

# INDUSTRIAL PSYCHOLOGY

- 3 Individual Differences
- 4 Assessing Individuals
- 5 Understanding Performance
- 6 Performance Measurement
- 7 Staffing Decisions
- 8 Training and Development

**2** PART

# INDIVIDUAL DIFFERENCES

## MODULE 3.1

### AN INTRODUCTION TO INDIVIDUAL DIFFERENCES 77

- Some Background 77
- Differential Psychology, Psychometrics, and I-O Psychology 78
- Varieties of Individual Differences 79

## MODULE 3.2

### MENTAL AND PHYSICAL ABILITIES 83

- A Taxonomy of Abilities 83
- Cognitive Abilities 89
  - Intelligence as “g”* 89
  - Is “g” Important at Work?* 90
  - Can Your Level of “g” Change?* 91
  - Cognitive Abilities beyond “g”* 91
- Physical, Sensory, and Psychomotor Abilities 93
  - Physical Abilities* 93
  - Sensory Abilities* 95
  - Psychomotor Abilities* 95

## MODULE 3.3

### PERSONALITY AND INTERESTS 99

- Personality 99
  - The Five Factor Model* 99
  - Practical Issues Associated with Personality Measures* 103
- Vocational Interests 105

## MODULE 3.4

### ADDITIONAL PROPOSED INDIVIDUAL DIFFERENCES 109

- Skills 109
- Knowledge 109
- Experience 115
- Competencies 116
- Emotional Intelligence 116
- Identifying Individual Differences: Sinking Shafts 117

## AN INTRODUCTION TO INDIVIDUAL DIFFERENCES

**W**hat do Princess Diana, the Pope, Yo-Yo Ma, Stephen King, Michael Jordan, George W. Bush, your grandmother, and your instructor have in common? Not much. They are different in abilities, interests, experiences, personality, age, gender, race, and backgrounds. Indeed, the only thing we can say with certainty about these individuals is that they are substantially different from one another. We would not expect your grandmother to try out for an NBA team, or Stephen King to officiate at a religious service, or your instructor to meet with heads of state of foreign countries. Many psychologists, including I-O psychologists, believe that the differences among individuals can be used, at least in part, to understand and predict their behavior.

But it isn't good enough to say simply that people are different. You don't have to be a psychologist to recognize that. Some types of differences prove more useful than others in predicting and understanding behavior. The differences among people on various attributes like intelligence, and personality, and knowledge are important in understanding a wide variety of socially important outcomes (Lubinski, 2000), including:

- Academic achievement
- Intellectual development
- Crime and delinquency
- Vocational choice
- Income and poverty
- Occupational performance

This chapter will deal with the concept of **individual differences** related to occupational performance. In the next chapter, we will show you the scientific ways that I-O psychologists use to measure these differences.

### SOME BACKGROUND

Psychology began in a laboratory in Germany in 1876. The father of the discipline, Wilhelm Wundt, was anxious to show that psychology was different from philosophy and medicine. Since this was a new science and the existing physical sciences like chemistry, biology, and physics had discovered many general principles that enhanced their importance, Wundt set out to uncover general principles of human behavior as well. He developed techniques for studying the sensations and reactions of people, examining the dimmest light that individuals could see, the faintest sound they could hear, and how quickly they could react to a signal. But those who assisted in conducting his experiments quickly discovered that not everyone had the same reaction time, or could see the same dim light, or hear the same soft tone. In other words, they discovered that there were *differences* among individuals.

#### INDIVIDUAL DIFFERENCES

*Dissimilarities between or among two or more people.*

**MENTAL TEST**

Instrument designed to measure a subject's ability to reason, plan, and solve problems; an intelligence test.

**DIFFERENTIAL PSYCHOLOGY**

Scientific study of differences between or among two or more people.

**INTELLIGENCE**

The ability to learn and adapt to an environment; often used to refer to general intellectual capacity, as opposed to cognitive ability or mental ability, which often refer to more specific abilities such as memory or reasoning.

**MENTAL ABILITY**

Capacity to reason, plan, and solve problems; cognitive ability.

**METRIC**

Standard of measurement; a scale.

**PSYCHOMETRICS**

Practice of measuring a characteristic such as mental ability, placing it on a scale or metric.

**INTELLIGENCE TEST**

Instrument designed to measure the ability to reason, learn, and solve problems.

**PSYCHOMETRICIAN**

Psychologist trained in measuring characteristics such as mental ability.

These differences detracted from the precise results Wundt sought, but to one of his students they represented a fascinating discovery. James McKeen Cattell (1860–1944), an American who received a PhD in psychology under Wundt's direction, soon began measuring and charting the differences among people using “psychological” variables. In 1890 Cattell developed the concept of a **mental test** as a way of charting these differences. Since the subject matter of this research was differences, the study of differences became known as **differential psychology** (Landy, 1993; 1997).

After leaving Wundt's laboratory at the University of Leipzig, Cattell went to England and worked with another researcher very interested in individual differences, Francis Galton. Galton was gathering information that would support his cousin Charles Darwin's radical theory of evolution. In earlier years, Galton had measured inherited characteristics like height, weight, reach, and hair color. With his new mental test, Cattell was able to expand the number of inherited characteristics that he could examine. After working with Galton for several years in developing a comprehensive mental test, Cattell returned to America and used this test to measure the **intelligence** of incoming college students. He believed that he could use the resulting scores to help students choose curricula and to predict who would successfully complete college. Cattell had developed methods of measuring **mental ability**, placing it on a scale or **metric**. As a result, the actual measurement of abilities became known as **psychometrics**.

While other early psychologists began to focus on *pathological* aspects of mental function, the pioneers of differential psychology were primarily interested in the mental abilities of “normal” people. Several were aware of Cattell's work in measuring intelligence. In France, Alfred Binet was measuring mental abilities of French school children. Lewis Terman was conducting similar studies in California with a translation of Binet's test. Hugo Munsterberg was measuring the abilities of trolley drivers in order to predict the likelihood of accidents. When the United States entered World War I in 1917, the leading industrial psychologists of the time persuaded the Army to use an **intelligence test** to screen recruits and determine who should attend officer's candidate school. Two years after the war's end, Walter Dill Scott, one of the founding fathers of I-O psychology, proclaimed that “possibly the single greatest achievement of the American Psychological Association is the establishment of individual differences” (Lubinski, 2000).

In the postwar years, intelligence tests were adapted for use in selecting individuals for jobs with government and industry. By 1932 measuring the differences in intelligence among individuals in order to predict things like accidents and productivity was a well-established practice (Landy, 1997; Viteles, 1932).

## DIFFERENTIAL PSYCHOLOGY, PSYCHOMETRICS, AND I-O PSYCHOLOGY

Nearly a century later, measuring the differences among individuals to predict later behavior (“psychometrics”) remains one of the most common frameworks applied by I-O psychologists. It is different from the framework used by an experimental psychologist. The experimental psychologist usually designs an experiment that will show how all people are alike in their response to a stimulus, and looks outside the individual to the stimulus as a way to explain behavior. In contrast, the differential psychologist is person-centered, looking for qualities or characteristics within the person that will help us understand that person's behavior (Hatrup & Jackson, 1996). In the past, I-O psychology—particularly the applied aspect of it—depended on these differences to predict things like job success, job satisfaction, and counterproductive behavior. I-O psychology still makes great use of the individual differences approach, but as we will see later in this chapter and in succeeding chapters, there is more to behavior than simply individual differences.

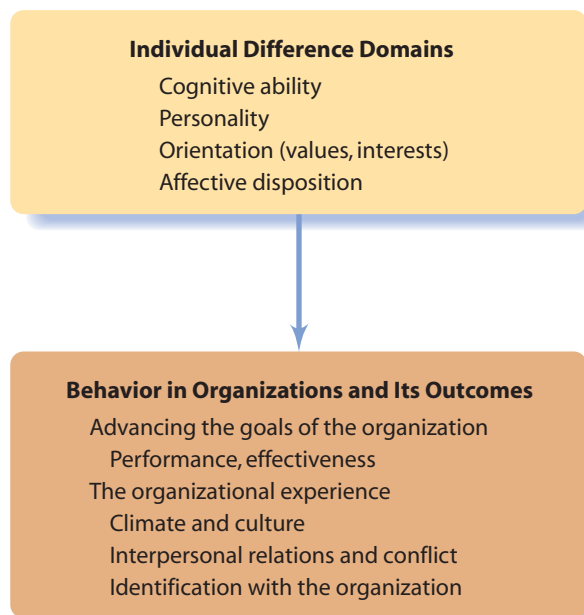
The marriage of psychometrics and differential psychology was a good one. The differential psychologist identified what should be measured, and the **psychometrician** set

about measuring it. As we saw from the work of Cattell and his contemporaries, the attribute most commonly measured was some form of intelligence. It was widely believed that **cognitive ability** was the single most important attribute that an individual possessed. We use cognitive abilities to acquire knowledge, solve problems, and apply reason to situations. Consequently, many studies were conducted to show that an individual's general intellectual capacity was closely associated with that individual's occupational and vocational success. The pioneers in theories of intelligence referred to this attribute as "g," an abbreviation for **general mental ability** (Hull, 1928; Spearman, 1927). Today's psychologists still use that term, and we will use it in this book.

## VARIETIES OF INDIVIDUAL DIFFERENCES

In the past decade, there has been a substantial shift in thinking about individual differences. Instead of simply examining "g" to understand and predict the behavior of workers—a tendency that Sternberg and Wagner (1993) called the **g-ocentric model**, researchers are moving toward broadening the field of examination. In addition to cognitive ability, I-O psychologists now consider individual differences in **physical abilities, personality, interests, knowledge, and emotion** in examining the behavior of people in work settings. This is the result of several forces. In the early years of testing, the only available tests were intelligence tests. Since that time, psychologists have developed many reliable methods for measuring personality, knowledge, interests, and emotional reactions to work. In addition, our understanding of the many facets of performance has become more sophisticated. Overall performance, like an overall GPA, has little meaning. Murphy (1996) proposes that there are many different attributes of people that serve many different demands of the job (see Figure 3.1).

Let's apply that view to a particular job. Some of the most important things that firefighters do are driving the fire truck to the fire, applying water to the fire, providing medical assistance, rescuing trapped citizens, and learning new procedures and how to use new equipment. To accomplish these tasks, firefighters work in teams. To provide medical



**FIGURE 3.1** The Link between Attributes and Behavior in Organizations

SOURCE: K. R. Murphy (1996a).

### COGNITIVE ABILITY

Capacity to reason, plan, and solve problems; mental ability.

### "g"

Abbreviation for general mental ability.

### GENERAL MENTAL ABILITY

The nonspecific capacity to reason, learn, and solve problems in any of a wide variety of ways and circumstances.

### G-OCENTRIC MODEL

Tendency to understand and predict the behavior of workers simply by examining "g."

### PHYSICAL ABILITIES

Bodily powers such as muscular strength, flexibility, and stamina.

### PERSONALITY

An individual's behavioral and emotional characteristics, generally found to be stable over time and in a variety of circumstances; an individual's habitual way of responding.

### INTERESTS

Preferences or likings for broad ranges of activities.

### KNOWLEDGE

A collection of specific and interrelated facts and information about a particular topical area.

### EMOTION

An affect or feeling, often experienced and displayed in reaction to an event or thought and accompanied by physiological changes in various systems of the body.

assistance and learn new procedures, the firefighter needs cognitive ability. To rescue trapped citizens and apply water to the fire, the firefighter needs both physical ability and courage in addition to problem-solving skills. To accomplish teamwork with fellow firefighters and to deal with victims, the firefighter needs communication skills. To drive the truck to the fire accurately and safely, the firefighter needs good vision, coordination, and the knowledge or memory of how to get to the location of the fire. If we only bothered to examine the differences among individuals in cognitive ability (or “g”), we would only be able to predict and understand a limited portion of the firefighter’s job performance. To understand the full range of performance, we need to consider attributes beyond “g.”

There is a growing consensus (Murphy, 1996; Guion, 1998) that we can divide the individual differences useful in understanding work behavior into certain categories, including:

- Cognitive ability
- Physical ability
- Personality
- Interests

In the next section, we will consider these broad categories of attributes as well as the theories that further define them. Before we do so, we need to consider the fundamental assumptions that I-O psychologists make when they apply the individual differences model. They are listed as follows (adapted from Guion, 1998).

1. Adults have a variety of attributes (e.g., intelligence, personality, interests) and the levels of these attributes are relatively stable over a reasonable time period (several years).



The performance of most jobs requires multiple abilities. What are some of the abilities called for in the job of firefighter?

---

James McKeen Cattell began testing incoming students, first at the University of Pennsylvania in 1892, then at Columbia in 1900. He wanted to identify the characteristics of “individual differences” of the students so that he could eventually predict which applicants for college admission were likely to get a degree. The following is a list of some of information Cattell gathered on each student:

- Memory
- Reasoning
- Numerical skills
- Reaction time
- Hair color

- Weight
- Height
- Right or left handedness

Questions:

1. Which of the characteristics in the list above are not a part of one of the categories of individual differences in this module?
2. Which of the characteristics in the list would be unlikely to be associated with college success?
3. Which characteristics in the list do you think are still routinely gathered in the college admissions process?

2. People differ with respect to these attributes (i.e., there are “individual differences”) and these differences are associated with job success.

3. The relative differences between people on these attributes remain even after training, job experience, or some other intervention. Thus, if individual A has less of an attribute than individual B before training or job experience, and if they both receive the same training or experience to increase that attribute, individual A will still have less of that attribute than individual B after the training or intervention, even though *both* may have higher levels of the attribute after training or experience.

4. Different jobs require different attributes.
5. These attributes can be measured.

With these assumptions in mind, we can now examine these attribute categories in the next modules.

