difficult to do (Stall, Meadows & Hebert, 2011). Environmental psychologists have long known that a lack of control and feedback is a major barrier (Abrahamse et al., 2005). (See Chapter 6, pages 219–221, for details.)

For example, programmable home thermostats and energy saving settings on appliances and electronics make it possible for conservation-conscious consumers to more precisely control their energy consumption. Similarly, feedback about electricity use usually arrives long after the temptation to turn up the heat or to leave lights on (the monthly electricity bill). Psychologists aware of this problem have shown that lower energy bills result from simply giving families and work groups daily feedback about their use of gas or electricity (Carrico & Riemer, 2011).

Savings are magnified further with the addition of programs that give monetary rewards for energy conservation. Smart meters, one recent example, can provide continuous feedback about energy usage to both consumers and their energy suppliers (U.S. Department of Energy, 2010). With this information, electricity utilities can, for example, offer electricity at lower prices during periods of low demand. Savvy consumers can not only more easily conserve electricity, but they can also save even more money by, say, running their dishwasher in the evening rather than during the day.

Effective feedback about overall resource use is also finally becoming widely available as several organizations provide ecological footprint calculators, websites that allow individuals to calculate and, therefore, track their individual resource consumption (Global Footprint Network, 2010). With growing public concern over global warming, many people are now calculating their individual carbon footprint, the volume of greenhouse gases individual consumption adds to the atmosphere (The Nature Conservancy, 2011).

It is now easier than ever to conserve energy (by installing energy efficient lights, for example) and see an immediate reduction in your carbon footprint. It is also becoming more popular to offset some carbon debt—by planting trees, for example. Prompt and accurate information and feedback about energy use is making it possible to aspire to a carbon-neutral lifestyle, in which your energy consumption is reduced and the remainder offset so that your overall impact on global warming is zero. Similar factors can greatly increase recycling, as described in “Reuse and Recycle.”
Discovering Psychology

Reuse and Recycle

Although reducing consumption can lighten the environmental impact of our “throw-away” society, personally reusing products and materials that would normally be thrown away is also important. In addition, we can recycle materials such as paper, steel, glass, aluminum, and plastic that can be used to make new products.

What can be done to encourage people to recycle? Psychological research has shown that all of the following strategies promote recycling (Duffy & Verges, 2009; Schmuck & Vlek, 2003; Winter & Koger, 2010):

- **Educate.** Learning about environmental problems and pro-environment values at school and work has been one of the most effective ways to encourage pro-environmental behavior including recycling (Carriero & Riemer, 2011; Schmuck & Vlek, 2003).
- **Provide monetary rewards.** As mentioned before, monetary rewards encourage conservation. Requiring refundable deposits on glass bottles is a good example of using incentives to increase recycling.
- **Remove barriers.** Anything that makes recycling more convenient helps. A good example is cities that offer curbside pickup of household recyclables. Another is businesses that help customers recycle old computers, printers, and the like. On campus, simply putting marked containers in classrooms is a good way to encourage recycling (Ludwig, Gray, & Rowell, 1998; Winter & Koger, 2010).
- **Use persuasion.** Many recycling programs benefit from media campaigns to persuade people to participate.
- **Obtain public commitment.** People who feel they have committed themselves to recycling are more likely to follow through and actually recycle. Sometimes, people are asked to sign “pledge cards” on which they promise to recycle. Another technique involves having people sign a list committing themselves to recycling. Such lists may or may not be published in a local newspaper. They are just as effective either way.
- **Encourage goal setting.** People who set their own goals for recycling tend to meet them. Goal setting has been used successfully with families, dorms, neighborhoods, offices, and factories, and so forth.
- **Give feedback.** To reiterate, feedback proves to be very valuable. Recycling typically increases when families, work groups, dorms, and the like are simply told, on a weekly basis, how much they recycled (Keller, 2010; Schultz, 1999). Even impersonal feedback can be effective. In one study, signs were placed on recycling containers on a college campus. The signs showed how many aluminum cans had been deposited in the previous week. This simple procedure increased recycling by 65 percent (Larson, Houlihan, & Goernert, 1995).
- **Revise attitudes.** Even people who believe that recycling is worthwhile are likely to regard it as a boring task. Thus, people are most likely to continue recycling if they emphasize the sense of satisfaction they get from contributing to the environment (Nigbur, Lyons, & Uzzell, 2010; Werner & Makela, 1998).

Social Dilemmas

*Why is it so difficult to get people to take better care of the environment?* A pattern of behavior called a social dilemma contributes to many environmental problems. A social dilemma is any social situation that tends to provide immediate rewards for actions that will have undesired effects in the long run (Van Vugt, 2002, 2009). In a typical social dilemma, no one individual intentionally acts against the group interest, but if many people act alike, collective harm is done. For example, the rapid transit systems in many large cities are underused. At the same time, the roads are jammed. Why? Because too many individuals decide that it is convenient to own and drive a separate car (in order to run errands and so on). However, each person’s behavior affects the welfare of others. Because everyone wants to drive for “convenience,” driving becomes inconvenient: The mass of cars in most cities causes irritating traffic snarls and a lack of parking spaces. It also contributes to pollution and global warming. Each car owner has been drawn into a dilemma.

The Tragedy of the Commons

Social dilemmas are especially damaging when we are enticed into overuse of scarce resources that must be shared by many people. Again, each person acts in his or her self-interest but collectively, everyone ends up suffering. Ecologist Garrett Hardin (1968) calls such situations the *tragedy of the commons*. An example we have already discussed is the lack of individual incentives to conserve

**Ecological footprint** The amount of land and water area required to replenish the resources that a human population consumes.

