

Characteristics of Consciousness

What can a scientific approach have to say about conscious experience? It would be asking too much to expect science to explain in detail the moment-to-moment changes in the contents of consciousness in one individual at a particular time and place. And it seems ludicrous even to attempt to *predict* such changes in any detail. The variety of experience and the complexity of the causal factors—both internal and external—is just too complex for a detailed account. A more reasonable goal for a scientific approach is to try to explain the processes that produce certain abstract characteristics of conscious experience, and the conditions under which these characteristics may vary. By abstract characteristics of consciousness I mean descriptive characteristics of conscious experience in general—characteristics that apply over a broad range of individual instances of conscious experience.

It will be useful, then, to list some of the abstract characteristics of human consciousness with which the psychology of consciousness is concerned. Any such list will be influenced by the goals and theoretical viewpoint of the list maker. Lists and categorization schemes are made by humans for human purposes, and it is not a matter of which list or categorization is correct, but rather, which one is most useful for a particular purpose. Thus, I do not pretend that this is a complete list of all of the characteristics of consciousness.

The following list covers some of the characteristics of conscious experience in normal adult humans which are of particular interest from a cogni-

tive psychology viewpoint. The list involves relatively large categories that are not entirely independent of each other. The list is divided into two parts. First there are five higher-order characteristics of consciousness that apply across the whole range of specific contents: (1) subjectivity; (2) change; (3) continuity; (4) intentionality (“aboutness”); and (5) selectivity. Second, there are eight abstract features that are more closely related to particular types of conscious experience. At any one moment the contents of consciousness can be characterized by one or more of these features, though not necessarily by all of them at the same time: (1) sensory perception; (2) mental imagery; (3) inner speech; (4) conceptual thought; (5) remembering; (6) emotional feeling (7) volition; and (8) self-awareness. At the end of the chapter I will consider the question of conscious unity—how all of these characteristics seem to go together.

HIGHER-ORDER CHARACTERISTICS OF CONSCIOUSNESS

William James (1842–1910) has been called the greatest of the nineteenth-century introspectionist psychologists. In his monumental textbook, *The Principles of Psychology* (1890/1983), he described five higher-order characteristics of consciousness. These characteristics are higher order in that they apply across a wide range of specific conscious contents, which may vary from moment to moment. These characteristics apply mainly to consciousness as we know it through introspection. I will briefly describe and comment on each of them.

Subjectivity

Every thought is part of a personal consciousness. . . . The universal conscious fact is not “feelings and thoughts exist,” but “I think” and “I feel” (James 1890/1983, pp. 220–21).

Each thought belongs to a single individual, a single personality or personal self. (James used the word “thought” broadly, to refer to the whole variety of conscious experiences and acts.) Even when two people are in the same place at the same time, seeing and thinking about the same things, their thoughts are separate and personal. Thoughts are subjective, in that they belong only to one individual and are directly known only by that person.

In our usual daily activities we have thoughts about objects and events (“. . . red car approaching . . . horn honking . . . danger . . . jump back”) where the “I” is implicit; this is primary consciousness. But when we introspect on our conscious experiences, the “I” becomes explicit: “I see.” “I think.” “I feel.” This is reflective consciousness. In reflective consciousness we are most aware that our thoughts belong to us as a separate, unique personal self.

Change

Within each personal consciousness thought is always changing (James 1890/1983, p. 220).

There are two senses in which conscious experience is always changing. First, the contents of consciousness are continuously changing. Our perception jumps rapidly from one object to another and our daydream images change from moment to moment like scenes in a movie. Our inner speech drifts from one topic to another, like a rambling conversation. Even when we try to focus our attention on a particular topic, we are soon distracted by external stimuli or daydreams.

But to suggest that the contents of consciousness change in a passive way, merely in reaction to changing stimulation or to daydream images floating up from memory, is to overlook one of the fundamental properties of humans: people actively seek to change their conscious experience. We find unchanging situations to be boring and unpleasant, so we seek varied experience by exploring new environments and social situations, either in person or vicariously, through books and movies of fact and fiction.