### MODULE 3.1 SUMMARY

- The *individual differences* among people on various attributes like intelligence, personality, and knowledge are important in understanding a wide variety of socially important outcomes.
- James McKeen Cattell developed the concept of a *mental test* as a way of charting the differences among people. Since the subject matter of this research was differences, the study of differences became known as *differential psychology*. The actual measurement of abilities became known as *psychometrics*.
- The differential psychologist is person-centered, looking for qualities or characteristics within the person that will help us understand that person’s behavior. The differential psychologist identifies what should be measured, and the *psychometrician* set about measuring it.
- The attribute most commonly measured by early differential psychologists was some form of *intelligence*. It was widely believed that *cognitive ability* was the single most important attribute possessed by an individual. The pioneers in theories of intelligence referred to this attribute as “g,” an abbreviation for *general mental ability*.
- In addition to cognitive ability, I-O psychologists consider individual differences in *physical abilities, personality, interests, knowledge, and emotion* in examining the behavior of people in work settings.

## KEY TERMS

individual differences  
 mental test  
 differential psychology  
 intelligence  
 mental ability  
 metric

psychometrics  
 intelligence test  
 psychometrician  
 cognitive ability  
 “g”  
 general mental ability

g-ocentric model  
 physical abilities  
 personality  
 interests  
 knowledge  
 emotion

CRITICAL THINKING  
EXERCISES

**3.1** How would differential psychology and psychometrics help to understand the academic achievement of students in grades K–12?

**3.2** Why should I-O psychologists examine individual differences? Wouldn't it be better to identify how people are the same rather than how they are different?



## MENTAL AND PHYSICAL ABILITIES

### A TAXONOMY OF ABILITIES

In the 1950s, Edwin Fleishman began a program of research to determine the most common mental and physical abilities associated with human performance, including work performance. Through a combination of field and laboratory research, he and his associates developed a comprehensive list, or **taxonomy**, of 52 abilities (Fleishman & Reilly, 1992). These can be divided into the broad categories of cognitive, physical, and **perceptual-motor abilities** (see Table 3.1). As you can see, they cover an impressive variety—and this list does not cover personality, **affect**, or interest! Fleishman’s work expanded the study of individual differences far beyond his predecessors’ focus on differences in intelligence.

Fleishman’s list of abilities can be used for many different applied purposes. It is an effective way to analyze the most important abilities in various occupations (Gael, 1988; Landy, 1989). It can also be used to determine training needs, recruiting needs, and even work design. Once we know the basic abilities that can be brought to the job, it is much easier to identify which of those abilities are truly important.

#### TAXONOMY

An orderly, scientific system of classification.

#### PERCEPTUAL-MOTOR ABILITIES

Physical attributes that combine the senses (e.g., seeing, hearing, smell) and motion (e.g., coordination, dexterity).

#### AFFECT

The conscious, subjective aspect of emotion.

TABLE 3.1

Definitions of Abilities in the Taxonomy with Task Examples

CONSTRUCT LABEL	OPERATIONAL DEFINITION	LEVEL SCALE	
		LEVEL RATING	EXAMPLE
<b>Verbal abilities</b>	<b>Cognitive abilities</b>		
1. Oral Comprehension	The ability to listen to and understand information and ideas presented through spoken words and sentences.	High—Understanding a lecture on advanced physics. Low—Understanding a television commercial.	
2. Written Comprehension	The ability to read and understand information and ideas presented in writing.	High—Understanding an instruction book on repairing a missile guidance system. Low—Understanding signs on the highway.	
3. Oral Expression	The ability to communicate information and ideas in speaking so others will understand.	High—Explaining advanced principles of genetics to college freshmen. Low—Canceling newspaper delivery by phone.	

(continued)

TABLE 3.1

*(continued)*

CONSTRUCT LABEL	OPERATIONAL DEFINITION	LEVEL SCALE	
		LEVEL RATING	EXAMPLE
4. Written Expression	The ability to communicate information and ideas in writing so others will understand.	High—Writing an advanced economics textbook. Low—Writing a note to remind someone to take something out of the freezer to thaw.	
<b>Idea Generation and Reasoning Abilities</b>			
5. Fluency of Ideas	The ability to come up with a number of ideas about a given topic. It concerns the number of ideas produced and <i>not</i> the quality, correctness, or creativity of the ideas.	High—Naming all the possible strategies for a particular military battle. Low—Naming four different uses for a screwdriver.	
6. Originality	The ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem.	High—Inventing a new type of human-made fiber. Low—Using a credit card to open a locked door.	
8. Problem Sensitivity	The ability to tell when something is wrong or is likely to go wrong. It does <i>not</i> involve solving the problem, only recognizing that there is a problem.	High—Recognizing an illness at an early stage of a disease when there are only a few symptoms. Low—Recognizing that an unplugged lamp does not work.	
11. Deductive Reasoning	The ability to apply general rules to specific problems to come up with logical answers. It involves deciding if an answer makes sense.	High—Designing an aircraft wing using the principles of aerodynamics. Low—Knowing that, because of the law of gravity, a stalled car can coast down the hill.	
12. Inductive Reasoning	The ability to combine separate pieces of information, or specific answers to problems, to form general rules or conclusions. It includes coming up with a logical explanation for why a series of seemingly unrelated events occur together.	High—Diagnosing a disease using the results of many different lab tests. Low—Determining clothing to wear on the basis of the weather report.	
13. Information Ordering	The ability to correctly follow a given rule or set of rules in order to arrange things or actions in a certain order. The things or actions can include numbers, letters, words, pictures, procedures, sentences, and mathematical or logical operations.	High—Assembling a nuclear warhead. Low—Putting things in numerical order.	
14. Category Flexibility	The ability to produce many rules so that each rule tells how to group (or combine) a set of things in a different way.	High—Classifying man-made fibers in terms of their strength, cost, flexibility, melting points, etc. Low—Sorting nails in a toolbox on the basis of length.	

*(continued)*

**TABLE 3.1**

*(continued)*

CONSTRUCT LABEL	OPERATIONAL DEFINITION	LEVEL SCALE	
		LEVEL RATING	EXAMPLE
<b>Quantitative Abilities</b>			
9. Mathematical Reasoning	The ability to understand and organize a problem and then to select a mathematical method or formula to solve the problem.	High—Determining the mathematics required to simulate a space craft landing on the moon. Low—Determining how much 10 oranges will cost when they are priced at 2 for 29 cents.	
10. Number Facility	The ability to add, subtract, multiply, or divide quickly and correctly.	High—Manually calculating the flight path of an aircraft, taking into account speed, fuel, wind, and altitude. Low—Adding 2 and 7.	
<b>Memory</b>			
7. Memorization	The ability to remember information such as words, numbers, pictures, and procedures.	High—Reciting the Gettysburg Address after studying it for 15 minutes. Low—Remembering the number on your bus to be sure you get back on the right one.	
<b>Perceptual Abilities</b>			
15. Speed of Closure	The ability to quickly make sense of information that seems to be without meaning or organization. It involves quickly combining and organizing different pieces of information into a meaningful pattern.	High—Interpreting the patterns on a weather radarscope to decide if the weather is changing. Low—Recognizing a song after hearing only the first few notes.	
16. Flexibility of Closure	The ability to identify or detect a known pattern (a figure, object, word, or sound) that is hidden in other distracting material.	High—Identifying camouflaged tanks while flying in a high speed airplane. Low—Tuning in a radio weather station in a noisy truck.	
19. Perceptual Speed	The ability to quickly and accurately compare letters, numbers, objects, pictures, or patterns. The things to be compared may be presented at the same time or one after other. This ability also includes comparing a presented object with a remembered object.	High—Inspecting electrical parts for defects as they flow by on a fast-moving assembly line. Low—Sorting mail according to zip codes with no time pressure.	
<b>Spatial Abilities</b>			
17. Spatial Organization	The ability to know one's location in relation to the environment, or to know where other objects are in relation to one's self.	High—Navigating an ocean voyage using only the positions of the sun and stars. Low—Using the floor plan to locate a store in a shopping mall.	

*(continued)*

TABLE 3.1

(continued)

CONSTRUCT LABEL	OPERATIONAL DEFINITION	LEVEL SCALE	
		LEVEL RATING	EXAMPLE
18. Visualization	The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged.	High—Anticipating your opponent's as well as your own future moves in a chess game. Low—Imagining how to put paper in the typewriter so the letterhead comes out at the top.	
<b>Attentiveness</b>			
20. Selective Attention	The ability to concentrate and not be distracted while performing a task over a period of time.	High—Studying a technical manual in a noisy boiler room. Low—Answering a business call with coworkers talking nearby.	
21. Time Sharing	The ability to efficiently shift back and forth between two or more activities or sources of information (such as speech, sound, touch, or other sources).	High—Monitoring radar and radio transmission to keep track of aircraft during periods of heavy traffic. Low—Listening to music while filing papers.	
<b>Psychomotor abilities</b>			
<b>Fine Manipulative Abilities</b>			
27. Arm-Hand Steadiness	The ability to keep the hand and arm steady while making an arm movement or while holding the arm and hand in one position.	High—Cutting facets in diamonds. Low—Lighting a candle.	
28. Manual Dexterity	The ability to quickly make coordinated movements of one hand, a hand together with the arm, or two hands to grasp, manipulate, or assemble objects.	High—Performing open-heart surgery using surgical instruments. Low—Screwing a light bulb into a lamp socket.	
29. Finger Dexterity	The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects.	High—Putting together the inner workings of a small wrist watch. Low—Putting coins in a parking meter.	
<b>Control Movement Abilities</b>			
22. Control Precision	The ability to quickly and repeatedly make precise adjustments in moving the controls of a machine or vehicle to exact positions.	High—Drilling a tooth. Low—Adjusting a room light with a dimmer switch.	
23. Multilimb Coordination	The ability to coordinate movements of two or more limbs together (for example, two arms, two legs, or one leg and one arm) while sitting, standing, or lying down. It does not involve performing the activities while the body is in motion.	High—Playing the drum set in a jazz band. Low—Rowing a boat.	

(continued)

**TABLE 3.1**

*(continued)*

CONSTRUCT LABEL	OPERATIONAL DEFINITION	LEVEL SCALE	
		LEVEL RATING	EXAMPLE
24. Response Orientation	The ability to choose quickly and correctly between two or more movements in response to two or more different signals (lights, sounds, pictures, etc.). It includes the speed with which the correct response is started with the hand, foot, or other body parts.	High—In a spacecraft that is out of control, reacting quickly to each malfunction with the correct control movements. Low—When the doorbell and telephone ring at the same time, quickly selecting which to answer first.	
25. Rate Control	The ability to time the adjustments of a movement or equipment control in anticipation of changes in the speed and/or direction of a continuously moving object or scene.	High—Operating aircraft controls used to land a jet on an aircraft carrier in rough weather. Low—Riding a bicycle alongside a jogger.	
<b>Reaction Time and Speed Abilities</b>			
26. Reaction Time	The ability to quickly respond (with the hand, finger, or foot) to one signal (sound, light, picture, etc.) when it appears.	High—Hitting the brake when a pedestrian steps in front of the car. Low—Starting to slow down the car when a traffic light turns yellow.	
30. Wrist-Finger Speed	The ability to make fast, simple, repeated movements of the fingers, hands, and wrists.	High—Typing a document at the speed of 90 words per minute. Low—Using a manual pencil sharpener.	
31. Speed of Limb Movement	The ability to quickly move the arms or legs.	High—Throwing punches in a boxing match. Low—Sawing through a thin piece of wood.	
<b>Physical abilities</b>			
<b>Physical Strength Abilities</b>			
32. Static Strength	The ability to exert maximum muscle force to lift, push, pull, or carry objects.	High—Lifting 75-pound bags of cement onto a truck. Low—Pushing an empty shopping cart.	
33. Explosive Strength	The ability to use short bursts of muscle force to propel oneself (as in jumping or sprinting), or to throw an object.	High—Propelling (throwing) a shot-put in a track meet. Low—Hitting a nail with a hammer.	
34. Dynamic Strength	The ability to exert muscle force repeatedly or continuously over time. This involves muscular endurance and resistance to muscle fatigue.	High—Performing a gymnastics routine using the rings. Low—Using pruning shears to trim a bush.	
35. Trunk Strength	The ability to use one’s abdominal and lower back muscles to support part of the body repeatedly or continuously over time without “giving out” or fatiguing.	High—Doing 100 sit-ups. Low—Sitting up in an office chair.	

*(continued)*

TABLE 3.1

(continued)

CONSTRUCT LABEL	OPERATIONAL DEFINITION	LEVEL SCALE	
		LEVEL RATING	EXAMPLE
<b>Endurance</b>			
40. Stamina	The ability to exert oneself physically over long periods of time without getting winded or out of breath.	High—Running a 10 mile race. Low—Walking a quarter of a mile to deliver a letter.	
<b>Flexibility, Balance, and Coordination</b>			
36. Extent Flexibility	The ability to bend, stretch, twist, or reach out with the body, arms, and/or legs.	High—Working under a car dashboard to repair the heater. Low—Reaching for a microphone in a patrol car.	
37. Dynamic Flexibility	The ability to quickly and repeatedly bend, stretch, twist, or reach out with the body, arms, and/or legs.	High—Maneuvering a kayak through swift rapids. Low—Hand picking a bushel of apples from a tree.	
38. Gross Body Coordination	The ability to coordinate the movement of the arms, legs, and torso together in activities where the whole body is in motion.	High—Performing a ballet dance. Low—Getting in and out of a truck.	
39. Gross Body Equilibrium	The ability to keep or regain one's body balance to stay upright when in an unstable position.	High—Walking on narrow beams in high-rise construction. Low—Standing on a ladder.	
<b>Sensory abilities</b>			
<b>Visual Abilities</b>			
41. Near Vision	The ability to see details of objects at a close range (within a few feet of the observer).	High—Detecting minor defects in a diamond. Low—Reading dials on the car dashboard.	
42. Far Vision	The ability to see details at a distance.	High—Detecting differences in ocean vessels on the horizon. Low—Reading a roadside billboard.	
43. Visual Color Discrimination	The ability to match or detect differences between colors, including shades of color and brightness.	High—Painting a color portrait from a living subject. Low—Separating laundry into colors and whites.	
44. Night Vision	The ability to see under low light conditions.	High—Finding one's way through the woods on a moonless night. Low—Reading street signs when driving at dusk (just after the sun sets).	
45. Peripheral Vision	The ability to see objects or movement of objects to one's side when the eyes are focused forward.	High—When piloting a plane in air combat, distinguishing friendly and enemy aircraft. Low—Keeping in step while marching in a military formation.	