**Carbon footprint** The volume of greenhouse gases individual consumption adds to the atmosphere.

**Social dilemma** A social situation that tends to provide immediate rewards for actions that will have undesired effects in the long run.

**Tragedy of the commons** A social dilemma in which individuals, each acting in his or her immediate self-interest, overuse a scarce group resource.
gasoline, water, or electricity. Whenever personal comfort or convenience is involved, it is highly tempting to “let others worry about it.” Yet, in the long run, everyone stands to lose (Van Vugt, 2009).

Why does such misguided behavior so often prevail? Again, we see a social dilemma at work: If one person pollutes a river or trashes the roadside, it has little noticeable effect. But as many people do the same, problems that affect everyone quickly mount. Throwing away one plastic bag may seem inconsequential, but across the world 500 billion plastic bags are used every year and it takes hundreds of years for the environment to recycle them. Plastic bags are major polluters of the world’s oceans.

As another example, consider the farmer who applies pesticides to a crop to save it from insect damage. The farmer benefits immediately. However, if other farmers follow suit, the local water system may be permanently damaged. In most cases of environmental pollution, there are immediate benefits for polluting and major—but delayed—long-term costs. What can we do to avoid such dilemmas?

Escaping Dilemmas

Persuasion and education have been used with some success to get individuals and businesses to voluntarily reduce destructive activities. Effective appeals may be based on self-interest (cost savings), the collective good (protecting one’s own children and future generations), or simply a personal desire to take better care of the planet (Pelletier, Baxter, & Huta, 2011; Stern, 1992; Winter & Koger, 2010). It really helps if conservation is seen as a group effort. There is evidence that in most social dilemmas, people are more likely to restrain themselves when they believe others will, too (Messick et al., 1983; Nigbur, Lyons, & Uzzell, 2010). Otherwise, they are likely to think, “Why should I be a sucker? I don’t think anyone else is going to conserve” (fuel, electricity, water, paper, or whatever).

In some cases, it is possible to dismantle social dilemmas by rearranging rewards and costs. For example, many companies are tempted to pollute because it saves them money and increases profits. To reverse the situation, a pollution tax could be levied so that it would cost more, not less, for a business to pollute. Likewise, incentives can be offered for responsible behavior. An example is the rebates offered for installing insulation or buying energy-efficient appliances (Schmuck & Vlek, 2003). Another is offering lower electricity rates for shifting use to off-peak times (U.S. Department of Energy, 2010).

Some problems may be harder to solve. What, for instance, can be done about truck drivers who cause dangerous traffic jams because they will not pull over on narrow roads? How can littering be discouraged or prevented? How would you make carpooling or using public transportation the first choice for most people? Or how could people feel (Evans, Lepore, & Schroeder, 1996; Zeisel, 2006). They also formed more friendships and were more open to social contacts. In comparison, students in the long-corridor dorm felt more crowded, stressed, and unfriendly, and they kept their doors shut much more frequently—presumably because they “wanted to be alone.”

Similar improvements have been made by altering the interior design of businesses, schools, apartment buildings, mental hospitals, and prisons. In general, the more spaces one must pass through to get from one part of a building to another, the less stressed and crowded people feel (Evans, Lepore, & Schroeder, 1996; Zeisel, 2006).

Conclusion

We have had room here only to hint at the creative and highly useful work being done in environmental psychology. Although many environmental problems remain, it is encouraging to see that behavioral solutions exist for at least some of them. Surely, creating and maintaining healthy environments is one of the major challenges facing coming generations (Winter & Koger, 2010; Oskamp & Schultz, 2006).

We have discussed work and the environment at some length because both have major effects on our lives. To provide a fuller account of the diversity of applied psychology, let’s conclude by briefly sampling four additional topics of interest: educational psychology, legal psychology, sports psychology, and human factors psychology.
Environmental Psychology

**Gateway Question 18.3: How has psychology improved education?**

You have just been asked to teach a class of fourth-graders for a day. What will you do? (Assume that bribery, showing them movies, and a field trip to an amusement park are out.) If you ever do try teaching, you might be surprised at how challenging it is. Effective teachers must understand learning, instruction, classroom dynamics, and testing.

**What are the best ways to teach? Is there an optimal teaching style for different age groups, topics, or individuals?** These and related questions lie at the heart of educational psychology (Table 18.4). Specifically, educational psychology seeks to understand how people learn and how teachers instruct (Snowman & McCown, 2011).

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**Figure 18.4** An architectural solution for crowding. Psychologists divided a dorm hall like that shown in the left diagram (a) into two shorter halls separated by unlocked doors and a lounge area (b). This simple change minimized unwanted social contacts and greatly reduced feelings of crowding among dorm residents. Adapted from Baum & Davis, 1980.

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**Knowledge Builder**

**Environmental Psychology**

**RECITE**

1. Although male rats in Calhoun’s crowded animal colony became quite pathological, female rats continued to behave in a relatively normal fashion. T or F?

2. To clearly understand behavior, it is necessary to make a distinction between crowding and ____________ (the number of people in a given space).

3. Milgram believed that many city dwellers prevent attentional overload by limiting themselves to superficial social contacts. T or F?

4. Using tools like smart meters and ecological footprint calculators to provide feedback is one effective approach for bringing about energy conservation. T or F?

5. So far, the most successful approach for bringing about energy conservation is to add monetary penalties to monthly bills for excessive consumption. T or F?

6. Performing an environmental ____________ might be a good prelude to redesigning college classrooms to make them more comfortable and conducive to learning.

**REFLECT**

**Think Critically**

7. Many of the most damaging changes to the environment being caused by humans will not be felt until sometime in the future. How does this complicate the problem of preserving environmental quality?

**Self-Reflect**

What is the nature of the natural environment, constructed environment, social environment, and behavioral setting you are in right now?