The human mind/brain system is continuously active. Consciousness continues to change even when external stimulation is absent or held constant. Experiments on sensory deprivation have shown that when people are kept in a restricted environment for long periods of time, they often develop a “hunger” for varied sensory stimulation (see Chapter 8). And in the absence of sensory stimulation they provide their own mental stimulation by becoming absorbed in daydreams or reveries, which may be particularly vivid under such conditions. And when we are asleep at night, under conditions of nearly total sensory deprivation, our mind is continuously active in the form of vivid dreams or other types of sleep mentation.

It is normal for the waking mind to be continuously active. If we were to succeed in deliberately holding the contents of consciousness constant, then we would produce an altered state of consciousness; this is the goal of concentrative meditation.

The second sense in which consciousness is constantly changing, which was emphasized by James, is that “no state [of consciousness] once gone can recur and be identical with what it was before” (p. 224). James used the term “state of consciousness” (or “state of mind”) to refer to the full momentary contents of consciousness, including the central percept or thought as well as any emotional background and contents in peripheral awareness.¹ He assumed that each conscious state corresponds to a brain state, and that the brain in its subtle details is continuously being changed as a result of the individual’s experiences. Thus, when you perceive an object the second time, the brain that perceives it is different than before, so your conscious experience is different the second time, at least in subtle details. To be sure, you may see the same object again, or think about the same topic again, but it is only the object or topic that is the same. Your conscious experience is different, at least in a subtle way.

For example, when you see a movie for the second time, you experience it differently than you did the first time. There are two reasons why the experience is different the second time. First, the social and physical context of the event has probably changed in some details. But more important is the fact that *you* have changed since the first time, as a result of the original experience itself (for example, you remember certain things about the movie so

there are fewer surprises the next time you see it), and as a result of other experiences since then (such as changes in knowledge, attitudes, motives, and mood that give you a new perspective).

Continuity

James used the famous metaphor the *stream of consciousness* to portray the idea that while the specific contents of consciousness change from moment to moment, consciousness itself seems to be continuous:

Within each personal consciousness, thought is sensibly continuous. . . . Even where there is a time-gap [as in sleep] the consciousness after it feels as if it belonged together with the consciousness before it, as another part of the same self. . . .

Consciousness, then, does not appear to itself chopped up in bits. Such words as "chain" or "train" do not describe it fitly. . . . It is nothing jointed; it flows. A "river" or "stream" are the metaphors by which it is most naturally described. *In talking of it hereafter, let us call it the stream of thought, of consciousness, or of subjective life* (James 1890/1983, pp. 231, 233).

The continuity of subjective consciousness is maintained in the short run by short-term memory of events within the last few seconds or minutes, and in the long run by recall of personal events from long-term memory (episodic memory). Thus, each day when you awaken you continue as the same person, with the same personal memories that you had before you fell asleep (plus perhaps a few more, if you can recall your dreams).

The feeling of continuity of consciousness is critical for maintaining one's sense of personal identity. Serious *depersonalization* would result if, each time you awoke, you could recall nothing of the events of the previous day. Exactly this sort of depersonalization occurs in cases of severe *anterograde amnesia*, in which brain-damaged patients are unable to transfer new information—including memories of personal experiences—from working memory to long-term memory.

Temporal gaps in waking consciousness are rare. We are always attending to either external events or to daydreams, and short-term memory bridges the gaps between them. On rare occasions we may be shocked by what appears to be a break in the continuity of consciousness. A typical case occurs in incidents of so-called "highway hypnosis" (Williams 1963). You may have had this experience while driving on a very familiar road or perhaps on a long straight highway, under easy driving conditions without much traffic, most likely at night. Suddenly you become aware that you have no recollection of having driven the last mile or so. You don't recall anything about the road or traffic or things along the way. You may wonder whether you blacked out. What happened is that the simplicity of the driving task, at which you are highly practiced, enabled you to switch to "autopilot," allowing automatic, nonconscious processes to do the driving. Meanwhile your conscious awareness turned inward, to daydreams. Then later, when your awareness suddenly switched back to the driving task, you were unable to recall recent events related to driving because they were not stored in mem-

ory during the period on autopilot. The illusion of a gap in consciousness will be magnified if you are also unable to recall the daydreams that you had while driving on autopilot. Such gaps in conscious experience are more likely to occur if you are stoned on marijuana, which interferes with short-term memory and transfer of information from STM to LTM. (I do not recommend this as an experiment. It could be dangerous. Marijuana can cause you to become so internally focused that you may miss external stimuli that are critical for driving safely. More on this in Chapter 18.)