(continued)

**TABLE 3.1** (continued)

CONSTRUCT LABEL	OPERATIONAL DEFINITION	LEVEL SCALE	
		LEVEL RATING	EXAMPLE
46. Depth Perception	The ability to judge which of several objects is closer or farther away from the observer, or to judge the distance between an object and the observer.	High—Throwing a long pass to a teammate who is surrounded by opponents. Low—Merging a car into traffic on a city street.	
47. Glare Sensitivity	The ability to see objects in the presence of glare or bright lighting.	High—Snow skiing in bright sunlight. Low—Driving on a familiar roadway on a cloudy day.	
<b>Auditory and Speech Abilities</b>			
48. Hearing Sensitivity	The ability to detect or tell the difference between sounds that vary over broad ranges of pitch and loudness.	High—Tuning an orchestra. Low—Noticing when the hourly watch alarm goes off.	
49. Auditory Attention	The ability to focus on a single source of auditory (hearing) information in the presence of other distracting sounds.	High—Listening to instructions from a coworker in a noisy saw mill. Low—Listening to a lecture while people are whispering nearby.	
50. Sound Localization	The ability to tell the direction from which a sound originated.	High—Determining the direction of an emergency vehicle from the sound of its siren. Low—Listening to a stereo to determine which speaker is working.	
51. Speech Recognition	The ability to identify and understand the speech of another person.	High—Understanding a speech presented by someone with a strong foreign accent. Low—Recognizing the voice of a coworker.	
52. Speech Clarity	The ability to speak clearly so that it is understandable to a listener.	High—Giving a lecture to a large audience. Low—Calling the numbers in a bingo game.	

SOURCE: Adapted from Fleishman et al. (1999); Fleishman & Reilly (1992).

## COGNITIVE ABILITIES

### Intelligence as “g”

Many people consider the terms intelligence, IQ, cognitive ability, and mental ability to be synonyms for one another. We will make some distinctions. **IQ** is an historical term that stood for **Intelligence Quotient** and refers to the way early intelligence test scores were calculated. The term no longer has scientific meaning, although it is still often used by the general public. Mental ability and cognitive ability are current terms, which scientists often use interchangeably. Cognitive ability and mental ability often refer to specific abilities



Abbreviation for intelligence quotient.

#### INTELLIGENCE QUOTIENT

Measure of intelligence obtained by giving a subject a standardized “IQ” test. The score is obtained by multiplying by 100 the ratio of the subject’s mental age to chronological age.

such as memory or reasoning; intelligence, on the other hand, most often refers to general intellectual capacity (often called “g” for general mental ability). Intelligence can be defined as the ability to learn and adapt to an environment. One or another variation of this definition has been used since at least 1921 (Sternberg & Kaufmann, 1998). A group of leading I-O psychologists recently defined it as follows: “Intelligence is a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly, and learn from experience” (Arvey et al., 1995).

Sternberg and Kaufmann (1998) pointed out that no matter how enduring this definition may be for Western cultures, other cultures have different views of who is “an intelligent person.” Speed of learning, for example, is not always emphasized in non-Western cultures. In fact, “other cultures may be suspicious of work done quickly” (Sternberg & Kaufmann, 1998), and in some cultures, the word intelligence means “prudence” and “caution.” Nevertheless, for our purposes, we will accept the meaning generally assigned by Western psychologists. Intelligence is required whenever people must manipulate information of any type (Murphy, 1996). Measures of “g” assess reasoning ability, knowledge acquisition, and problem-solving ability (Lubinski, 2000).

### *Is “g” Important at Work?*

Yes. Almost every job requires some active manipulation of information. This means that your level of general mental ability can affect your performance on any job. The greater the amount of information that needs to be manipulated, the more important “g” becomes. **Meta-analyses** of the relationship between “g” and job performance (Hunter & Hunter, 1984; Schmidt & Hunter, 1998) demonstrated very clearly that as the complexity of the

#### **META-ANALYSIS**

*Statistical method of combining many small studies to reach a conclusion.*



Critical abilities for the job of emergency dispatcher include verbal comprehension, reaction time, and problem solving.



job increased, the predictive value (i.e., validity) of tests of general intelligence also increased. In practical terms, this means that if the information-processing demands of a job are high, a person with lower general mental ability is not as likely to be successful as a person of higher general mental ability. That does not mean, however, that high general mental ability guarantees success on that job. If the job also requires interpersonal skills, communication skills, and certain personality traits, even a person with high general mental ability (but lower levels of those noncognitive traits) might fail.

In 1965 Tanner showed that he could accurately predict which Olympic athletes were competing in which sports by looking at their body builds. But *within* each Olympic event, the same individual differences were useless as predictors of who would get a medal (Lubinski, 2000). In this example, think of body build as “g,” and all the other attributes of the athletes as specific abilities and attributes; “g” may help a candidate get into the police academy, but it will not ensure that the person will become a successful police officer.

Some of today’s psychologists continue to believe that nothing more than measures of “g” are needed to predict training, grades, and job performance (Ree & Earles, 1992). Another psychologist framed the issue somewhat differently.

General mental ability (g) is a substantively significant determinant of individual differences for any job that includes information-processing tasks . . . The exact size of the relationship will be a function of . . . the degree to which the job requires information processing and verbal cognitive skills (Campbell, 1990).

From Campbell’s statement we can infer that since “g” represents information-processing ability, then it should logically predict information-processing performance in the workplace. In addition, we can infer that jobs differ in terms of how much “information processing” they require. A backhoe operator certainly has to process some information, but not as much as a software help-desk operator. The backhoe operator will depend much more heavily on visual/spatial ability than on problem solving or reasoning ability.

### Can Your Level of “g” Change?

Today’s researchers observe a fascinating phenomenon: Intelligence continues to rise over time. Individuals appear to be getting smarter and smarter through the lifespan, and new generations appear to be smarter than their parents. The phenomenon is labeled the **Flynn effect** after a political scientist who has done extensive research on the topic (Flynn, 1984, 1987, 1999). It amounts to a gain of 15 points in average intelligence test scores per generation. This is a substantial increase, considering that the **mean** intelligence on most tests is pegged at 100 with a **standard deviation** of 15. Many psychologists have proposed theories as to why this is occurring, including better health care, better nutrition, increased schooling, and better-educated parents (Sternberg & Kaufmann, 1998). It could also be because we live in an increasingly complex environment both at work and at home (Neisser et al., 1996). The phenomenon of increasing intelligence is interesting for two reasons. First, it refutes the perception of many people that intelligence is fixed at an early age. Second, it suggests that the complexity of modern work settings may very well act as a stimulant for cognitive growth. It also raises a crucial question for I-O psychologists: Is the increase in intelligence keeping up with the increase in complexity of the environment?

### Cognitive Abilities beyond “g”

The majority of today’s psychologists agree that while “g” is important, more specific cognitive abilities also play a role in performance, with some specific abilities important for some jobs and other specific abilities important for other jobs. The example of the backhoe operator and the software help-desk operator points out the importance of specific cognitive abilities.

#### FLYNN EFFECT

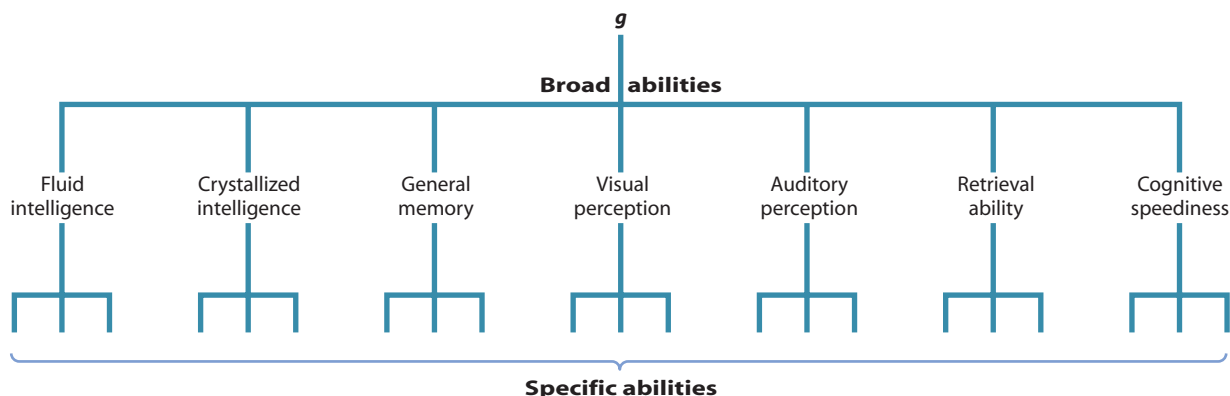
*Phenomenon in which new generations appear to be smarter than their parents by a gain of 15 points in average intelligence test score per generation; named after the political scientist who did extensive research on the topic.*

#### MEAN

*The arithmetic mean or average, computed by dividing the sum of all values in a set by the number of values comprising that set.*

#### STANDARD DEVIATION

*Measure of the extent of spread in a set of scores.*



**FIGURE 3.2** Carroll's Hierarchical Model SOURCE: Carroll (1993).

The question then becomes, How many specific abilities are there? There is no conclusive answer to that question, but we can say with great confidence that there is more than one (i.e., more than just “g”). As you saw in Table 3.1, Fleishman and his colleagues posited 52 abilities, 21 of which are in the cognitive category, but “g” is not one of them. The reason for this is that Fleishman was more concerned with identifying *specific* abilities than general mental ability. It is now generally accepted that cognitive ability is best conceptualized as having multiple layers of abilities.

Carroll (1993) proposed that there are three layers, or strata, to intelligence (see Figure 3.2). The highest layer is “g”; the next layer down consists of seven more specific abilities: fluid intelligence, crystallized intelligence, memory, visual perception, auditory perception, information retrieval, and cognitive speed (Murphy, 1996). The lowest and most specific level includes abilities that are tied to the seven broad abilities in the middle level. For example, information ordering (one of Fleishman’s proposed abilities) would be connected to fluid intelligence, and spatial relations would be associated with visual perception.

There are many other theories of cognitive abilities, but all resemble Carroll’s. The important thing to remember is that “g” will only get you so far in understanding work behavior. Different jobs will require additional specific cognitive abilities as well. It is fair to say that a person with a high level of “g” will probably be a successful performer at certain tasks of almost every job (Schmidt & Hunter, 1998), but that other abilities will vary in importance depending on the job in question. As we will see in the subsequent sections of this module, not only will cognitive abilities play a role in job success and satisfaction, but so also will personality, emotional reactions, and interests.

You might wonder if it is possible to have *too much* intelligence. This reminds us of a story that is often told about a well-known boxer. A radio interviewer was talking with a retired middleweight boxer who had fought for many years and had a relatively undistinguished career, finishing with approximately 60 wins and 30 losses. The interview went something like this, with the interviewer represented by “I” and the boxer by “B.”

- I You must have fought many interesting boxers in your career.  
 B Yeah, there were plenty of them.  
 I I noticed that you fought so-and-so four times and beat him all four times.  
 B Yeah, that surprised me because he had a lot better record than me.  
 I Why did it surprise you?

- B Because he was so smart. He was always thinking ahead, what combination he would set up, where he wanted to be in the ring, and things like that. He was really smart, always thinking.
- I Then let me ask the obvious question—why do you think you beat him so consistently?
- B I guess it was because when he was thinking, I was punching.
- So it does appear that, occasionally, too much “g” can get you hurt!

## PHYSICAL, SENSORY, AND PSYCHOMOTOR ABILITIES

### Physical Abilities

In the introductory section to this module, we considered Fleishman’s taxonomy of human abilities. That taxonomy remains one of the most detailed statements of the range of physical abilities found in humans. There are many jobs that are physically demanding and for which physical ability testing is appropriate. Some examples are firefighter, mine worker, and baggage handler. Each of these jobs requires strength, flexibility, and **stamina** or aerobic endurance. In Table 3.2, we “analyze” the job of firefighter using the Fleishman taxonomy.

Hogan (1991a; 1991b) suggested that seven physical abilities are sufficient for analyzing most jobs. Guion compared Hogan’s seven abilities with similar abilities identified by Fleishman and Reilly (1992) and found a close match. As you can see in Figure 3.3, several of Hogan’s dimensions are combinations of Fleishman’s dimensions (e.g., Hogan combines extent flexibility and dynamic flexibility into a single dimension called “flexibility”).

#### STAMINA

*Physical ability to supply muscles with oxygenated blood through the cardiovascular system; also known as cardiovascular strength or aerobic strength or endurance.*

TABLE 3.2

Fleishman Taxonomy with Firefighting Examples

*Static Strength.* This is the ability we generally think of when we hear the word *strength*. It is the amount of force that is exerted against a fairly immovable or heavy external object. Force is exerted continuously and might involve pushing, pulling, or lifting. Examples of this would include prying a door open, lifting a person, or holding hoses.