What forms of territorial behavior are you aware of in your own actions?

Have you ever experienced a stressful level of crowding? Was density or control the key factor?

Have you ever calculated your carbon footprint? Why not try it? You might be surprised by what you find.

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**Environmental assessment** Measurement and analysis of the effects an environment has on the behavior and perceptions of people within that environment.

**Architectural psychology** Study of the effects buildings have on behavior and the design of buildings using behavioral principles.

**Educational psychology** The field that seeks to understand how people learn and how teachers instruct.
There are many different approaches to the topic of learning styles. One stems from Howard Gardner’s theory of multiple intelligences (remember Chapter 9?). Someone high in language ability may learn best by hearing or reading, someone high in visual intelligence may learn best through pictures, someone high in interpersonal intelligence may learn best working in groups, and so on (Gardner, 2008; Kornhaber & Gardner, 2006).

There is also little doubt that teachers can greatly affect student interest, motivation, and creativity. But what styles have what effects? To answer this question, psychologists have compared a number of teaching styles. Two of the most basic are direct instruction and discovery learning.

In direct instruction, factual information is presented by lecture, demonstration, and rote practice. In discovery learning, teachers create conditions that encourage students to discover or construct knowledge for themselves (Dean & Kuhn, 2007). As it turns out, both approaches have certain advantages. Students of direct instruction do slightly better on achievement tests than students in discovery classrooms (Klahr & Nigam, 2004). However, students of discovery learning do somewhat better on tests of abstract thinking, creativity, and problem solving. They also tend to be more independent, curious, and positive in their attitudes toward school (Scruggs & Mastropieri, 2007). At present, it looks as if a balance of teaching styles goes hand in hand with a balanced education.

Although we have viewed only a small sample of educational theory and research, its value for improving teaching and learning should be apparent (Snowman & McCown, 2011). Before we leave the topic of education, “Peanut Butter for the Mind: Designing Education for Everyone” offers a peek at where education is going in the future.

**Psychology and Law—Judging Juries**

**Gateway Question 18.4:** What does psychology reveal about juries and court verdicts?

One of the best places to see psychology in action is the local courthouse. Jury trials are often fascinating studies in human behavior. Does the defendant’s appearance affect the jury’s decision? Do the personality characteristics or attitudes of jurors influence how they vote? These and many more questions have been investigated by psychologists interested in law. Specifically, the psychology of law is the study of the behavioral dimensions of the legal system (Greene & Heilbrun, 2011; see Table 18.5).

**Jury Behavior**

When a case goes to trial, jurors must listen to days or weeks of testimony and then decide guilt or innocence. How do they reach their decision? Psychologists use mock juries (simulated juries) to probe such questions. In some mock juries, volunteers are simply given written evidence and arguments to read before making a decision. Others watch videotaped trials staged by actors. Either
"Education is the key to unlock the golden door of freedom," said George Washington Carver. Born in 1860, a son of slaves, he invented that universally popular food, peanut butter. In today's ever more complicated world, Carver's words ring truer than ever. Yet, educators face an increasingly diverse mix of students: "regular" students, adult learners, students with disabilities, students who speak English as a second language, and students at risk for dropping out (Bowe, 2000). In response, educators have begun to apply an approach called Universal Design for Instruction (Holbrook, Moore, & Zoss, 2010; Scott, McGuire, & Shaw, 2003). The basic idea is to design lessons so richly that they will benefit most, if not all, students and their diverse needs and learning styles.

One principle of Universal Design for Instruction is to use a variety of instructional methods, such as a lecture, a podcast of the lecture, a group activity, an Internet discussion list, and perhaps student blogs. That way, for example, hearing impaired or visually impaired students can find at least one learning approach they can use. Likewise, adult learners who can't always get to class, because of work or family responsibilities, can get course information in other ways. Ultimately, everyone benefits because we all learn better if we can choose among different ways of gaining knowledge. Besides, it's not a bad idea to work through learning materials more than once in different ways.

Another principle is to make learning materials simple and intuitive by removing unnecessary complexity. For instance, students can be given clear grading standards, accurate and complete course outlines, and handbooks to guide them through difficult topics. Again, such materials are not just better for special groups of students. They make learning easier for all of us.

Are these principles being applied to learning in colleges and universities? In short, yes they are (McGuire, & Scott, 2002; Or & Hamig, 2009). Universal instruction has broad appeal—like peanut butter—but fortunately it won't stick to the roof of your mind!

Way, studying the behavior of mock juries helps us understand what determines how real jurors vote (Pezdek, Avila-Mora, & Sperry, 2010).

Some of the findings of jury research are unsettling (Levett et al., 2005). Studies show that jurors are rarely able to put aside their biases, attitudes, and values when making a decision (Buck & Warren, 2010; Devine et al., 2001). For example, appearance can be unduly influential (halo effect? Chapter 17). Jurors are less likely to find attractive defendants guilty (on the basis of the same evidence) than unattractive defendants (Perlman & Cozby, 1983). In one mock jury study, defendants were less likely to be convicted if they wearing eyeglasses than if they were not. Presumably eye glasses imply intelligence and, hence, that the defendant wouldn’t do anything as foolish as he or she was accused of (Brown, Henriquez, & Groscup, 2008).

A second major problem is that jurors are not very good at separating evidence from other information, such as their perceptions of the defendant, attorneys, witnesses, and what they think the judge wants. For example, if complex scientific evidence is presented, jurors tend to be swayed more by the expertise of the witness than by the evidence itself (Cooper, Bennett, & Sukel, 1996; Hans et al., 2011). Similarly, today's jurors place too much confidence in DNA evidence because crime-solving programs like CSI and Forensic Files make it seem simple (Myers, 2007). Further, jurors who have been exposed to pretrial publicity tend to inappropriately incorporate that information into their jury deliberations, often without being aware it has happened (Ruva, McEvoy, & Bryant, 2007).