Intentionality (“Aboutness”)

Human thought appears to deal with objects independent of itself; that is, it is cognitive, or possesses the function of knowing (James 1890/1983, p. 262).

The fact that consciousness is about something—it has contents—is its most critical defining feature. Nowadays philosophers and psychologists say that consciousness has *intentionality* (Bechtel 1988; Churchland 1988). “Intentionality” is derived from one of the less common meanings of *intend*, to point to something. Various conscious attitudes have intentionality in the sense of pointing to something other than themselves: “I know WWW.” “I believe that XXX.” “I want YYY.” “I intend to do ZZZ.” Personally I find “intentionality” to be confusing, so I usually speak of the “aboutness” of consciousness: consciousness is about something, it has contents.

Psychologists may try to distinguish between consciousness in the abstract, and the particular contents of consciousness at a particular moment. But James pointed out that in personal conscious experience one does not necessarily distinguish between conscious content and the fact that one is conscious of it. Both primary and reflective consciousness have contents, but only in reflective consciousness do we distinguish between conscious contents (percepts, thoughts, images) and the fact that we are conscious of them.

Selectivity

[Consciousness] is always interested more in one part of its object than in another, and welcomes, rejects, or chooses, all the while it thinks. . . . We find it quite impossible to disperse our attention impartially over a number of impressions. . . . But we do far more than emphasize things, and unite some, and keep others apart. We actually *ignore* most of the things before us (James 1890/1983, p. 273).

Here James was referring to the fact of selective attention: at any moment we are consciously aware of only a limited part of all of the stimuli—external and internal—of which we might potentially be aware. A selection process is necessary because of the limited capacity of consciousness or working memory. The direction of attention is influenced by both voluntary and nonvoluntary factors. You may try to attend to the task at hand, such as listening to a lecture, selecting only those stimuli that are most relevant. But frequently you are distracted by irrelevant stimuli, such as nearby whispers, or by your daydreams. James emphasized the voluntary aspect of attention,

but in fact the selection process itself for the most part operates automatically, nonconsciously, to determine what gets into consciousness.

The fact that attention is selective and habitual, and that perception is heavily influenced by our interests and expectations, led James and other psychologists (for example, Ornstein 1977) to conclude that our conscious experience is *constructed*. In a sense, reality is constructed in consciousness, rather than being merely reflected in consciousness. An implication is that there are alternative ways to construct reality in consciousness. James gave this colorful example:

A man's empirical thought depends on the things he has experienced, but what these shall be is to a large extent determined by his habits of attention. . . . Let four men make a tour in Europe. One will bring home only picturesque impressions—costumes and colors, parks and views and works of architecture, pictures and statues. To another all this will be non-existent; and distances and prices, populations and drainage arrangements, door- and window-fastenings, and other useful statistics will take their place. A third will give a rich account of the theaters, restaurants, and public balls, and naught beside; whilst the fourth will perhaps have been so wrapped in his own subjective broodings as to tell little more than a few names of places through which he passed. Each has selected, out of the same mass of presented objects, those which suited his private interest and has made his experience thereby (James 1890/1983, pp. 275–76).

Psychotherapists know that people's problems often derive from the way they construct their personal reality, perhaps selecting and emphasizing the negative and ignoring the positive things in their lives.

The notion that consciousness is a personal construction has been carried to extremes by some writers (such as Carlos Casteneda 1971) who suggest that our ordinary everyday reality is quite arbitrary, and that equally valid alternate realities can be produced merely by a shift in our attitudes and attention. Yet, our ordinary reality, as constructed in consciousness, is *not* arbitrary. Consciousness is ultimately a biological phenomenon. Our functions of perception and selective attention evolved as they did because they enabled our species to survive on this particular planet. Thus, it continues to be meaningful to believe that our everyday reality—the world as we ordinarily perceive it—is more “real” than, say, the world of our nighttime dreams or the world of someone who is tripping on LSD. The world perceived in altered states of consciousness—in which processes of selective attention, perception, memory, and judgment are altered—is actually less real than the world of our ordinary waking consciousness.