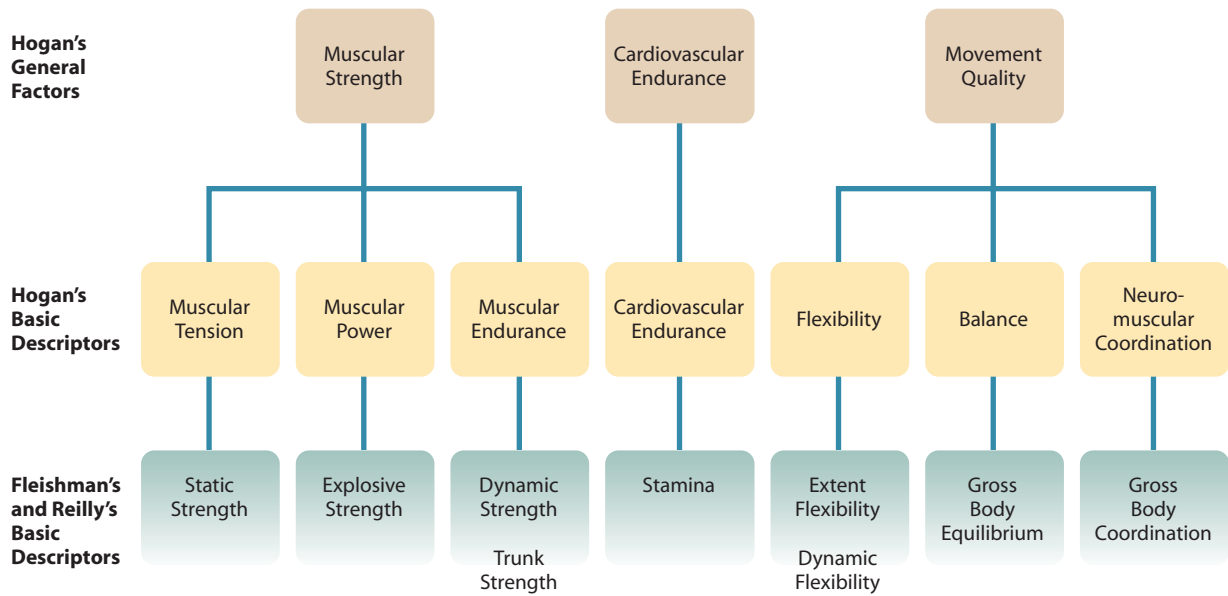
*Explosive Strength.* This is the ability to use energy in one or a series of explosive muscular acts. What is needed is a burst of muscular energy rather than a steady effort. Examples might be jumping over an obstacle, using an ax, or kicking open a door.

*Dynamic Strength.* This ability involves using your arms and trunk in moving your own body weight for some period of time or across some distance. An example would be climbing a rope or pulling yourself along using only your arms. Another important part of this ability is that you must use the same arm muscles repeatedly or continuously.

*Stamina.* This is the ability to maintain physical activity over a long period of time. This deals with the extent to which the cardiovascular system (heart and lungs) is exercised. A good example of the use of this ability would be climbing up 20 flights of stairs. Another example would be running a long distance.

*Extent Flexibility.* This ability involves stretching or extending arms and legs and their particular muscle groups. An example of this ability would be stretching a leg up above your waist to climb over a wall. A second example would be reaching with your arms at an extreme angle so that a ladder could be put in place.

*Dynamic Flexibility.* This is the ability to make repeated or continuous arm and leg flexing movements with some speed. An example would be pulling in a hose or rope, hand over hand, in a short time or quickly climbing up a ladder.



**FIGURE 3.3 A Model of Physical Abilities** SOURCE: Guion (1998).

#### MUSCULAR TENSION

Physical quality of muscular strength.

#### MUSCULAR POWER

Physical ability to lift, pull, push, or otherwise move an object; unlike endurance, this is a one-time maximum effort.

#### MUSCULAR ENDURANCE

Physical ability to continue to use a single muscle or muscle group repeatedly over a period of time.

In a manner reminiscent of Carroll's theory of intelligence, she then combines her seven measures to form three higher-order physical abilities: muscular strength, cardiovascular endurance, and movement quality. For most jobs, this three-ability taxonomy would likely be sufficient since most physically demanding jobs require **muscular tension**, **muscular power**, and **muscular endurance**, not just one of the three. Similarly, flexibility and balance usually go together in a physically demanding job.

**Fairness of Physical Ability Tests** Because employers often use physical ability tests to screen applicants for physically demanding jobs, it is important to determine whether such tests are fair to female applicants and older applicants. Because we lose muscle, stamina, and flexibility as we age, the older an applicant is the less well he or she is likely to perform on physical ability tests. For women the situation has an additional consideration. On average, females have less muscle mass (which means diminished muscular strength) and lower levels of cardiovascular endurance (or stamina) than men (Hogan, 1991a). In contrast, on measures of flexibility (e.g., sit and reach tests) women tend to do better than men. However, most physically demanding jobs require—or are perceived by employers to require—more muscular strength and stamina than flexibility. This has meant that male candidates, who tend to excel on those physical tests, are predominantly hired for such jobs. As a result, women candidates for popular positions such as firefighter have filed employment discrimination suits (*Brunet v. City of Columbus*, 1995).

You have probably observed that women and men of all ages can increase their individual physical abilities with exercise and training. In addition, it is clear that many jobs require a fixed level of strength and endurance and that more is not always better. If your job requires you to lift 25-pound boxes from a conveyor belt and place them on a table, the fact that you are strong enough to move 100-pound boxes is irrelevant to the task at hand. In this case, more strength would not lead to higher performance. This means that it is not always necessary for individuals to compete *against* each other on physical ability tests; they merely need to demonstrate sufficient strength and endurance to perform the tasks that comprise the job. By training for several months prior to the administration of physical ability tests, women candidates are able to improve their performance significantly.

Thus, one way of helping women to do better on these tests is for employers to encourage them to train ahead of time (McArdle, Katch, & Katch, 2001). We can predict that this same strategy may help older job seekers as well.

### Sensory Abilities

**Sensory abilities** are the physical functions of vision, hearing, touch, taste, smell, and kinesthetic feedback (e.g., noticing changes in body position). Hogan includes kinesthetic feedback in a dimension she called “movement quality.” The sensory abilities of vision and hearing are particularly interesting for applied I-O psychologists because employers often test these abilities in would-be employees.

To prevent employers from using a disability as an excuse to reject an applicant who is capable of performing a job, the **Americans with Disabilities Act** of 1990 forbids them from asking about or testing areas such as sensory or physical abilities that may be considered “disabilities” until after they have made a job offer to the candidate.

Until recently, cognitive psychologists considered sensory abilities to be independent of cognitive abilities, but Carroll’s (1993) model of intelligence calls that assumption into question. Remember that two of his mid-level abilities are visual perception and auditory perception. But in most real-life settings, sensation and perception are inextricably bound together. We usually infer from some kind of report (verbal or behavioral) that a person has sensed something. There has been little research on this question, but as the development of Carroll’s model continues, the interplay between senses and intelligence will become more prominent.

### Psychomotor Abilities

**Psychomotor abilities**, sometimes called **sensorimotor**, or just **motor abilities**, deal with issues of coordination, dexterity, and reaction time. Once again, Fleishman (Fleishman & Reilly, 1992) has done the most extensive work in identifying these abilities (see Table 3.3). A simple inspection of these abilities immediately brings to mind the jobs for which they may be important (e.g., crane operators, organists, watch repair technicians, surgeons, wait staff, and bartenders). Once again, from this discussion it should be clear that many of these abilities (e.g., rate control and aiming) may very well be associated with visual and/or auditory perception or cognitive speed, facets of Carroll’s theory of intelligence.

TABLE 3.3	Psychomotor Abilities
1. Arm-hand steadiness	
2. Manual dexterity	
3. Finger dexterity	
4. Control precision	
5. Multilimb coordination	
6. Response orientation	
7. Rate control	
8. Reaction time	
9. Wrist-finger speed	
10. Speed of limb movement	

SOURCE: Adapted from Fleishman et al. (1999); Fleishman & Reilly (1992).

#### SENSORY ABILITIES

*Physical functions of vision, hearing, touch, taste, smell, and kinesthetic feedback (e.g., noticing changes in body position).*

#### AMERICANS WITH DISABILITIES ACT

*Federal legislation in 1990 requiring employers to give applicants and employees with disabilities the same consideration as other applicants and employees, and to make certain adaptations in the work environment to accommodate disabilities.*

#### PSYCHOMOTOR ABILITIES

*Physical functions of movement, associated with coordination, dexterity, and reaction time; also called motor or sensorimotor abilities.*

#### SENSORIMOTOR ABILITIES

*Physical functions of movement, associated with coordination, dexterity, and reaction time; also called psychomotor or motor abilities.*

#### MOTOR ABILITIES

*Physical functions of movement, associated with coordination, dexterity, and reaction time; also called psychomotor or sensorimotor abilities.*

The work of researchers like Carroll blurs the classical distinctions between cognitive and “noncognitive” abilities. In some senses, this is a good development. Until recently, psychologists tended to treat abilities in isolation when it is clear in real life (and—more importantly for us—in work) that all of these abilities interact within a single person to produce a response or action. Theories like Carroll’s will require us to consider the individual in a more realistic way by looking at these interactions.

## MODULE 3.2 SUMMARY

- Fleishman and his associates developed a taxonomy of 52 abilities, divided into the broad categories of cognitive, physical, and perceptual-motor abilities.
- “Intelligence [or “g”] is a very general mental capability that . . . describes a person’s ability to learn from experience.
- Meta-analyses of the relationship between “g” and job performance demonstrated that the more complex the job, the stronger the predictive value of general intelligence tests.
- Carroll proposed that intelligence had three layers, or strata. The highest layer is “g”; the next layer down consists of seven more specific abilities: fluid intelligence, crystallized intelligence, memory, visual perception, auditory perception, information retrieval, and cognitive speed.
- Physically demanding jobs require strength, flexibility, and stamina or aerobic endurance. Hogan proposed a seven-measure taxonomy of physical abilities, and combined these seven measures to form three higher-order physical abilities: muscular strength, cardiovascular endurance, and movement quality.
- It is important to determine whether employers’ physical ability tests are fair to female applicants and older applicants, since both of these groups tend to have less strength than young men do. One way of enhancing the performance of females and older applicants on these tests is to encourage applicants to train ahead of time.

## KEY TERMS

taxonomy	Flynn effect	muscular endurance
perceptual-motor abilities	mean	sensory abilities
affect	standard deviation	Americans with Disabilities Act
IQ	stamina	psychomotor abilities
meta-analysis	muscular tension	sensorimotor abilities
Intelligence Quotient	muscular power	motor abilities

## CRITICAL THINKING EXERCISES

**3.3** Examine the Fleishman Taxonomy of Abilities which appears in Table 3.1. Using that list of abilities, identify what you feel are the five most important abilities for the following jobs:

Manager of a supermarket

Used car salesperson

Leader of a religious congregation

Civil engineer who specializes in highway construction

College-level teacher

Kindergarten teacher

Prison guard

Accountant

Coach of a professional tennis star

**CASE  
STUDY**
**3.1**
**What Do a Major League Baseball Team and a Railroad Have in Common? Confusion about Reaction Time**

During the eighth inning of a professional baseball game, a relief pitcher was warming up to come into the game. Unlike many ballparks, this stadium had the bullpens located along the first and third baselines. The catcher's back is toward home plate and as he warms up, the pitcher is throwing the ball to the catcher and toward the ground-level stands on the third base line. There was a net behind the catcher to protect the fans in the field-level seats from a wild pitch, but the net had been lowered somewhat because it interfered with the vision of some fans. The pitcher was almost finished with his warm-up and was throwing pitches at speeds between 90 and 96 miles per hour. One of these pitches sailed over the catcher's outstretched mitt and over the protective net, hitting a spectator in the cheek and breaking most of the bones on the left side of her face. She had been a successful financial consultant making a six-figure income before being hit by the pitch. After being hit, she lost vision in her left eye, had occasional seizures, and suffered memory and reasoning impairments. She sued the pitcher, the team owner, and the stadium owner. One of the "defenses" of the team and stadium owner was that the fan should have ducked before the pitch hit her.

A young man driving with his girlfriend along a four-lane highway inexplicably lost control of his car. The car went into a shallow ditch and emerged on the shoulder. The car was not badly damaged but the young man's girlfriend had hit her head on the dashboard and her shoulder on the passenger door and was in pain. They turned off the highway to take a more direct route to a nearby hospital. As they headed down a dirt road, they crossed a train track. As they crossed, their car was hit in the rear by a passenger train going 64 miles per hour. There was no visual obstruction at the railroad crossing and the young man said that he was aware that the train was

coming but could not react quickly enough to stop. The engineer testified that he had seen the car coming down the road when the train was 800 yards away from the crossing and the car was at least 400 yards from the crossing. The only action the engineer could take was to blow the whistle continually and apply the emergency brakes of the train. Despite the braking, the train did not come to a stop until it was 600 yards past the crossing. Luckily, neither passenger in the car was killed or seriously injured. The passengers sued the railroad claiming, among other things, that the driver could not react in time to stop the car since the train was traveling too fast.

Both of these lawsuits involve reaction time. Both the baseball fan and the driver seem to be victims of reaction times slower than what was required to avoid injury. Both were expected to react quickly enough to save themselves. While it might have been possible for the driver to avoid the accident, it was impossible for the baseball fan to avoid the pitch (even assuming she was looking directly at the relief pitcher instead of the batter at home plate). The fastest recorded reaction time for a human being is between 25/100 and 30/100 of a second. An example of someone who can react that quickly is a spectacular fast-draw artist. It was possible to calculate how much time the baseball fan would have had to react once it was apparent that the catcher would not stop the ball. The ball reached her head in less than one-tenth of a second, almost three times faster than the fastest recorded reaction time. Based on calculations from the accident scene, the driver of the car had more than six seconds to react to the presence of the train, exceeding the time necessary to react (even for a normal person) by more than five seconds. He could have stopped but did not.