Often the jurors' final verdict is influenced by inadmissible evidence, such as mention of a defendant's prior conviction. When jurors are told to ignore information that slips out in court, they find it very hard to do so. A related problem occurs when jurors take into account the severity of the punishment a defendant faces (Sales & Hafemeister, 1985). Jurors are not supposed to let this affect their verdict, but many do.

### TABLE 18.5 Topics of Special Interest in the Psychology of Law

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A fourth area of difficulty arises because jurors usually cannot suspend judgment until all the evidence is in. Typically, they form an opinion early in the trial. It then becomes hard for them to fairly judge evidence that contradicts their opinion.

Problems like these are troubling in a legal system that prides itself on fairness. However, all is not lost. The more severe the crime and the more clear-cut the evidence, the less a jury’s quirks affect the verdict. Although it is far from perfect, the jury system works reasonably well in most cases.

Jury Selection

In many cases, the composition of a jury has a major effect on the verdict of a trial (Lieberman & Sales, 2007). Before a trial begins, opposing attorneys are allowed to disqualify potential jurors who may be biased. For example, a person who knows anyone connected with the trial can be excluded. Beyond this, attorneys try to use jury selection to remove people who may cause trouble for them. For instance, juries composed of women are more likely to vote for conviction in child sexual assault trials (Golding et al., 2007).

Only a limited number of potential jurors can be excused. As a result, many attorneys ask psychologists for help in identifying people who will favor or harm their efforts. In scientific jury selection, social science principles are applied to the process of choosing a jury (Seltzer, 2006). Several techniques are typically used. As a first step, demographic information may be collected for each juror. Much can be guessed by knowing a juror’s age, sex, race, occupation, education, political affiliation, religion, and socioeconomic status. Most of this information is available from public records.

To supplement demographic information, a community survey may be done to find out how local citizens feel about the case. The assumption is that jurors probably have attitudes similar to people with backgrounds like their own. Although talking with potential jurors outside the courtroom is not permitted, other information networks are available. For instance, a psychologist may interview relatives, acquaintances, neighbors, and coworkers of potential jurors.

Back in court, psychologists also often watch for authoritarian personality traits in potential jurors. Authoritarians tend to believe that punishment is effective, and they are more likely to vote for conviction (Devine et al., 2001). At the same time, the psychologist typically observes potential jurors’ nonverbal behavior. The idea is to try to learn from body language which side the person favors (Sales & Hafemeister, 1985).

In the United States, murder trials require a special jury—one made up of people who are not opposed to the death penalty. “Death-Qualified Juries” examines the implications of this practice.

In the well-publicized case of O. J. Simpson, who was accused of brutally killing his wife and her friend, a majority of African Americans thought Simpson was innocent during the early stages of the trial. In contrast, the majority of European Americans thought he was guilty. The opinions of both groups changed little over the course of the yearlong trial. (Simpson was ultimately acquitted, but he later lost a civil lawsuit brought by the victims’ families.) The fact that emerging evidence and arguments had little effect on what people believed shows why jury makeup can sometimes decide the outcome of a trial (Cohn et al., 2009; Forster Lee et al., 2006).

Cases like Simpson’s raise troubling ethical questions. Wealthy clients have the advantage of scientific jury selection—something
most people cannot afford. Attorneys, of course, can’t be blamed for trying to improve their odds of winning a case. And because both sides help select jurors, the net effect in most instances is probably a more balanced jury. At its worst, jury analysis leads to unjust verdicts. At its best, it helps to identify and remove only people who would be highly biased (Lieberman & Sales, 2007).

Jury research is perhaps the most direct link between psychology and law, but there are others. Psychologists evaluate people for sanity hearings, do counseling in prisons, profile criminals, advise lawmakers on public policy, help select and train police cadets, and more (Brewer & Williams, 2005; Wrightsman & Fulero, 2009). In the future, it is quite likely that psychology will have a growing impact on law and the courts.

Sports Psychology—The Athletic Mind

Gateway Question 18.5: Can psychology enhance athletic performance?

What does psychology have to do with sports? Sports psychology is the study of the behavioral dimensions of sports performance (Cox, 2011). As almost all serious athletes soon learn, peak performance requires more than physical training. Mental and emotional “conditioning” are also important. Recognizing this fact, many teams, both professional and amateur, now include psychologists on their staffs. On any given day, a sports psychologist might teach an athlete how to relax, how to ignore distractions, or how to cope with emotions. The sports psychologist might also provide personal counseling for performance-lowering stresses and conflicts (LeUnes, 2008). Other psychologists are interested in studying factors that affect athletic achievement, such as skill learning, the personality profiles of champion athletes, the effects of spectators, and related topics (Table 18.6). In short, sports psychologists seek to understand and improve sports performance and to enhance the benefits of participating in sports (Cox, 2011).

Sports often provide valuable information on human behavior in general. For example, one study of adolescents found a link between sports participation and physical self-esteem that was, in turn, linked with overall self-esteem (Bowker, 2006). In other work, psychologists have learned that such benefits are most likely to occur when competition, rejection, criticism, and the “one-winner mentality” are minimized. When working with children in sports, it is also important to emphasize fair play, intrinsic rewards, self-control of emotions, independence, and self-reliance.

Adults, of course, may also benefit from sports through reduced stress, better self-image and improved general health (Williams, 2010). Running, for instance, is associated with lower levels of tension, anxiety, fatigue, and depression than is found in the nonrunning population.

Before the advent of sports psychology, it was debatable whether athletes improved because of “homespun” coaching methods or in spite of them. For example, in early studies of volleyball and gymnastics, it became clear that people teaching these sports had very little knowledge of crucial, underlying skills (Salmela, 1974, 1975).