ASPECTS OF CONSCIOUS EXPERIENCE

Endel Tulving pointed out that “one of the problems with the concept of consciousness has always been that it is too global, and hence in principle it cannot be expected to be particularly useful” (personal communication, 1990). He drew a parallel between the concept of consciousness and the concept of memory. Formerly, memory was thought of as an undifferentiated,

unitary storage system. In recent decades, however, cognitive psychologists have advanced the understanding of memory by distinguishing between different types of memory. For example, Tulving (1985a) proposed a distinction between episodic, semantic, and procedural memory, and he suggested that each type of memory is associated with a different type of consciousness (more on this in the section on remembering, to follow).

Here I will differentiate conscious experience into several aspects or types, in hopes of helping to advance our understanding of consciousness. Some critics have argued that psychology has made little progress in understanding consciousness. But in fact psychology has already made a good deal of progress in understanding different *aspects* of consciousness (Flanagan, 1985). The greatest difficulties have been encountered in trying to deal with consciousness as a unified concept. It is hard to let go of the idea of conscious unity, insofar as introspection suggests that consciousness is unified. In the final section of this chapter I will have something to say about the unity of consciousness. But first I will briefly sketch the different aspects of consciousness that have been studied by various specialized branches of psychology. Each of these aspects relates to some but not necessarily to all of the ever-changing contents of consciousness. Each aspect has been advocated by one writer or another as *the* fundamental feature of human consciousness.

Sensory Perception

Sensory perception includes both exteroception and interoception. *Exteroception* refers to the perception of external objects and events by means of our senses of vision, hearing, touch, taste, and smell. *Interoception* refers to the perception of body states and events, such as kinesthesia (sense of movement), proprioception (sense of body and limb position), and feelings of pain, internal pressure, tummy rumblings, and other discomforts.

Sensory perception may be regarded as the fundamental aspect of consciousness for several reasons. (1) Sensory perception ordinarily has priority in waking consciousness, because it is critical for guiding our interactions with the environment. Inner speech often occurs concurrently with sensory perception, but perception is dominant in the interaction between them, insofar as perceptual inputs can disrupt the flow of inner speech, more than vice versa. (2) Sensory perception is the foundation, the starting place, of mental development. In the course of human development, sensory perception develops first and leads to higher levels of thinking, including mental imagery (such as visuo-spatial problem solving) and verbal-conceptual thinking and reflective awareness. (3) Sensory perception is an aspect of consciousness that occurs in animals, though the nature of perception varies among species. In an evolutionary sense, sensory perception is the first stage toward the development of higher-level cognitive aspects of consciousness.

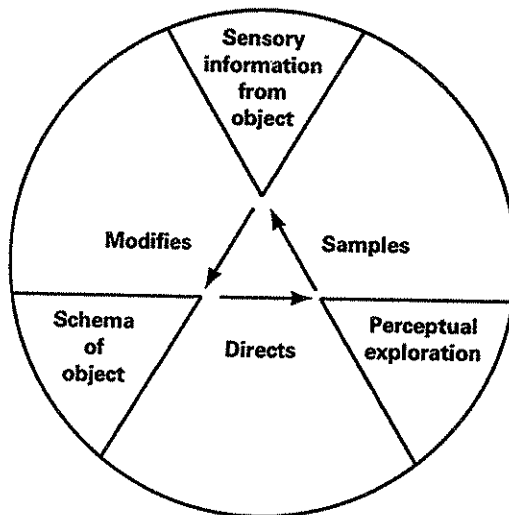
Conscious perception—at least exteroception—involves objects and events, not raw sensations. For example, you perceive this thing on your desk as a book, not as a set of raw visual inputs (white quadrilaterals, etc.). Though the specific nature of the sensory inputs varies depending upon your perspective, you always see the object as a book regardless of the angle from which you look at it.² Thus, perception is a process of interpreting sensory

inputs. The interpretive process occurs mainly at a nonconscious level, but it results in conscious perception of objects and events.

The *constructivist* theory of perception says that perception is an interpretation of sensory data, based on our prior knowledge, beliefs, and expectations (Best 1989; Neisser 1976). Perception is not a passive response to sensory inputs. Rather, according to Neisser (1976), it is an active process involving a three-way interaction between sensory inputs, *schemata* (knowledge structures in LTM), and behavior. Neisser called this three-way interaction the *perceptual cycle* (Figure 2.1). Sensory inputs are analyzed and interpreted according to appropriate schemata. The schemata also guide acts of exploration in which we search for more information, thus producing new sensory inputs to further influence our interpretations. The schemata may be modified by experience, thus changing future interpretations and exploratory acts. Thus, perception depends not only on sensory inputs, but also on prior knowledge, beliefs, and expectations. Usually this process produces accurate, efficient perception of the external world, though sometimes it can produce errors or illusions. For example, in an experiment by Bruner (1957) subjects had to identify rapidly flashed visual stimuli. When the experimenter flashed a red ace of spades, the subjects thought they saw an ace of hearts. Their prior knowledge led them to expect red hearts, not red spades.