Think about reaction time as it has been defined by Fleishman in Table 3.1. What jobs are you familiar with where reaction time will be crucial to success (or may be implicated in injury or death)?

## A Level Playing Field

It is common to test for physical abilities before choosing candidates for recruit positions in fire academies. Although physical abilities will be improved in the 16 weeks of the academy training program, you still require a minimum amount of ability to profit from the training. Most fire departments administer physical ability tests that simulate actual tasks performed by firefighters. As examples, candidates may be asked to carry heavy hose bundles up stairs, or open fire hydrants with wrenches or hang heavy exhaust fans in windows. Two tests, in particular, seem to be harder for female applicants than their male counterparts. The first is the “dummy drag” simulation. In this test, the candidate is asked to drag a 150-pound dummy through a 40-foot maze with several left and right turns in it. The second task is pulling 50 feet of a simulated fire hose through a 50-foot

maze with two right turns. Since men tend to be larger and stronger, they simply pick up the dummy and carry it through the maze, while women are more likely to drag the dummy along the floor of the maze. Similarly, for the hose pull, men tend to simply loop the hose over their shoulder and pull it through the maze in one single movement. The test is not exactly the same as the actual task, however; in an actual fire situation the firefighter is usually pulling a person or a hose through a burning room and must stay close to the ground since the toxic fumes, smoke, and temperature (often as high as 2000 degrees) are more deadly in the upper part of a room.

If you wanted to make these test components more realistic, how would you redesign the test course? If you did redesign it, do you think that the performance of women would improve? Why or why not?



## PERSONALITY AND INTERESTS

### PERSONALITY

There is now a broad consensus that personality represents an important area of individual differences for examination by I-O psychologists (Murphy, 1996; Hough & Schneider, 1996; Mount & Barrick, 1995). There are clear connections between aspects of personality and various work behaviors, both productive (e.g., job performance) and counterproductive (e.g., dishonesty, absenteeism). This consensus is the result of concentrated work on developing a taxonomy of personality factors. This taxonomy is labeled the **Big 5** or the **Five Factor Model (FFM)** (Digman, 1990; McCrae & Costa, 1985, 1987). This model is the result of both statistical analyses of personality test information gathered over many decades, and a careful conceptual analysis of what most personality tests were trying to assess. Like most innovations, it has its critics, but for our purposes in this book it is a good basic model for describing the potential importance of personality variables in understanding job performance.

#### *The Five Factor Model*

As suggested by its title, the Five Factor Model (FFM) proposes that we can describe someone's "personality" by looking at five relatively independent factors. Personality can be defined in simplest terms as the typical way that an individual has of responding. It is considered a trait because it is fairly stable, even though situations and circumstances might lead a person to behave in a way that is out of character with his or her overall personality. The FFM identifies five different components which, when taken together, give a fair representation of how a person typically responds to events and people. These components and their definitions are presented in Table 3.4.

TABLE 3.4

The Five Factor Model

FACTOR	CHARACTERISTICS
1. Conscientiousness	Responsible, prudent, self-control, persistent, planful, achievement oriented
2. Extraversion	Sociable, assertive, talkative, ambitious, energetic
3. Agreeableness	Good natured, cooperative, trusting, likeable, friendly
4. Emotional stability	Secure, calm, low anxiety, low emotionality
5. Openness to experience	Curious, intelligent, imaginative, independent

SOURCE: Based on Digman (1990); McCrae & Costa (1985, 1987).

#### BIG 5

A taxonomy of five personality factors; the Five Factor Model (FFM).

#### FIVE FACTOR MODEL (FFM)

A taxonomy of five personality factors, comprised of conscientiousness, extraversion, agreeableness, emotional stability, and openness to experience.

**CONSCIENTIOUSNESS**

*Quality of having positive intentions and carrying them out with care.*

**FUNCTIONAL PERSONALITY AT WORK**

*The way that an individual behaves, handles emotions, and accomplishes tasks in a work setting; a combination of Big 5 factors.*

**AGREEABLENESS**

*Likable, easy to get along with, friendly.*

**EMOTIONALLY STABILITY**

*Displaying little emotion; showing the same emotional response in various situations.*

**INTEGRITY**

*Quality of being honest, reliable, and ethical, as in an employee.*

It is important to keep in mind that the five factors are intended to measure normal personality, not to identify any evidence of psychopathology. We will make that distinction clearer in Chapter 4 when we discuss how personality is measured. Of the five factors, the first to have attracted most attention from I-O psychologists was **conscientiousness**. More recently, extraversion, openness to experience, and agreeableness are also attracting increased attention. In some early research, Barrick and Mount (1991) proposed, on the basis of a meta-analysis, that in all likelihood conscientiousness was positively related to success in all aspects of work for all occupations. That was a strong statement, but it was supported by their analyses. Naturally, there were disagreements with the five factor taxonomy and with the presumed overarching importance of conscientiousness. The first disagreement was that five factors are too few to capture the full range of aspects of personality (Hough, 1992; Tellegen, 1993; Tellegen, Grove & Waller, 1991; Tellegen & Waller, 2000). The second criticism was that although conscientiousness might be correlated with a wide range of work behaviors, it was not *highly* correlated with them. In addition, extraversion often correlated as highly with behavior as conscientiousness. A third criticism was that there were combinations of the five factors that led to greater predictive power than any one of the factors by itself (Dunn, 1993; Hogan & Hogan, 1989; Ones, Viswesvaran, & Schmidt, 1993). The first and third criticisms present an interesting dilemma, since one argues for *more* factors while the other seems to be arguing for *fewer* factors.

What seems to be true is that although each of the five factors does predict successful in contrast to unsuccessful performance of certain behaviors, some combinations of the factors may be stronger predictors than any single factor by itself. This introduces the idea of a **functional personality at work** (Barrick, Mount, & Judge, 2001; Mount & Barrick, 1995). This means that not just one factor predicts success, but a combination of factors. For example, Ones et al. (1993) found that individuals who were high on the conscientiousness, **agreeableness**, and **emotional stability** factors of the FFM tended to have higher **integrity**. Integrity in this context means honest, reliable, and ethical. Dunn (1993) found that managers believed that a combination of conscientiousness, agreeableness, and emotional stability made applicants more attractive to managers who had hiring responsibilities. Hogan and Hogan (1989) found that the same factors were related to employee reliability (Mount & Barrick, 1995).

Other meta-analyses also reveal relationships between the FFM and job performance, both in the United States (Hurtz & Donovan, 2000) and with European data (Salgado, 1997, 1998). The latter series of meta-analyses suggest that at least for many European countries, culture may not be a moderator variable for the personality/performance relationship. Nevertheless, remember from Chapter 1 that Hofstede's (1980, 2001) model of cultural influence showed that the biggest cultural differences seemed to be between Asian and Western nations, so the jury is still out on whether the personality/performance relationship holds true in countries like China and Japan. There is reason to expect that it will be different from its manifestation in the Europe or the United States since the collectivist cultures of China and Japan emphasize group outcomes over individual outcomes.

**Implications of the Five Factor Model** It appears that as the aspect of work behavior we are trying to predict gets broader (e.g., overall job performance), large FFM factors like conscientiousness do as well as smaller and more discrete factors. There is some debate whether to use broad or narrow personality dimensions (Hogan & Roberts, 1996; Ones & Viswesvaran, 1996; Schneider, Hough, & Dunnette, 1996). It turns out that narrow traits seem to be useful for predicting very specific job behaviors and broader traits for predicting broader behaviors, so it is not necessary to choose between the two approaches. Each has its own use.

Hough suggested that the FFM factor of conscientiousness should be broken down into two discrete factors called **achievement** and **dependability**. Achievement consists of hard work, persistence, and the desire to do good work. Dependability represents being disciplined, well organized, respectful of laws and regulations, honest, trustworthy, and accepting of authority (Hough, 1992). When we break conscientiousness down into those two facets, it turns out that dependability is a better predictor of employee reliability than conscientiousness, and achievement is a better predictor of effort than conscientiousness. But if we try to predict ratings of overall job performance, then conscientiousness does as well as either achievement or dependability (Mount & Barrick, 1995). Another general finding is that as the behavior we are trying to predict (e.g., effort or reliability) becomes more specific, the correlations with both the FFM factors and the more refined factors go up. The more specific we are about the aspect of performance we are trying to predict, the more accurate the prediction is.

Tett (1995) made the point with a few concrete examples. He suggested that the “dependable” (or “rule-bound”) aspect of conscientiousness might actually be counterproductive in professions such as musician, sculptor, painter, actor, choreographer, and even management positions in which the manager is expected to “think outside the box” (e.g., marketing manager). He referred to the problem of too much attention to detail and rules as “analysis-paralysis.”

Problems can also arise when an individual has plenty of “g” but lacks other attributes. The recent movie *A Beautiful Mind* tells the story of John Nash, a Nobel Prize–winning mathematician who was brilliant (in a “g” sense) and high on achievement as defined above, but who was severely impaired in social and interpersonal skills. Nash was emotionally unstable, eventually disintegrating into paranoia and delusional states. Early in his career, he was favored because of his sheer brilliance (“g”) and tenacity (conscientiousness), but his impairments in other dimensions eventually rendered him useless to the research facility where he was employed. Nash’s story illustrates the point that to get a true understanding of behavior, we often need to decompose elements (like conscientiousness) or consider patterns or combinations of elements.

There is a final aspect of the research on the Five Factor Model that deserves discussion. Have you ever had a job in which you were closely supervised and required to follow very detailed work and organizational procedures? In that environment, you would have had little opportunity to let your “habitual way of responding” (i.e., your personality) appear in your behavior. Think of the opposite situation—a job where you had a good deal of control over your work habits. In the latter, you could really be “you”—and whether you performed well or poorly probably depended on how well your personality was suited to the job’s demands. That is exactly what Barrick and Mount (1993) found with their research on the FFM. In jobs where the employee had a great deal of control (i.e., autonomy), personality was much more predictive of performance than in jobs where the employee had little or no control. You will remember that this is how we defined a “moderator” variable in Chapter 2. In this case, control moderated the relationship between personality and performance. It has been commonly found that if a situation allows for little discretion on the part of a person (referred to as a “strong” situation), personality will play a minor role in his or her behavior.

How can we summarize what we know about the relationship between personality and work behavior? And what can we say more specifically about the FFM compared to other theories, such as Hough’s (1992)? We believe that the following conclusions can be drawn with confidence.

1. Personality differences play a role in work behavior independent of the role played by cognitive ability (Borman, White, Pulakos, & Oppler, 1991; Mount & Barrick, 1995; Murphy, 1996).

#### ACHIEVEMENT

*A facet of conscientiousness consisting of hard work, persistence, and the desire to do good work.*

#### DEPENDABILITY

*A facet of conscientiousness, consisting of being disciplined, well organized, respectful of laws and regulations, honest, trustworthy, and accepting of authority.*

2. Personality is more closely related to motivation aspects of work (e.g., effort expenditure) than to technical aspects of work (e.g., knowledge components). Personality is more likely to predict what a person *will* do and ability measures are more likely to predict what a person *can* do (Campbell, 1990; Mount & Barrick, 1995).

3. The FFM is a good general framework for thinking about important aspects of personality (Digman, 1990; Guion, 1998; Lubinski, 2000).

4. The more relevant and specific the work behavior we are trying to predict, the stronger the association between personality and behavior (Mount & Barrick, 1995).

5. Conscientiousness is best considered a combination of achievement and dependability. Achievement will predict some behaviors (e.g., effort) and dependability will predict other behaviors (e.g., attendance) (Hough, 1992; Moon, 2001; Mount & Barrick, 1995; Stewart, 1999).

6. Conscientiousness (along with its constituent factors achievement and dependability) has widespread applicability in work settings. It is possibly the most important personality variable in the workplace and it may be the equivalent of “g” in the noncognitive domain (Schmidt & Hunter, 1992).

7. Conscientiousness and its constituent factors (achievement and dependability) have a greater impact on behavior in situations where the worker has substantial autonomy (Barrick & Mount, 1993).

8. Conscientiousness, achievement, and dependability are only a small collection of a number of interesting facets of personality. The single-minded pursuit of “g” slowed down advances in understanding intelligence for almost 80 years. We should not let the same thing happen with the single-minded focus on conscientiousness (Collins, 1998).

9. There is evidence that factors other than conscientiousness have applicability for specific job families and occupations. Extraversion appears related to sales performance; openness to experience predicts training and expatriate success; agreeableness is associated with performance in customer-service and team-oriented jobs; emotional stability contributes to a broad range of jobs including management positions as well as jobs in the safety/security sector (Barrick, Mount & Judge, 2001; Mount, Barrick, & Stewart, 1998; Vinchur, Schippmann, Switzer, & Roth, 1998).

Psychologists will continue to debate the number of elements of personality, the names of those elements, and the content of those elements, but we think that it is safe to say that personality is divided into no fewer than 5 basic elements and no more than 10 or 11. For the time being, we can use the Five Factor Model (McCrae & Costa, 1987) and the Nine Factor Model (Hough, 1992) as examples of the upper and lower limits. Neither of those models is “right” in any scientific sense. They are both plausible and they both have their applications. It is not uncommon to see some personality tests that measure more than the 10 or 11 elements we have proposed (e.g., the OPQ 32 or the 16PF tests), but these tests are addressing much more distinct facets of personality rather than its basic dimensions.