How has psychology helped? An ability to do detailed studies of complex skills has been one of the major contributions. In a task analysis, sports skills are broken into subparts, so that key elements can be identified and taught. Such methods are an extension of techniques first used for job analyses, as described earlier. For example, it doesn’t take much to be off target in the Olympic sport of marksmanship. The object is to hit a bullseye the size of a dime at the end of a 165-foot-long shooting range. Nevertheless, an aver-

<table>
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Scientific jury selection Using social science principles to choose members of a jury.

Death-qualified jury A jury composed of people who favor the death penalty or at least are indifferent to it.

Sports psychology Study of the psychological and behavioral dimensions of sports performance.

Task analysis Breaking complex skills into their subparts.
age of 50 bullseyes out of 60 shots is not unusual in international competition (prone position).

What does it take—beyond keen eyes and steady hands—to achieve such accuracy? The answer is surprising. Sports psychologists have found that top marksmen consistently squeeze the trigger between heartbeats (Figure 18.5). Apparently the tiny tremor induced by a heartbeat is enough to send the shot astray (Pelton, 1983). Without careful psychological study, it is doubtful that this element of marksmanship would have been identified. Now that its importance is known, competitors have begun to use various techniques—from relaxation training to biofeedback—to steady and control their heartbeat. In the future, the best marksmen may be those who set their sights on mastering their hearts.

**Motor Skills**

Sports psychologists are very interested in how we learn motor skills. A **motor skill** is a series of actions molded into a smooth and efficient performance. Typing, walking, pole-vaulting shooting baskets, playing golf, driving a car, writing, and skiing are all motor skills.

A basketball player may never make exactly the same shot twice in a game. This makes it almost impossible to practice every shot that might occur. How, then, do athletes become skillful? Typically, athletic performances involve learning **motor programs**. A **motor program** is a mental plan or model of what a skilled movement should be like. Motor programs allow an athlete—or a person simply walking across a room—to perform complex movements that fit changing conditions. If, for example, you have learned a “bike-riding” motor program, you can easily ride bicycles of different sizes and types on a large variety of surfaces.

Throughout life you will face the challenge of learning new motor skills. How can psychology make your learning more effective? Studies of sports skills suggest that you should keep the following points in mind for optimal skill learning (Karagheorgis & Terry, 2011; Williams, 2010):

1. Begin by observing and imitating a **skilled model**. Modeling provides a good mental picture of the skill. At this point, try simply to grasp a visual image of the skilled movement.
2. Learn **verbal rules** to back up motor learning. Such rules are usually most helpful in the early phases of skill learning. When first learning cross-country skiing, for example, it is helpful to say, “left arm, right foot, right arm, left foot.” Later, as a skill becomes more automated, internal speech may actually get in the way.
3. Practice should be as **lifelike** as possible so that artificial cues and responses do not become a part of the skill. A competitive diver should practice on the board, not on a trampoline. If you want to learn to ski, try to practice on snow, not straw.
4. Get **feedback** from a mirror, videotape, coach, or observer. Whenever possible, get someone experienced in the skill to direct attention to **correct responses** when they occur.
5. When possible, it is better to practice **natural units** rather than breaking the task into artificial parts. When learning to type, it is better to start with real words rather than nonsense syllables.
6. Learn to **evaluate** and **analyze** your own performance. Remember, you are trying to learn a motor program, not just train your muscles. Motor skills are actually very mental.

The last point leads to one more suggestion. Research has shown that **mental practice**, or merely imagining a skilled performance, can aid learning (Short, Ross-Stewart, & Monsa, 2006). This technique seems to help by refining motor programs. Of course, mental practice is not superior to actual practice. Mental practice tends to be most valuable after you have mastered a task at a basic level (Tenenbaum, Bar-Eli, & Eyal, 1996). When you begin to get really good at a skill, give mental practice a try. You may be surprised at how effective it can be (Caliari, 2008; Morris, Spittle, & Watt, 2005).

**The Whole Human: Peak Performance**

One of the most interesting topics in sports psychology is the phenomenon of **peak performance**. During peak performance, physical, mental, and emotional states are harmonious and optimal. Many athletes report episodes during which they felt almost as if they were in a trance. The experience has also been called **flow** because the athlete becomes one with his or her performance and flows with it. At such times, athletes experience intense concentration, detachment, a lack of fatigue and pain, a subjective slowing of time, and feelings of unusual power and control (Csikszentmihalyi, Abuhamdeh, & Nakamura, 2005; Dietrich & Stoll, 2010). It is at just such times that “personal bests” tend to occur.

A curious aspect of flow is that it cannot be forced to happen. In fact, if a person stops to think about it, the flow state goes away. Psychologists are now seeking to identify conditions that facilitate peak performance and the unusual mental state that usually accompanies it (Csikszentmihalyi, Abuhamdeh, & Nakamura, 2005).
Even though flow may be an elusive state, there is much that athletes can do mentally to improve performance (Williams, 2010). A starting point is to make sure that their arousal level is appropriate for the task at hand. For a sprinter at a track meet that may mean elevating arousal to a very high level. The sprinter could, for example, try to become angry by picturing a rival cheating. For a golfer or a gymnast, lowering arousal may be crucial, in order to avoid “choking” during a big event. One way of controlling arousal is to go through a fixed routine before each game or event. Athletes also learn to use imagery and relaxation techniques to adjust their degree of arousal (LeUnes, 2008).