We will see that the constructivist view of perception has wide applications to consciousness that extend beyond sensory perception (Ornstein 1977, 1986). For example, our explanations of our own behavior may be based more on prior assumptions than on accurate assessments of the influ-

FIGURE 2.1. The perceptual cycle. Sensory inputs from objects or events are interpreted through schemata, which are organized knowledge structures. Schemata also direct exploratory behavior, which leads to new sensory inputs, which can modify the schemata. Thus perception is influenced by both sensory inputs and prior knowledge and expectations. [Adapted from Neisser, U. *Cognition and reality*. Copyright ©1976 by W. H. Freeman and Company. Reprinted with permission of W. H. Freeman and Company.



ence of causal stimuli (see Chapter 7). And waking fantasies and night dreams are fictions constructed from knowledge in memory (see Chapter 12).

Mental Imagery

Answer these three questions: (1) "How many years are there in the president's term of office?" (2) "What is the meaning of *justice*?" (3) "How many windows are there on the front side of the house that you lived in when you were a senior in high school?"

Now introspect on the processes by which you answered each of these questions. The answer to the first one probably occurred to you instantaneously and effortlessly, whereas the second and third took more time and effort. Assuming that you did not have ready-made answers to the "justice" and "window" questions, answering them was like solving a problem. Both required thinking, but the nature of the thinking was different. Defining an abstract concept like "justice" is mostly a matter of thinking in words. But thinking about concrete objects is done mostly in visual mental images. In answering the third question, you first constructed a conscious image of the house, and then you "looked" at the house image and counted the windows. Subjectively, thinking in visual mental images "feels" different than thinking in words.

A *mental image* is a quasi-perceptual experience that exists in the absence of the stimuli that are known to produce its genuine perceptual counterpart (Richardson 1969, p. 2). Mental images are constructed from information stored in long-term memory. Although humans can generate mental images in all sensory modalities, visual mental images are the most important type, along with internal speech, which is a special class of auditory images. *Mental imagery* is thinking in mental images.

The most distinctive characteristic of visual mental imagery is that it involves a representation of the shapes of objects and of their relative positions in space. Hence Julian Jaynes's term, *spatialization*, to refer to this important aspect of conscious experience (1976). Jaynes sees spatialization as of-the-essence of conscious experience.

Visual mental images serve several functions: (1) Memory of the appearance of physical objects, as in the window example. (2) Solving problems involving physical objects and their arrangement and movements in space. For example, planning how to construct a bookcase of bricks and boards. (3) Considering various personal actions, and imagining their consequences. For example, imagining taking the left turn, rather than the right turn, at a fork in the road. (4) Reverie—fantasy for the sake of wish fulfillment or entertainment. (5) Mental practice of skilled movements—such as movements in dart throwing, diving, or karate—using visual and kinesthetic imagery, may lead to improved performance (Ryan & Simons 1982; White, Ashton, & Lewis 1979).

From one instance to another, images can differ on two fundamental dimensions: vividness and spontaneity. *Vividness* refers to the clarity or lifelikeness of the image. For most people, night dreams are vivid in both color and visual detail. Waking visual hallucinations, such as those produced by

psychedelic drugs, may also be quite vivid. Ordinary waking images, such as those used in memory or problem solving, are only slightly to moderately vivid for most people. When one is relaxed and engaging in waking reverie, the images can sometimes be strikingly vivid, though more commonly daydreams are only slightly to moderately vivid.

Spontaneity refers to the degree to which images occur and undergo changes in a seemingly automatic manner, without any conscious volition or control. Night dreams and psychedelic hallucinations are very spontaneous, waking reveries are moderately so. But when we use images for memory, planning, and problem solving, we generate and manipulate them voluntarily, and their changes occur with conscious control. Thus the opposite of spontaneity is *control*.