Tellegen (1993; Tellegen & Waller, 2000) has proposed an intriguing seven-factor model. His model includes the five dimensions of the FFM plus two other dimensions: positive and negative valence. **Positive valence** is represented by descriptions such as remarkable, extraordinary, excellent, and outstanding and appears to be a continuum running from normal to exceptional. **Negative valence**, on the other hand, is the dark side of personality and is represented by descriptions such as cruel, evil, wicked, and sickening. It represents a continuum from decent to awful (Lubinski, 2000). Although there needs to be much more research on Tellegen’s view of personality, these two additional dimensions strike a chord. We have all known people who were extraordinary in every respect. We want to be like them and be around them. And we have probably known a despicable

#### POSITIVE VALENCE

*Continuum of favorable personality characteristics running from normal to exceptional.*

#### NEGATIVE VALENCE

*Continuum of unfavorable personality characteristics running from normal to abominable.*

- Q:** There are many personality tests and scales available. How do you choose among them?
- A:** Use valid and reliable tests that cover at least the Five Factor Model dimensions.
- Q:** Why should you use a test that measures more than one aspect of personality when you are interested in only one?
- A:** Because behavior usually is a function of many different influences, not just one.
- Q:** What do personality tests measure?
- A:** A person's typical "style."
- Q:** Why use personality tests to make employment decisions?
- A:** Because most workers and managers use terms like "being a team player," "remaining calm under pressure," "being persistent," and "taking initiative" as critical for success in almost any job.
- Q:** Do personality tests predict job performance?
- A:** Yes.
- Q:** Do personality tests predict performance in all jobs?
- A:** Probably, but they are less predictive for jobs with little autonomy.
- Q:** Weren't personality tests developed to measure psychopathology and for use in clinical settings?
- A:** Many years ago, that was true. The tests available today are designed to assess normal personality.
- Q:** People's behavior changes constantly. Doesn't this invalidate personality tests?
- A:** By definition, personality is relatively stable over time and from one set of circumstances to another and continues to affect our lives in important ways. Even though behavior changes occasionally, stable aspects of personality are still effective predictors.
- Q:** Do personality measures discriminate against ethnic minorities, women, older individuals, and the disabled?
- A:** There is no evidence of discrimination against these groups in well-developed personality tests. People over 40 tend to receive more positive scores than those under 40. There are some differences between males and females (men have higher scores on emotional stability and women have higher scores on conscientiousness) but these are not significant enough to result in different hiring decisions.
- Q:** Do personality tests invade privacy?
- A:** Some appear to. Choose tests with the highest validity and reliability, and the fewest number of offensive-appearing questions.
- Q:** What is the best way to use personality measures for pre-employment screening?
- A:** In combination with measures of technical skills, experience, and the ability to learn.
- Q:** Is it easy to fake on personality measures?
- A:** Some tests (e.g., integrity tests) are easier to fake than others, but it appears that the faking rate among applicants is low and faking does not appear to affect the validity of these measures substantially.

SOURCE: Based on Hogan, Hogan & Roberts (1996).

person whom we avoid like the plague. Furthermore, both types of people might be high or low on conscientiousness, openness to experience, or even agreeableness!

### **Practical Issues Associated with Personality Measures**

Up to this point, we have been dealing with the "science" of personality. But there are also practical questions that arise about the measurement of personality for making employment decisions. Hogan, Hogan, and Roberts (1996) addressed those larger practical questions as summarized in Box 3.2.

**Faking** The final question in Box 3.2 brings up a controversial point about personality tests. Some tests, particularly some commercially available integrity tests, are very transparent. It is obvious how one should answer the test questions in order to appear to have high integrity. A candidate might bear the following "script" in mind when answering the test questions:

I have never stolen anything since I was a young child, and even then, I don't think I ever stole anything. I do not have any friends who steal, or would even *think* of stealing anything. If they did, they could not be my friends anymore and I would tell the appropriate

authorities that they had stolen something. I think that showing up for work late, not doing a complete job, leaving work early, and taking sick days when you are not sick is also stealing and I would not do any of those things or be friends with anyone who would. I would inform management if I ever found out that a co-worker was engaging in any of these behaviors.

This “script” is only partly facetious. It is amusing in its extremity, but it makes the point that it is possible to answer questions on a personality-like device in a way that gets the best result—that is, an offer of employment. But what about tests that are not so transparent? From a practical standpoint, there are actually three questions to answer: (1) How easy is it to fake personality tests? (2) How many people do it? and (3) How much does it matter whether people do or do not fake? Let’s take these one at a time.

How easy is it to fake personality tests? Not difficult. As Hogan et al. (1996) pointed out, some are easier to fake than others. But you can answer any personality test in a way that makes you look “good.” The real question is whether that is “faking.” From some perspectives, personality is all about **self-presentation**; it is your public face, your “game face.” So to the extent that the personality test is a paper-and-pencil form of self-presentation, it is not faking, nor is it distortion (Hogan et al., 1996; Mount & Barrick, 1995). People often view themselves in more positive terms than an outside observer might. When you consider faking from this vantage point, there is not much of a distinction between self-esteem or **self-efficacy** and “faking.” Another way to think of how you might answer a personality inventory is that you are really answering as an “ideal candidate” for the position might answer the question (Schmit & Ryan, 1992; Schmit & Ryan, 1993). People responding simply to make themselves look good—**social desirability**—will not end up looking like the ideal candidate and thus may actually be doing themselves as much harm as good. As we will see in Chapter 14, it is increasingly obvious that for an individual to succeed within an organization, there should be a good match or “fit” between the culture of the organization and the personality of the individual. Distorting responses in order to “look good” will not make that match any better.

How many people fake personality measures? It is not clear what the prevalence of distortion is (Mount & Barrick, 1995) because the prevalence depends, as we’ve seen in the preceding paragraph, on how you define faking. The main line of evidence to suggest that faking may be occurring is that applicant groups often have significantly more positive scores on given personality measures than employed groups (Bass, 1957; Kirchner, Dunnette, & Mousely, 1960). In addition, sophisticated statistical analyses of responses to personality questionnaires (Michaelis & Eysenck, 1971; Schmit & Ryan, 1993) show that there are different patterns of responses from applicants than from employees or students. Not surprisingly, some studies say the rate of faking is substantial while others say it is minimal.

Which brings us to the third question: How much does it matter? The answer is that it does not appear to matter much. In studies where participants were instructed to distort their responses to make themselves look more favorable, the predictive validity of the personality measures remained the same (Hough et al., 1990). And if we return to the self-presentation view of personality, “distortion” could either increase or decrease the validity of the personality measures. If the job in question were a sales position, a desire to look “good” in the eyes of another might actually be a job-related attribute (Hogan et al., 1996). On the other hand, if an individual is having a performance counseling discussion with a supervisor, a more realistic presentation of strengths and weaknesses by the individual would be more effective than trying to look good. The issue of faking is not “settled” yet, but there does seem to be some agreement that it is not a fatal flaw in personality testing (Hough, 1998; Hough & Ones, 2001; Ones & Viswesvaran, 1998; Salgado, Viswesvaran, & Ones, 2001; Viswesvaran & Ones, 1999).

#### SELF-PRESENTATION

*A person's public face or "game face."*

#### SELF-EFFICACY

*Feeling of capability; belief that one can overcome obstacles and accomplish difficult tasks.*

#### SOCIAL DESIRABILITY

*Desire to be appealing to others.*

There is one additional cautionary note of some practical significance for test-takers inclined to intentionally distort their responses. Most personality tests have a “lie” scale which indicates if a person is trying to make themselves look “ideal” in some way. The test report for an individual will usually include a cautionary note indicating a lack of confidence in the resulting scores if the applicant scored too high on the lie scale.

## VOCATIONAL INTERESTS

Measures of **vocational interest** have been around for almost 80 years, but they have received only passing attention from I-O psychologists. Two reasons explain this lack of attention. The first is the belief that vocational interests do not predict job performance. The second is that they were often thought to be in the domain of vocational counseling and only useful for advising students about vocations and occupations. As we will see below, there are reasons to reconsider these measures of individual differences.

In their simplest form, vocational interests are expressions of *liking* about environments (including social environments) and activities. When someone expresses a liking for “mechanical things” or “science” or “being around people,” they are expressing an interest. An interest is less a behavior than a vision of oneself in a desired environment. You may like working with mechanical things but have a job as an accountant, or like working with people and have a job as a snow cat operator. If your interest (i.e., working with mechanical things or working with people) is strong and you find yourself in an environment that is not aligned with that interest, we would expect there to be some consequences. One of those consequences should be dissatisfaction with your occupation and probably with your job. We can see the prevalence of this dissatisfaction in the workforce when we consider how many people retire at the first opportunity in order to devote themselves to a second career that they “always wanted to do.” A second, related consequence ought to be tenure in the occupation or job. People whose job and occupation are compatible with their interests should, all other things being equal, stay in that occupation (and possibly that job) for long periods of time. Finally, there ought to be some consequences for performance. If you are in a job or occupation that does not match a strong interest, it is more likely that your performance will be poorer than if you were in a job that matched your interests. This assumes, of course, that interests also reflect abilities to some extent.

It is important to remember that there are a myriad of other factors that can affect your job tenure, satisfaction, and performance. But that does not deny the possibility that interests add information that is not covered by ability or personality (Hogan & Blake, 1996; Lubinski, 2000). It is also intriguing that vocational interests appear in early adolescence (as early as age 13) and remain relatively stable over long periods of time (Lubinski, 2000). The reluctance of I-O psychologists to consider vocational interests in their decomposition of work behavior is unfortunate. To be sure, the associations with performance are not as high as one finds when considering mental ability or personality, but they are there and they are reliable (Barge & Hough, 1988). Since one of the primary activities for I-O psychologists, whether employed within organizations or as consultants, is maintaining or enhancing profitability, it is not hard to understand why they would be more interested in predictors (such as “g” or conscientiousness) that are more strongly associated with performance. Similarly, it is not surprising that they would be less interested in predictors of satisfaction or occupational tenure than of performance. But that is a narrow view of work

### VOCATIONAL INTEREST

*Preference or liking for a particular activity or setting (as in a job or occupational setting).*



Parents are often an important influence on their children's choice of occupation.

TABLE 3.5

Holland's Adjectival Descriptions of Six Personality Types

Realistic	Asocial, conforming, frank, genuine, hard-headed, materialistic, natural, normal, persistent, practical, self-effacing, inflexible, thrifty, uninsightful, uninvolved
Investigative	Analytical, cautious, critical, complex, curious, independent, intellectual, introspective, pessimistic, precise, rational, reserved, retiring, unassuming, unpopular
Artistic	Complicated, disorderly, emotional, expressive, idealistic, imaginative, impractical, impulsive, independent, introspective, intuitive, nonconforming, original, sensitive, open
Social	Ascendant, cooperative, patient, friendly, generous, helpful, idealistic, empathic, kind, persuasive, responsible, sociable, tactful, understanding, warm
Enterprising	Acquisitive, adventurous, agreeable, ambitious, domineering, energetic, exhibitionistic, excitement-seeking, extroverted, flirtatious, optimistic, self-confident, sociable, talkative
Conventional	Careful, conforming, conscientious, defensive, efficient, inflexible, inhibited, methodical, obedient, orderly, persistent, practical, prudish, thrifty, unimaginative

SOURCE: Hogan &amp; Blake (1996).

**RIASEC**

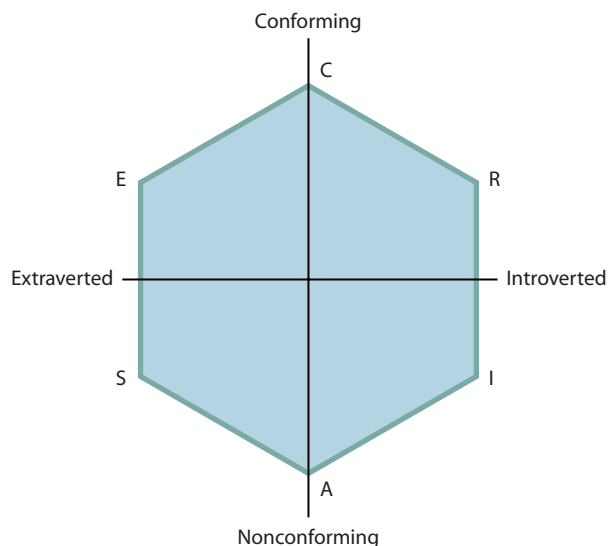
Acronym for Holland's model of vocational interests which proposes six interest types of people: realistic, investigative, artistic, social, enterprising, and conventional.

and workers. As we will see in Part III of this book, the investigation of satisfaction and organizational, occupational, and job tenure is beneficial not only to workers but also to employers.

As was the case with intelligence and personality, the area of vocational interests is dominated by one model. Developed and presented by Holland (1973; 1985), it is known by the acronym, **RIASEC** (see Table 3.5). The model proposes six interest types of people: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional; the label RIASEC comes from the first initial of each interest type. An additional feature of the model is that the types are arranged hexagonally, with each type occupying a particular position (see Figure 3.4). As can be seen from that figure, some types are adjacent to each other and

FIGURE 3.4

**Personality Dimensions Underlying the Hexagonal Representation of Holland's Vocational Typology** SOURCE: Hogan & Blake (1996).





some types are directly opposite from each other. Thus, enterprising is opposite from investigative. Practically speaking, this means if you express interests that would be enterprising, it would be unlikely that you would express interests that are investigative. And when you look at the definitions in Table 3.5, that makes sense. Investigating interests include reserved, cautious, and retiring behavior. Enterprising interests, on the other hand, represent excitement-seeking, talkative, and adventurous behaviors. Types that are close to each other in the hexagon are more compatible. Thus, it would not be surprising to see someone who expresses social interests to express enterprising interests as well. The social type includes friendly and sociable interests while enterprising types include agreeable, extroverted, and social interests.

Like intelligence and the FFM theory of personality, it is likely that interests can be more specific than the RIASEC factors, but as a basic model this is a good one to use in developing more discrete measures of interests.