Imaging techniques can be used to focus attention on the athlete’s task and to mentally rehearse it beforehand. For example, golf great Jack Nicklaus “watches a movie” in his head before each shot. During events, athletes learn to use cognitive-behavioral strategies to guide their efforts in a supportive, positive way (Johnson et al., 2004). For instance, instead of berating herself for being behind in a match, a soccer player could use the time between points to savor a good shot or put an error out of mind. In general, athletes benefit from avoiding negative, self-critical thoughts that distract them and undermine their confidence (Cox, 2011). Finally, top athletes tend to use more self-regulation strategies, in which they evaluate their performance and make adjustments to keep it at optimum levels (Anshel, 1995; Puente & Anshel, 2010).

At present, sports psychology is a very young field and still much more an art than a science. Nevertheless, interest in the field is rapidly expanding (Gallucci, 2008).

A Look Ahead

Although we have sampled several major areas of applied psychology, they are by no means the only applied specialties. Others that immediately come to mind are community psychology, military psychology, and health psychology. The upcoming Psychology in Action section explores one of the most important applied fields, human factors psychology.
Gateway Question 18.6: How are tools designed to better serve human needs?
Should we serve machines or should they serve us? The demands that machines can make will be all too familiar if you have ever struggled with a new cell phone or failed to put together that “easy to assemble” home gym. Despite all they do for us, machines are of little value unless we humans can operate them effectively. An awkward digital camera might just as well be a paperweight. An automobile design that creates large blind spots in the driver’s vision could be deadly.

Designing for Human Use

The goal of human factors psychology (also known as ergonomics) is to design machines and work environments so they are compatible with our sensory and motor capacities (Buckle, 2011; Gamache, 2004). For example, displays must be easy to perceive, controls must be easy to use, and the tendency to make errors must be minimized (Figure 18.6). (A display is any dial, screen, light, or other device used to provide information about a machine’s activity to a human user. A control is any knob, handle, button, lever, or other device used to alter the activity of a machine.)

Psychologist Donald Norman (1994) refers to successful human factors engineering as natural design, because it is based on perceptual signals that people understand naturally, without needing to learn them. An example is the row of vertical buttons in elevators that mimic the layout of the floors. This is simple, natural, and clear. One way to create

**Figure 18.6** Human factors engineering. (a) Early roll indicators in airplanes were perceptually confusing and difficult to read (top). Improved displays are clear even to nonpilots. Which would you prefer if you were flying an airplane in heavy fog? (b) Even on a stove, the placement of controls is important. During simulated emergencies, people made no errors in reaching for the controls on the top stove. In contrast, they erred 38 percent of the time with the bottom arrangement (Chapanis & Lindenbaum, 1959). (c) Sometimes the shape of a control is used to indicate its function, to discourage errors. For example, the left control might be used to engage and disengage the gears of an industrial machine, whereas the right control might operate the landing flaps on an airplane. (d) This design depicts a street intersection viewed from above. Psychologists have found that painting white lines across the road makes drivers feel like they are traveling faster. This effect is even stronger if the lines get progressively closer together. Placing lines near dangerous intersections or sections of highway has dramatically lowered accident rates.
more natural designs is to use metaphors (one thing used to describe another) to create resemblances between different subjects. One famous example is the desktop metaphor (Kaptelinin & Czerwinski, 2007). The design of all current personal computers presents a visual "desktop" with images of "files," "folders," and even a "trashcan." That way, you can use your knowledge of real desktops to immediately begin to use the virtual "desktop" on your computer. Earlier personal computer interfaces, which required you to type in coded instructions, were much harder to use. Similarly, digital cameras are designed to look a lot like film cameras. That way people who were familiar with film cameras could use their knowledge of how such cameras work to start using a digital camera.

Effective design also provides feedback (information about the effect of making a response). The audible click designed into many computer keyboards is a good example. As Norman points out, the cause of many accidents is not just "human error." The real culprit is poor design. Human factors psychologists helped design many of the tools we rely on each day, such as "user-friendly" computers, home appliances, cameras, personal digital assistants (PDAs), airplane controls, and traffic signals.

**Usability Testing** To design useful tools, human factors psychologists do usability testing. That is, they directly measure the ease with which people can learn to use a machine (Bruno & Muzzupappa, 2010; Norman & Panizzi, 2006). Health and safety are also important targets of usability testing. For example, construction workers who install steel rods in the floors of large buildings spend most of their work days awkwardly bent over. To avoid injuries and to minimize fatigue, machines have been designed that allow workers to do the job while standing upright. People using these machines are faster, and they spend less time in backbreaking positions (Vi, 2006).

One interesting form of usability testing is the thinking aloud protocol. In this case, people are asked to say everything they are thinking as they use a machine. By comparing their actual performance with what they were thinking, it is often possible to fine-tune the details of a design (Gerjets, Kammerer, & Werner, 2011; Norman & Panizzi, 2006).

**Human–Computer Interaction**

Using human factors methods to design computers and software is referred to as human–computer interaction (HCI) (Fuchs & Obrist, 2010; McKay, 2008). Traditionally, machines were designed to make us stronger (such as the automobile, which moves us faster and farther than we could go on our own). In contrast, computers are meant to make us smarter (such as software that can balance a checkbook more quickly and accurately than you could on your own) (Norman, 1994). In the world of HCI, controls are also called input devices and displays are called output devices. Humans communicate with computers through the interface, or set of input and output devices a computer provides.

The typical laptop computer today relies on a keyboard, touch pad, and perhaps voice recognition for input. Output is handled by a display screen and audio speakers. Many experts believe that current computer interfaces are too unnatural and limited when compared with the richness of human communication (Kaptelinin & Czerwinski, 2007). Accordingly, the search is on for ways to open up new channels of communication between humans and computers. As mentioned at the beginning of this chapter, the click wheel interface and multi-touch interfaces are a key to the success of the iPod. The Nintendo Wii game console is another example. The Wii wand allows players to interface with the game through more natural hand and body movements. More recently, Microsoft’s Kinect offers an even more natural interface by eliminating the hand-held controller, allowing players to play just by moving and speaking to the computer (Barras, 2010).