Psychologists have developed tests to measure individual differences in the ability to generate vivid mental images and the ability to control them—transforming their size, shape, and orientation at will (White, Sheehan, & Ashton 1977). Such measures are correlated to some extent with individual differences in the ability to use images for memory, mental practice, and problem solving. Interestingly, controlled images may be very helpful for solving visual-spatial problems even though the images are not particularly vivid (Richardson 1969).

Research by cognitive psychologists (e.g. Kosslyn 1980) has led to two general conclusions about imagery processes: (1) Thinking in mental images requires limited, general purpose processing resources (working memory). This conclusion is indicated by experiments that show that thinking in images can interfere with a variety of other types of thinking that require working memory. For example, you cannot very well visualize the construction of a house and do mental arithmetic at the same time. (2) Thinking in mental images uses certain modality-specific processing resources. This conclusion comes from experiments showing that interference between two concurrent tasks is greater when they are in the same modality than when they are in a different modality. For example, visual mental images interfere with detection of dim visual signals more than they interfere with detecting soft auditory signals; but auditory images interfere with auditory signal detection more than visual detection (Segal & Fusella 1971).

Inner Speech

Talking to yourself is normal—as long as you don't do it out loud. A large part of conscious thinking in adult humans involves thinking in words. A study focusing on college students found that 73 percent of thought samples contained some degree of interior monologue (inner speech), while 67 percent had some degree of visual-spatial mental imagery (Klinger & Cox 1987–88; more on this in Chapter 8 on daydreaming).

Communicating in language is the most distinctive aspect of human behavior. Language develops first to communicate about objects and about ourselves with other people. Later we learn to use language to talk to ourselves about ourselves. Language and consciousness are inextricably intertwined both in the mental evolution of the human species and in the mental growth of the individual human child (Kagan 1981; Luria 1978).

Inner speech—thinking in words—cuts across several other aspects of consciousness. Thinking in words is important for two distinctive characteristics of human consciousness: conceptual thought and reflective consciousness. Inner speech is involved in deciding upon and planning volitional acts. The processes that organize inner speech may occur nonconsciously, but inner speech itself is a conscious experience.

Perhaps most commonplace is the use of inner speech in *narratization*—our ongoing commentary on our personal experience (Jaynes 1976). Narratization includes interpreting our present experience and behavior in terms of its causes and expected effects, and fitting it into the story of our lives. Whenever you ask yourself “Why is this happening to me?” or “What am I going to do?”, you are narratizing. Narratization also may involve mental imagery and spatialization. For example, you may think of a series of personal events in terms of an arrangement of events in space, representing the flow from past to present to future in a left-to-right pattern. Narratization is an important feature of self-awareness.

Conceptual Thought

Conceptual thought is thought involving abstraction and inference. Rather than thinking only about specific individual objects or events, in conceptual thought we can group objects into categories according to their similarities of appearance or function (such as birds, fruits, tools). Thus, we can discover generalizations that apply to all objects in a category, and, if we know their category, we can infer that objects probably have certain features that we have not yet observed. (For example: Do bats give milk? Yes, since bats are mammals and all mammals give milk.) Some types of conceptual thought are formalized in inductive and deductive logic, and at a more abstract level in mathematics and symbolic logic.

The capacity for conceptual thought is highly developed in humans because of our capacity for language, in which a category of objects, events, or experiences can be represented by a single word. Thus, most conceptual thought is a matter of inner speech—thinking in words—which has the advantage that it can be readily communicated to other people. In contrast, most thinking of specific objects and events—concrete thought—is done in mental images. However, just as concepts can be represented by nonverbal visual symbols, some types of conceptual thought employ nonverbal mental images; this is particularly true in mathematical thinking.

Even when concepts are labeled by words, we may use visual-spatial thinking to understand the relationship between them. For example, hierarchical categories may be thought of in terms of a spatial arrangement, with the larger, more encompassing categories located above the smaller, more specialized categories. (For example, superordinate categories—animal and musical instrument—are above basic-level categories—birds and fish, drums and pianos—which in turn are above subordinate-level categories—hawks and ducks, kettle and bongo.) In hierarchical categories, one level—the *basic level*—is learned first by children and is used most commonly in conceptual thought (Rosch 1973). Basic-level concepts can be represented by mental im-

ages as well as by words, and they contain enough descriptive information to be useful for most purposes, without going into too much detail.