### MODULE 3.3 SUMMARY

- There are clear connections between aspects of personality and various work behaviors, both productive (e.g., job performance) and counterproductive (e.g., dishonesty, absenteeism). I-O psychologists studying personality use a taxonomy labeled the Big 5 or the Five Factor Model (FFM).
- Of these five factors, the one that has attracted the most attention from I-O psychologists is conscientiousness. Barrick and Mount concluded, on the basis of a meta-analysis, that conscientiousness was positively related to success in all aspects of work for all occupations.
- Hough proposed nine basic personality factors rather than five; she suggested that the FFM factor of conscientiousness should be broken down into two discrete factors called achievement and dependability.
- Tett (1995) suggested that the “dependable” (or “rule-bound”) aspect of conscientiousness might actually be counterproductive in professions where the employee is expected to “think outside the box.” The same can be true of “g” when success in the job depends on action rather than thought. Problems can arise when an individual has plenty of “g” but lacks other attributes.
- Barrick and Mount found through FFM research that in jobs where the employee had a great deal of control or autonomy, personality was much more predictive of performance than in jobs where the employee had little or no control.
- Tellegen (1993; Tellegen & Waller, 2000) has proposed an intriguing seven-factor model of personality which includes the five dimensions of the FFM plus two other dimensions: positive and negative valence.
- Hogan, Hogan, and Roberts addressed practical questions about using the measurement of personality for making employment decisions.
- Job applicants taking personality tests are likely to give the answers they believe are most likely to result in an offer of employment, which may be interpreted as “faking.”
- The area of vocational interests is dominated by Holland’s model, known by the acronym RIASEC. The model proposes six interest types of people: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional.

### KEY TERMS

Big 5	integrity	self-presentation
Five Factor Model (FFM)	achievement	self-efficacy
conscientiousness	dependability	social desirability
functional personality at work	positive valence	vocational interest
agreeableness	negative valence	RIASEC
emotionally stability		

## CRITICAL THINKING EXERCISES

**3.4** Refer to Point #9 on p. 102. You will see the following general findings:

1. Extraversion is related to sales success.
2. Openness to experience is related to success of Americans who go to work in a different country.
3. Openness to experience is related to training success.
4. Agreeableness is related to success in customer service positions.
5. Emotional stability is associated with success in safety and security jobs.

For each of these general findings, explain *why* the particular Big Five Factor is associated with success in that job.

**3.5** Consider each of the factors of the Five Factor Model. Identify a job in which *too much* of the factor

would lead to failure in an important part of that job. Explain *why* too much of the factor is a problem.

- Conscientiousness
- Agreeableness
- Extraversion
- Emotional stability
- Openness to experience

**3.6** Imagine that you have just picked up from the airport a friend who will accompany you on a ski trip. Your friend tells you that she talked to the person who sat next to her for three hours and came to the conclusion that this person had “zero personality.” Applying the Big 5 model to your friend’s “analysis,” which of the five dimensions do you think that your friend would have been able to assess in that three-hour plane ride?

## ADDITIONAL PROPOSED INDIVIDUAL DIFFERENCES

The collection of cognitive abilities, physical and motor abilities, personality, and interests covers the major categories of proposed individual differences. The patterns formed by their combinations describe much of the variation among individuals. Nevertheless, some scientists propose additional aspects of individual differences. Below we will briefly cover some of them.

### SKILLS

**Skills** are practiced acts. Shooting a basketball, using a computer keyboard, and persuading someone to buy something are all examples of skills. They come with hours, days, and weeks of practice. It is unlikely that skills can be developed without certain abilities (eye-hand coordination, or memory, or reasoning) and personality characteristics (persistence or agreeableness), and knowledge (understanding the controls that activate a piece of equipment). Although the skills depend on these ability, personality, and knowledge factors, the reason we call them skills is that they develop through practice. Technical and job-related skills are as varied as jobs and job tasks. There are other nontechnical skills that are more widespread than any technical skill. Examples include negotiating skills, communication skills, and conflict-resolution skills. These three are often lumped together by nonpsychologists and called **people skills**. Since they come into play most commonly in situations involving leader-follower and team member interactions, we will discuss these skills in the chapters that deal with teams and leadership.

### KNOWLEDGE

Knowledge can be defined as “a collection of discrete but related facts and information about a particular domain. It is acquired through formal education or training, or accumulated through specific experiences” (Peterson, Mumford, Borman, Jeanneret, & Fleishman, 1999, p. 71). Knowledge is closely connected to skill when we are considering job-related skills (as opposed to psychomotor skills like shooting a basketball). Knowledge supports skill development and it comes in many varieties. It can be very basic (knowledge of mathematical operations or of vocabulary), or it can be sophisticated (knowledge of the circuitry of a notebook computer). Table 3.6 presents some representative categories of knowledge as identified in the comprehensive occupational information network that has come to be known as

#### SKILLS

*Practiced acts, such as shooting a basketball, using a computer keyboard, or persuading someone to buy something.*

#### PEOPLE SKILLS

*A nontechnical term that includes negotiating skills, communication skills, and conflict resolution skills.*



Dealing cards is an example of a well-developed psychomotor skill.

TABLE 3.6

## Descriptions and Definitions of Knowledges

CONSTRUCT LABEL	OPERATIONAL DEFINITION	LEVEL SCALE
<b>Business and management</b>		
1. Administration and Management	Knowledge of principles and processes involved in business and organizational planning, coordination, and execution. This includes strategic planning, resource allocation, manpower modeling, leadership techniques, and production methods.	High—Managing a \$10 million company. Low—Signing a pay voucher.
2. Clerical	Knowledge of administrative and clerical procedures and systems, such as word processing systems, filing and records management systems, stenography and transcription, forms design principles, and other office procedures and terminology.	High—Organizing a storage system for company forms. Low—Filing letters alphabetically.
3. Economics and Accounting	Knowledge of economic and accounting principles and practices, the financial markets, banking, and the analysis and reporting of financial data.	High—Keeping a major corporation's financial records. Approving a multimillion dollar loan to a real estate developer. Low—Answering billing questions from credit card customers.
4. Sales and Marketing	Knowledge of principles and methods involved in showing, promoting, and selling products or services. This includes marketing strategies and tactics, product demonstration and sales techniques, and sales control systems.	High—Developing a marketing plan for a nationwide phone system. Low—Selling cakes at a bake sale.
5. Customer and Personal Service	Knowledge of principles and processes for providing customer and personal services, including needs assessment techniques, quality service standards, alternative delivery systems, and customer satisfaction evaluation techniques.	High—Responding to a citizen's request for assistance after a major natural disaster. Low—Processing customer dry-cleaning drop-off.
6. Personnel and Human Resources	Knowledge of policies and practices involved in personnel/human resources functions. This includes recruitment, selection, training, and promotion regulations and procedures; compensation and benefits packages; labor relations and negotiation strategies; and personnel information systems.	High—Designing a new personnel selection and promotion system for the Army. Low—Filling out a medical claim form.

(continued)

TABLE 3.6

(continued)

CONSTRUCT LABEL	OPERATIONAL DEFINITION	LEVEL SCALE
<b>Manufacturing and production</b>		
7. Production and Processing	Knowledge of inputs, outputs, raw materials, waste, quality control, costs, and techniques for maximizing the manufacture and distribution of goods.	High—Managing a food processing plant. Low—Putting a computer back into its packing materials.
8. Food Production	Knowledge of techniques and equipment for planting, growing, and harvesting of food for consumption, including crop rotation methods, animal husbandry, and food storage/handling, techniques.	High—Running a 100,000 acre farm. Low—Keeping an herb box in the kitchen.
<b>Engineering and technology</b>		
9. Computers and Electronics	Knowledge of electric, circuit boards, processors, chips, and computer hardware and software, including applications and programming.	High—Creating a program to scan computer disks for viruses. Low—Operating a VCR to watch a prerecorded training tape.
10. Engineering and Technology	Knowledge of equipment, tools, mechanical devices, and their uses to produce motion, light, power, technology, and other applications.	High—Designing an efficient and clean power plant. Low—Installing a door lock.
11. Design	Knowledge of design techniques, principles, tools and instruments involved in the production and use of precision technical plans, blueprints, drawings, and models.	High—Developing detailed design plans for a new high-rise office complex. Low—Drawing a straight line 4 3/16 inches long.
12. Building and Construction	Knowledge of materials, methods, and the appropriate tools to construct objects, structures, and buildings.	High—Building a high-rise office tower. Low—Sawing a board in half.
13. Mechanical	Knowledge of machines and tools, including their designs, uses, benefits, repair, and maintenance.	High—Overhauling an airplane jet engine. Low—Replacing the filters in a furnace.
<b>Mathematics and science</b>		
14. Mathematics	Knowledge of numbers, their operations, and interrelationships, including arithmetic, algebra, geometry, calculus, statistics, and their applications.	High—Deriving a complex mathematical equation. Low—Adding two numbers.
15. Physics	Knowledge and prediction of physical principles, laws, and applications, including air, water, material dynamics, light, atomic principles, heat, electric theory, earth formations, and meteorological and related natural phenomena.	High—Designing a cleaner burning gasoline engine. Low—Using a crowbar to pry open a box.

(continued)

TABLE 3.6

*(continued)*

CONSTRUCT LABEL	OPERATIONAL DEFINITION	LEVEL SCALE
16. Chemistry	Knowledge of the composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.	High—Developing a safe commercial cleaner. Low—Using a common household bug spray.
17. Biology	Knowledge of plant and animal living tissue, cells, organisms, and entities, including their functions, interdependencies, and interactions with each other and the environment.	High—Isolating and identifying a microscopic virus. Low—Feeding domestic animals.
18. Psychology	Knowledge of human behavior and performance, mental processes, psychological research methods, and the assessment and treatment of behavioral and affective disorders.	High—Treating a person with a severe mental illness. Low—Monitoring several children on a playground.
19. Sociology and Anthropology	Knowledge of group behavior and dynamics, societal trends and influences, cultures, their history, migrations, ethnicity, and origins.	High—Developing a new theory about the development of early civilizations. Low—Identifying two cultures in a story as being different.
20. Geography	Knowledge of various methods for describing the location and distribution of land, sea, and air masses, including their physical locations, relationships, and characteristics.	High—Developing a map of the world showing mountains, deserts, and rivers. Low—Knowing the capital of the United States.
<b>Health services</b>		
21. Medicine and Dentistry	Knowledge of the information and techniques needed to diagnose and treat injuries, diseases, and deformities. This includes symptoms, treatment alternatives, drug properties and interactions, and preventive health-care measures.	High—Performing open-heart surgery. Low—Using a small bandage.
22. Therapy and Counseling	Knowledge of information and techniques needed to rehabilitate physical and mental ailments and to provide career guidance, including alternative treatment, rehabilitation equipment and its proper use, and methods to evaluate treatment effects.	High—Counseling an abused child. Low—Putting ice on a sprained ankle.

*(continued)*

TABLE 3.6

*(continued)*

CONSTRUCT LABEL	OPERATIONAL DEFINITION	LEVEL SCALE
<b>Education and training</b>		
23. Education and Training	Knowledge of instructional methods and training techniques, including curriculum design principles, learning theory, group and individual teaching techniques, design of individual development plans, and test design principles.	High—Designing a training program for new employees. Low—Showing someone how to bowl.
<b>Arts and humanities</b>		
24. English Language	Knowledge of the structure and content of the English language, including the meaning and spelling of words, rules of composition, and grammar.	High—Teaching a college English class. Low—Writing a thank-you note.
25. Foreign Language	Knowledge of the structure and content of a foreign (non-English) language, including the meaning and spelling of words, rules of composition and grammar, and pronunciation.	High—Providing spoken translation of a political speech while listening to it at an international meeting. Low—Saying “please ” and “thank-you” in a foreign language.
26. Fine Arts	Knowledge of theory and techniques required to produce, compose, and perform works of music, dance, visual arts, drama, and sculpture.	High—Composing a symphony. Low—Attending a popular music concert.
27. History and Archaeology	Knowledge of historical events and their causes, indicators, and impact on particular civilizations and cultures.	High—Determining the age of bones for placing them in the fossil history. Low—Taking a class in U.S. history.
28. Philosophy and Theology	Knowledge of different philosophical systems and religions, including their basic principles, values, ethics, ways of thinking, customs, and practices, and their impact on human culture.	High—Comparing the teachings of major philosophers. Low—Watching a TV program on family values.
<b>Law and public safety</b>		
29. Public Safety and Security	Knowledge of weaponry, public safety, and security operations, rules, regulations, precautions, prevention, and the protection of people, data, and property.	High—Commanding a military operation. Low—Using a seatbelt.
30. Law, Government, and Jurisprudence	Knowledge of law, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.	High—Being a judge in a federal court. Low—Registering to vote in a national election.

*(continued)*

TABLE 3.6

(continued)

CONSTRUCT LABEL	OPERATIONAL DEFINITION	LEVEL SCALE
<b>Communications</b>		
31. Telecommunications	Knowledge of transmission, broadcasting, switching, control, and operation of telecommunication systems.	High—Developing a new, worldwide telecommunication network. Low—Dialing a phone.
32. Communications and Media	Knowledge of media production, communication, and dissemination techniques and methods, including alternative ways to inform and entertain via written, oral, and visual media.	High—Producing a combined TV, radio, and newspaper campaign to inform the public about world hunger. Low—Writing a thank-you note.
<b>Transportation</b>		
33. Transportation	Knowledge of principles and methods for moving people or goods by air, sea, or road, including their relative costs, advantages, and limitations.	High—Controlling air traffic at a major airport. Low—Taking a train to work.

SOURCE: Adapted from Peterson et al. (1999).

**O\*NET**

Collection of electronic databases, based on well-developed taxonomies, that has updated and replaced the Dictionary of Occupational Titles.

**TACIT KNOWLEDGE**

Action-oriented, goal-directed knowledge, acquired without direct help from others; colloquially called “street smarts.”