In addition to projecting a person’s actions into a virtual world, computer interfaces can create a sense of being present in a remote location (Iastrebov, 2008). Telepresence, as this is called, was illustrated in 2001 when a surgeon in New York first used telesurgery to remove the diseased gallbladder of a patient an ocean away in France. In this instance, the surgeon controlled robotic hands to perform the surgery. Because a good surgeon relies on the sense of touch, it will be important to improve telepresence systems so they provide touch feedback to users (Jin, 2010; Kitada et al., 2010).

**Using Tools Effectively**

Even the best-designed tools, whether for the body or the mind, can be misused or underused. Do you feel like you are in control of the tools in your life or do you sometimes worry that they control you? Here are two tips for making sure you get the most out of the tools you use.

**Understand Your Task** Using a tool like a digital camera, a cell phone, or social networking software can be challenging, especially if you are not sure what it can do. Begin by finding out more about what specific tasks your new tool is designed to help you accomplish. For example, if you are buying photo editing software for your digital camera, find out what tools it offers to adjust, improve, and transform photographs. In our hectic modern world, it is often tempting to satisfice, or just...
get by, rather than doing things really well (Güth, Levati, & Ploner, 2009). Satisficing is not just a matter of being lazy. Getting by can be a survival skill, but it does not always take full advantage of the tools available to us. For example, if you know a little about photography and jump into using your new digital camera, you may be satisfied with just being able to take a basic photo. However, if you stop there, you will have used about 10 percent of what your camera is capable of doing.

Understand Your Tools As tempting as it may be to just dive in and use your new tool, do take a peek at the instruction manual. Many modern tools, especially electronic devices, have valuable capacities hidden several layers down in menus. Without reading a manual, you might never find some of them, no matter how user friendly the device’s interface may be.

**Space Habitats**

Let’s conclude on a high note: Nowhere are the demands on human factors psychology greater than in space flight. Every machine, tool, and environment in a spacecraft must be carefully adapted for human use (Mulavara et al., 2010). Already, we have discovered that life on the International Space Station isn’t easy, physically or mentally. For months at a time, residents are restricted to tiny living quarters with little privacy. These conditions, and other sources of stress, make it clear that the design of space habitats must take many human needs into account. For instance, researchers have learned that astronauts prefer rooms with clearly defined “up” and “down”—even in the weightlessness of space. This can be done by color-coding walls, floors, and ceilings, and by orienting furniture and controls so they all face the “ceiling” (Suedfeld & Steel, 2000).

Ideally, there should be some flexibility in the use of living and work areas inside a space station. Behavior patterns change over time, and being able to control one’s environment helps lower stress. At the same time, people need stability. Psychologists have found, for instance, that eating becomes an important high point in monotonous environments.

Eating at least one meal together each day can help keep crew members working as a social unit.

Sleep cycles must be carefully controlled in space to avoid disrupting body rhythms (Kanas & Manzey, 2008; Suedfeld & Steel, 2000). In past space missions, some astronauts found they couldn’t sleep while other crew members continued to work and talk. Problems with sleep can be worsened by the constant noise on a space station. At first, such noise is annoying. After weeks or months, it can become a serious stressor. Researchers are experimenting with various earmuffs, eye-shades, and sleeping arrangements to alleviate such difficulties.

**Sensory Restriction**

Sensory monotony can be a problem in space, even with the magnificent vistas of Earth below (Kanas & Manzey, 2008). (How many times would you have to see the North American continent before you lost interest?) Researchers are developing stimulus environments that use music, movies, and other diversions to combat monotony and boredom. Again, they are trying to provide choice and control for space crews. Studies of confined living in the Arctic and elsewhere make it clear that one person’s symphony is another’s grating noise. When music is concerned, individual earphones may be all that is required to avoid problems.

Most people in restricted environments find that they prefer solitary pastimes such as reading, listening to music, looking out windows, writing, and watching films or television. As much as anything, this preference may show again the need for privacy. Reading or listening to music is a good way to psychologically withdraw from the group. Experiences with confining environments on Earth (such as Biosphere 2) suggest that including live animals and plants in space habitats could reduce stress and boredom (Suedfeld & Steel, 2000).

**Life on Spaceship Earth**

It is curiously fitting that the dazzling technology of space travel has highlighted the inevitable importance of human behavior. Here on Earth, as in space, we cannot count on cleverly designed machines or technology alone to solve problems. The threat of nuclear war, social conflict, crime, prejudice, infectious disease, overpopulation, environmental damage, famine, homicide, economic disaster—these and most other major problems facing us are behavioral.

Will spaceship Earth endure? It’s a psychological question.
**Human Factors Psychology**

**RECITE**

1. Human factors psychologists are interested in finding ways to help people adapt to working with machines. T or F?
2. According to Donald Norman, successful human factors engineering makes use of perceptual signals that people understand naturally. T or F?
3. Usability testing is used to empirically investigate machine designs. T or F?
4. To use tools effectively it is worth
   a. understanding your tool  b. satisficing  c. understanding your task  d. overcoming writer’s block
5. Researchers have learned that astronauts don’t really care if living quarters have clearly defined “up” and “down” orientations. T or F?

**REFLECT**

**Think Critically**

6. Check out this photo of a men’s urinal in Amsterdam’s Schiphol Airport. Is that fly real? If not, why is it there?

**Self-Reflect**

Is there a machine whose design you admire? Can you express why the design works for you?

Have you thought about how you write? How does your approach differ from the one in this section? Are you using your word processor to your best advantage? What could you be improving?