Conceptual thought frees us from being bound to the immediate stimulus situation. We can think of high-level abstractions, such as peace, justice, freedom, and principles of morality—good and evil, right and wrong. We can think of objects not present, and we can conceive of objects that do not exist. We can think of events that happened in the past, or that might happen in the future. And if we can imagine objects or events that are desirable and possible, then we can begin planning actions to make them a reality (Kinget 1975).

Remembering

Remembering is a conscious experience. We can distinguish between *memory* as a flexible system in which information is stored, and *remembering* or recollection as the conscious experience that accompanies retrieval of information from the memory system. Memory is one of the two sources of information input to consciousness, the other source being the sensory systems. Remembering involves conscious mental images or inner speech that represents the knowledge or personal events that have been retrieved from memory.

Tulving (1985a, 1985b) described three separate but interrelated long-term memory (LTM) systems, and argued that each is associated with a different type of conscious experience. *Procedural memory* is concerned with how things are done. It deals with the acquisition, retention, and utilization of perceptual, cognitive, and motor skills. *Semantic memory* has to do with symbolically represented knowledge about the world. It includes knowledge of the meanings of words and of miscellaneous impersonal facts. *Episodic memory* concerns the personal events of our lives—knowledge that relates to ourselves as the actor and experiencer. For example, if you recall that the *Challenger* spaceship exploded in January 1986 it would be a case of semantic memory—an impersonal fact. But if you recall when and how and where you learned about the explosion, it would be a case of episodic memory—related to yourself as the experiencer. Dramatic episodic memories often include recollection of our emotional reaction at the time of the original event.

Tulving (1985b) argued that the three long-term memory systems are associated with different types of consciousness: procedural memory with *anoetic* (nonknowing) consciousness, semantic memory with *noetic* (knowing) consciousness, and episodic memory with *autonoetic* (self-knowing) consciousness. Tulving described autonoetic and noetic consciousness as follows:

Autonoetic (self-knowing) consciousness is a necessary correlate of episodic memory. It allows an individual to become aware of his or her own identity and existence in subjective time that extends from the past through the present to the future . . . (1985a, p. 388). [It] confers the special phenomenal flavor to the remembering of [personally experienced] past events, the flavor that distinguishes remembering from other kinds of awareness, such as those characterizing perceiving, thinking, imagining, or dreaming (1985b, p. 3).

The object of *noetic consciousness* is the organism's knowledge of its world. (1985a, p. 388). . . . Noetic consciousness allows an organism to be aware of, and to cognitively operate on, objects and events, and relations among objects and events, in the absence of these objects and events. The organism can flexibly act upon such symbolic knowledge of the world. Entering information into, and retrieval of information from, semantic memory is accompanied by noetic consciousness (1985b, p. 3).

Thus, auto-noetic consciousness emphasizes the personal memory aspect of self awareness. Noetic consciousness emphasizes the memory aspect of concrete thought (dealing with specific objects and events) and conceptual thought (concerning categories of objects and events).

The concept of *anoetic consciousness* has not been developed as much as noetic and auto-noetic consciousness. Apparently, *anoetic consciousness* is a sort of minimal awareness of external stimuli necessary for executing conditioned reflexes, automatic habits, and overlearned skills, with no concurrent awareness of the past or future or thoughts about any other objects or events outside of the present situation. The cognitive and motor control programs of procedural memory are themselves unavailable to introspection, and the programs are often executed nonconsciously (Kihlstrom 1984, 1987).

Tulving (1985a, 1985b) hypothesized that the three memory systems are arranged in a hierarchical relationship, in which episodic memory is a subsystem of semantic memory and semantic memory is a subsystem of procedural memory. The hierarchical arrangement was inferred from observations on brain-damaged patients suffering amnesia, in which episodic memory for new experiences was most severely disrupted, semantic memory was less severely disrupted, and procedural memory was least disrupted. Similar dissociations of memory systems sometimes occur in normal people. For example, people may recall information that they have learned, without recalling when and where they learned it—this *source amnesia* is a type of episodic recall failure. (I will go into more detail on amnesia and its implications for consciousness in Chapter 6.)