**PROCEDURAL KNOWLEDGE**

Familiarity with a procedure or process; knowing “how.”

**DECLARATIVE KNOWLEDGE**

Familiarity with facts or abstract concepts, often acquired through direct instruction; knowing “that.”

**O\*NET** (Peterson et al., 1999). This figure provides the name of the knowledge domain, the definition of the knowledge, and examples of what someone with a great deal or very little of the knowledge might be capable of doing. Perhaps the most immediate example of individual differences in knowledge is the distribution of test grades in your class. Although many variables may play a role in this grade distribution, one of those variables is certainly knowledge of the course material as presented in the text and lectures.

Another kind of knowledge that has been proposed is called **tacit knowledge**, studied by Sternberg and his colleagues (Sternberg & Wagner, 1986; Sternberg, Wagner, & Okagaki, 1993). They distinguish between “academic” and “tacit” knowledge, the latter described as “action oriented knowledge, acquired without direct help from others, that allows individuals to achieve goals they personally value” (Sternberg, Wagner, Williams, & Horvath, 1995). They describe tacit knowledge as “knowing how” rather than “knowing that.” A more formal way of distinguishing these two types of knowledge is **procedural knowledge** (knowing how) in contrast with **declarative knowledge** (knowing that).

The researchers give an example of how tacit knowledge about getting along with your boss might affect your behavior: If you need to deliver bad news, and it is Monday morning, and you know the boss’s golf game was rained out the day before, and the whole staff is nervous and walking on eggs, tacit knowledge would tell you that it would be best to deliver the bad news later. A common nonscientific term for tacit knowledge might be “street smarts.” One of the important distinctions researchers make between formal or academic knowledge on the one hand and tacit knowledge on the other is that tacit knowledge is always goal-directed and useful, while academic knowledge may not be. People develop tacit knowledge about environments and processes that are personally valuable to them. Research seems to indicate that tacit knowledge is something above and beyond intelligence (Sternberg et al., 1995). Learning little tricks to perform better might be considered the light side of the tacit knowledge coin, and learning how to manipulate people might be the dark side.



## EXPERIENCE

The concept of tacit knowledge leads directly to a consideration of **experience** as an aspect of individual difference. Although experience does not always lead to tacit knowledge, tacit knowledge depends on experience. Just as most people would agree that individuals often differ in knowledge, they would also agree that individuals often differ in experience. This experience can be with a task, a job, an organization, or an occupation. Experience is often confused with seniority, but doing the same thing 100 times (seniority) is not the same as doing 100 things one time (experience). Jacobs, Hofmann and Kriska (1990) suggested that experience on a given job is valuable up to a point, but then its value declines as the same work tasks and challenges begin to appear with greater frequency over time, making them less valuable “learning” experiences.

Two refined models of experience have been presented in the last few years. Quinones, Ford, and Teachout (1995) proposed that experience can be considered along two dimensions: **measurement modes** and **level of specificity**. Measurement modes refer to the unit of measurement we use to assess experience. They propose that there are three modes: “amount” or the number of times a person has actually performed the task; “time,” which would represent the length of time an individual has been performing a task or job; and “type,” which captures some qualitative aspects of the experience related to task difficulty or job complexity. The second dimension of experience in their model addresses the issue of how specific the experience was. There are three levels of specificity: task, job, and organizational. Using this model, we can now describe experience as falling into one of the nine cells formed by the combination of these two dimensions of mode and specificity (see Figure 3.5). These cells provide an understandable method for categorizing experience. With such a framework, it will be much easier to examine the relationship between experience and work performance.

### EXPERIENCE

*Direct participation in, or observation of, events and activities that serves as a basis for knowledge.*

### MEASUREMENT MODES

*Unit of measurement used to assess experience.*

### LEVEL OF SPECIFICITY

*Method used to gauge experience according to task, job, and organizational characteristics.*

		Amount	Time	Type
Specificity of Experience	Task	Use Microsoft “Word” daily	Example	Example
	Job	Example	Was a police officer on patrol for 6 years	Example
	Organizational	Example	Example	Prepared funding proposals for defense contractors

**FIGURE 3.5**  
**Modes of Experience**

Tesluk and Jacobs (1998) expanded on the Quinones et al. (1995) model and suggested ways of combining the alternative measures suggested by the latter (amount, time, and type) to get a more complete index of experience. They also suggested that experience has a direct impact on increased work knowledge and skills, motivation, values, and attitudes, as well as indirect effect on job performance. Much of the emphasis in the Tesluk and Jacobs work experience model is on shaping experiences to make them of maximal value. We will return to the issue of shaping work experience in Chapter 8.

## COMPETENCIES

### COMPETENCIES

*Sets of behaviors, usually learned by experience, that are instrumental in the accomplishment of various activities.*

In the past decade it has been common for I-O psychologists to talk about combinations of knowledge, skills, abilities, and personality characteristics (KSAOs) in terms of **competencies**. Many different definitions and sets of competencies have been suggested. Kurz and Bartram (2002) have defined competencies as “sets of behaviors that are instrumental in the delivery of desired results or outcomes.” Following from that definition, it is reasonable to assume that people can differ in the extent to which they possess competencies. But competencies are different from knowledge, or a skill, ability, or personality characteristic, in that a competency is really a collection of all of these specific individual difference characteristics. The essence of a competency is the *combination* of these characteristics and is not dominated by any one (Harris, 1998).

Competencies are unique in another way as well. Abilities can be defined and measured in the abstract, as can personality characteristics. But competencies only have meaning in the context of organizational goals. For example, you could distinguish between two individuals based on their measured conscientiousness, their reasoning ability, or their skill with a word processing program. But a competency of organizing and executing a business plan would require a combination of these three individual elements, in addition to various aspects of technical and procedural knowledge (Kurz & Bartram, 2002), and would have relevance only to that series of actions. Thus, competencies are really collections and patterns of the individual difference attributes we have already covered, rather than separate characteristics. We will return to competencies and how they are identified (competency modeling) in Chapter 5, as a new way of thinking about analyzing jobs—a process called **job analysis**).

### JOB ANALYSIS

*Method for determining the important tasks of a job and the human attributes necessary to successfully perform those tasks.*

## EMOTIONAL INTELLIGENCE

In the 1980s Howard Gardner (1983, 1993) proposed a novel theory of intelligence. Rather than a unitary approach to intelligence such as “g,” he posited seven different types of intelligence, including logical-mathematical, bodily-kinesthetic, linguistic, musical, spatial, interpersonal, and intrapersonal. He described the latter two intelligences as follows:

Interpersonal intelligence is the ability to understand other people: what motivates them, how they work, how to work cooperatively with them. Successful sales people, politicians, teachers, clinicians, and religious leaders are all likely to be individuals with high degrees of interpersonal intelligence. Intrapersonal intelligence, a seventh kind of intelligence, is a correlative ability turned inward. It is a capacity to form an accurate veridical model of oneself and to be able to use that model to operate effectively in life. (1983, p. 9)

Gardner’s notion of inter- and intrapersonal intelligence was popularized by Goleman (1995) using the label **emotional intelligence (EI)**. EI is a relatively new concept with little in the way of an empirical data base at this point, but two questions about it have emerged. The first and perhaps simpler question is whether this actually represents

### EMOTIONAL INTELLIGENCE (EI)

*A proposed kind of intelligence focused on our awareness of our own and others’ emotions.*

a kind of intelligence, a skill developed and honed with practice, or a personality characteristic (Barrett, 2001). In many respects, this becomes more a semantic battle than a theoretical one. Nevertheless, the studies which have been done on the **construct** have been disappointing, failing to identify EI as something different from attributes with which we are already familiar (Davies et al., 1998; Roberts, Zeidner, & Mathews, 2001). It is not uncommon for the imagination of nonscientists to run ahead of the scientific foundation for a concept. Emotional intelligence is an example of such a disconnect, at least at this point. The concept had intuitive appeal but still lacks an adequate scientific foundation. The lack of a substantial data base has not discouraged commercial test publishers from developing tests of EI. We will return to a discussion of EI measurement in Chapter 4.

#### CONSTRUCT

*A proposed variable capable of being examined through scientific methodology.*

## IDENTIFYING INDIVIDUAL DIFFERENCES: SINKING SHAFTS

As we saw in the earlier section describing the history of individual differences, Francis Galton was one of the early advocates of studying such differences. In 1890, Galton wrote that “One of the most important objects of measurement is . . . to obtain a general knowledge . . . of capacities . . . by sinking shafts at a few critical points” (Lubinski, 2000). By this, Galton meant that we can use psychometric tests to explore individual abilities and other attributes the way miners use drilling to explore minerals in the earth. That is an excellent way to think of what we are doing when we study individual differences: We are sinking shafts to obtain more general knowledge about behavior at work. The concept of sinking shafts also provides a good framework for looking at how I-O psychologists envision individual differences today as opposed to 25 years ago. Before, we concentrated on only one shaft—intelligence. Today we are sinking many more shafts, as well as deeper ones (e.g., specific aspects of cognitive ability; the constituents of conscientiousness). Before we were content to stop at a more superficial level (“g”). Today we are sinking stronger shafts because the reliability and validity of our measuring devices are better.

We need to keep in mind that not all individual differences will tell us something important. As in drilling for oil, water, or gold, we don’t always “strike it rich.” This is one of the reasons we do research: to see which shafts provide encouragement. To continue with the drilling metaphor, we can distinguish between the differential psychologist, the psychometrician, and the applied I-O psychologist. The differential psychologist examines the psychological landscape and identifies some attractive areas for drilling. The psychometrician actually sinks the shaft. The applied I-O psychologist uses what comes out of that shaft, but instead of oil, water, or gold, what comes out are valuable predictors of performance. In this chapter, we have examined the areas that appear fruitful for exploration. In the next chapter, we will examine the methods by which these areas can be explored: the actual assessment methods for examining these individual differences.

However, you must continually remind yourself (and we will help remind you) that behavior is complex and people are whole. No single area of individual difference (e.g., intelligence) is likely to completely (or even substantially) explain any important aspect of work behavior (Murphy, 1996). The concept of a competency follows from that principle. In a similar vein, you cannot separate an individual’s intelligence from his or her personality, knowledge, or experience (Hatrup & Jackson, 1996). When you look at the behavior of any individual, you need to remember that they are whole, intact entities. To acknowledge a person’s individuality, we need to go beyond considering just one or another possible predictor of his or her behavior (Schneider, 1996; Schneider, Smith, & Sipe, 2000).

## MODULE 3.4 SUMMARY

- Skills are practiced acts. Although skills depend on ability, personality, and knowledge factors, what makes us call them skills is that they develop through practice.
- Knowledge can be defined as “a collection of discrete but related facts and information about a particular domain. It is acquired through formal education or training, or accumulated through specific experiences.” Another proposed kind of knowledge is tacit knowledge, described as “knowing how” rather than “knowing that.” A more formal way of distinguishing these two types of knowledge is procedural knowledge (knowing how) compared with declarative knowledge (knowing that).
- Although experience does not always lead to tacit knowledge, tacit knowledge depends on experience. Experience is often confused with seniority, but doing the same thing 100 times (seniority) is not the same as doing 100 things one time (experience).
- Competencies are “sets of behaviors that are instrumental in the delivery of desired results or outcomes.” Competencies are different from knowledge, or a skill, ability, or personality characteristic, in that they are really a collection of all of these specific individual difference characteristics.
- Those who invoke the concept of emotional intelligence suggest that there is a unique kind of intelligence that is focused on our awareness of our own and others’ emotions.
- We can use psychometric tests to explore individual abilities and other attributes the way miners use drilling to explore minerals in the earth. Not all individual differences will tell us something important; behavior is complex and people are whole. No single area of individual difference (e.g., intelligence) is likely to completely (or even substantially) explain any important aspect of work behavior.

## KEY TERMS

skills

people skills

O\*NET

tacit knowledge

procedural knowledge

declarative knowledge

experience

measurement modes

level of specificity

competencies

job analysis

emotional intelligence (EI)

construct

## CRITICAL THINKING EXERCISES

**3.7** As the issue of security continues to assume more importance in our everyday lives, the role of the “security screener” (e.g., at airports, courthouses) becomes more central. Considering all of the categories of individual differences (e.g., abilities, personality, interests, and additional attributes) that you have encountered in this chapter, which categories, and which attributes within these categories, would you identify as critical for the success of security screeners?

**3.8** Employers (and often parents!) lament that their employees (or children) lack “common sense.” In this chapter we have covered many different human attributes, but common sense was not one of them. Nevertheless, to the nonpsychologist, common sense has some meaning. From what you have examined in this chapter, identify the attributes that you think define common sense.

**3.9** The point of this chapter is that each individual is really a combination of abilities, personality, interests, and other attributes. In the following matrix, you will see that the rows represent areas on which individuals may differ—what we have been calling attributes. The columns represent different people with whom you are familiar, including a column for yourself, one for a family member, and one for a close friend or co-worker. We want you to mark the columns, one at a time, placing an H (for high), M (for medium), or an L (for low) in each box to indicate the extent to which the person whose name appears at the top of the column possesses that attribute. When you have finished, look at the pattern of differences. These same differences appear with any collection of people—co-workers, classmates, relatives, and so on.

<b>INDIVIDUAL DIFFERENCE CHARACTERISTIC</b>	<b>SELF</b>	<b>FAMILY MEMBER</b>	<b>CLOSE FRIEND OR CO-WORKER</b>
Oral comprehension			
Written expression			
Memorization			
Mathematical reasoning			
Spatial organization			
Static strength			
Trunk strength			
Dynamic strength			
Stamina			
Conscientiousness			
Agreeableness			
Intellect			
Neuroticism			
Extraversion			
Realistic			
Artistic			
Investigative			
Social			
Enterprising			
Conventional			

H = high

M = medium

L = low