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**Answers:**

1. F  
2. T  
3. T  
4. a and c  
5. F

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**Chapter in Review**

**Gateways to Applied Psychology**

**Gateway QUESTIONS REVISITED**

**18.1 How is psychology applied in business and industry?**

18.1.1 Applied psychology refers to the use of psychological principles and research to solve practical problems.

18.1.2 Industrial/organizational psychologists enhance the quality of work by studying jobs to better match people to them and by studying organizational structures and culture to improve worker performance.

18.1.3 Two basic leadership styles are Theory X (scientific management) and Theory Y (human relations approaches). Theory X is mostly concerned with work efficiency, whereas Theory Y emphasizes psychological efficiency.

18.1.4 Theory Y methods include shared leadership (participative management), management by objectives, self-managed teams, and quality circles.

18.1.5 Job satisfaction influences productivity, absenteeism, morale, employee turnover, and other factors that affect business efficiency. Job satisfaction comes from a good fit between work and a person’s interests, abilities, needs, and expectations. Job enrichment tends to increase job satisfaction.

18.1.6 To match people with jobs, personnel psychologists combine job analysis with selection procedures, such as gathering biodata, interviewing, giving standardized psychological tests, and using assessment centers.

**18.2 What have psychologists learned about the effects of our physical and social environments?**

18.2.1 Humans affect the environment and environments affect humans. Many problems can be solved by understanding both relationships.
18.2.2 Environmental psychologists are interested in the effects of behavioral settings, physical or social environments, and human territoriality, among many other topics.

18.2.3 Environmental problems such as crowding, pollution, and wasted resources are based on human behavior; they can only be solved by changing behavior patterns. Overpopulation is a major world problem, often reflected at an individual level in crowding.

18.2.4 Animal experiments indicate that excessive crowding can be unhealthy. However, human research shows that psychological feelings of crowding do not always correspond to density.

18.2.5 One major consequence of crowding is attentional overload.

18.2.6 Providing feedback about resource use is an effective way to promote conservation.

18.2.7 Research has shown that various psychological strategies can promote recycling.

18.2.8 The origins of many environmental disasters lie in social dilemmas like tragedy of the commons.

18.2.9 Environmental psychologists have offered solutions to many practical problems—from noise pollution to architectural design. Their work often begins with a careful environmental assessment.

18.3 How has psychology improved education?

18.3.1 Educational psychologists improve the quality of both learning and teaching.

18.3.2 Educational psychologists seek to understand how people learn and teachers instruct. They are particularly interested in teaching strategies, learning styles, and teaching styles, such as direct instruction and discovery learning.

18.4 What does psychology reveal about juries and court verdicts?

18.4.1 The psychology of law includes studies of courtroom behavior and other topics that pertain to the legal system. Psychologists also serve various consulting and counseling roles in legal, law enforcement, and criminal justice settings.

18.4.2 Studies of mock juries show that jury decisions are often far from objective.

18.4.3 Scientific jury selection is used in attempts to choose jurors who have particular characteristics. In some instances, this may result in juries that have a particular bias or that do not represent the community as a whole.

18.4.4 A bias toward convicting defendants is characteristic of many death-qualified juries.

18.5 Can psychology enhance athletic performance?

18.5.1 Sports psychologists seek to enhance sports performance and the benefits of sports participation. A careful task analysis of sports skills is one of the major tools for improving coaching and performance.

18.5.2 A motor skill is a nonverbal response chain assembled into a smooth performance. Motor skills are guided by internal mental models called motor programs.

18.5.3 Motor skills are refined through direct practice, but mental practice can also contribute to improvement.

18.5.4 During moments of peak performance, or flow, physical, mental, and emotional states are optimal.

18.5.5 Top performers in sports often use a variety of self-regulation strategies to focus their attention and maintain optimal levels of arousal.

18.6 How are tools designed to better serve human needs?

18.6.1 Human factors psychologists (also known as ergonomists) design tools to be compatible with our sensory and motor capacities.

18.6.2 Successful human factors engineering uses natural design, which makes use of perceptual signals that people understand naturally.

18.6.3 Human factors psychologists rely on usability testing to empirically confirm that machines are easy to learn and use.

18.6.4 Human–computer interaction (HCI) is the application of human factors to the design of computers and computer software.

18.6.5 To use tools effectively it is useful to know something about the tool and the task you are using it to complete. Be aware of satisfying.

18.6.6 Space habitats must be designed with special attention to the numerous human factors issues raised by space flight.
MediA Resources

Web Resources

*Internet addresses frequently change. To find an up-to-date list of URLs for the sites listed here, visit your Psychology CourseMate.*

**Human Impact** Read more about human influences on the biosphere.

**Universal Design Education Online** Read more about designing education for everyone.

**Society for Industrial and Organizational Psychology** Visit the website of APA Division 14.

**Women in Management** Read about how women are cracking the glass ceiling.

**Universal Design Education Online** Read more about designing education for everyone.

**Sports Psychology** Read sports training articles.

**Bad Human Factors Designs** Explore these examples of poor human factors design.

**Human-Computer Interaction** Read about training in human-computer interaction design.

**International Space Station** Visit the NASA home page for the International Space Station.

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2. Complete the corresponding homework exercises as required by your professor.
3. When finished, click “Grade It Now” to see which areas you have mastered and which need more work, and for detailed explanations of every answer.

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**The Whole Human: Psychology and You**

At the beginning of this book we described psychology as a journey of self-discovery. It is our sincere hope that you have found enough relevance and value here to spark a lifelong interest in psychology. As your personal journey continues, one thing is certain: Many of your greatest challenges and most treasured moments will involve other people. You would be wise to continue adding to your understanding of human behavior. Psychology’s future looks exciting. What role will it play in your life, real or virtual?