Tulving's three types of memory and consciousness can be related to the levels-of-consciousness model described in Chapter 1, though they do not correspond exactly to the different levels. Procedural memory operations (habits, skills) are carried out largely or entirely at a nonconscious level. Knowledge from semantic and episodic memory are used in primary conscious thinking to decide how to react to a situation, rather than reacting in a habitual or reflexive manner. Episodic memory knowledge (auto-noetic consciousness) is a critical aspect of self-awareness, which is an aspect of reflective consciousness. Tulving's noetic consciousness also implies epistemic awareness—knowing what we know (Klatzky 1984)—which is an aspect of reflective awareness.

Tulving's ideas are important for showing the intimate relationship between remembering and consciousness. As he says, "there is no such thing as 'remembering without awareness'" (1985b, p. 5). Behavior can be influenced by stored information without conscious awareness, but "remembering" implies consciousness. Furthermore, Tulving's hierarchical model of memory interconnects the ideas of different memory systems with different

levels of consciousness, with stages of development of consciousness in children (episodic memory and auto-noetic consciousness develop after semantic memory and procedural memory), and with the localization of different memory systems in different parts of the brain.

Emotional Feeling

The subjective feeling of emotion is one of three major aspects of emotion, the other two being the pattern of physiological reactions and the overt expression, including facial expressions and other responses. Emotional feeling can vary on the dimensions of intensity and quality. Increasing subjective emotional intensity is correlated fairly well with stronger physiological reactions, such as increased heart rate, breathing rate, vasodilation (facial flushing), and release of adrenalin. The simplest qualitative classification of emotion is in terms of pleasant versus unpleasant. Pleasant or positive emotions increase our feeling of well-being and are associated with a tendency to approach objects or situations that produce them, whereas unpleasant or negative emotions have the opposite characteristics. However, human emotion is too complex to be described simply in terms of pleasant versus unpleasant affect. Most theorists propose six or more qualitative types of human emotions (Ortony & Turner 1990; Plutchik, 1980).

Different emotional reactions are produced by different types of stimuli or situations, and the different subjective feelings are accompanied by different facial expressions. Ekman, Friesen, and Tomkins (1971) analyzed photographs of the faces of people showing different emotions and devised a scoring scheme based on the muscles involved in the different expressions. Their analysis indicated that there are six clearly distinguishable primary human emotions, plus three less clearly distinguishable ones. The *six primary emotions* are happiness, sadness, anger, fear, surprise, and disgust. The three less well established ones are curiosity, guilt, and contempt. In studies using photographs of actors showing different emotions, Ekman and Friesen (1971) demonstrated that facial expressions of the six primary emotions can be recognized across widely different cultures. The processes underlying emotions are complex, and several competing theories have been proposed to explain the causes of different emotions and their subjective and expressive qualities (see Mook 1987, Chapter 12, for a brief review).

Caroll Izard (1980) suggested that emotion is "always present in ordinary consciousness, giving it a particular experiential quality and maintaining its purposeful flow." He assumed that there is a relatively limited set of primary human emotions. Though strong emotions may be relatively infrequent, weaker emotions are always present, in his view. He counted *interest* (or *curiosity*) as an emotion that occurs whenever it is not suppressed by stronger negative or positive emotions. Izard saw emotions as "motivational phenomena that give impetus and directedness to perceptual and cognitive processes and to motor acts" (p. 193).

Izard argued that emotional feeling, not sensory perception, is the first stage in the development of consciousness in infants. In neonates the dominant emotion is distress in response to uncomfortable internal stimuli. The crying response ultimately brings relief, since it calls the caretaker who at-

tends to the baby's needs (food, warmth); this is the first occasion for learning about cause-and-effect relationships. Soon the emotion of interest in response to external stimuli appears. Infants follow objects with their eyes, focusing more on moderately complex patterns than on very simple ones. Thus interest motivates attention and exploration that lead to complex perceptual skills, including the ability to perceive the similarities and differences between objects, and their interactions in time and space. Next, the emotion of joy and the social smiling response promote positive social interactions and the beginning of a self concept, in which self is differentiated from other people, and people are differentiated from other objects. The initial emotions of distress, interest, and joy are followed by others, including anger, fear, and shame/shyness, by the end of the first year. The emotions motivate interactions with other people and the environment, which promotes learning (including language, social skills, and sensory-motor skills) and vastly expands the variety of conscious experiences.

Volition

Volition may be defined as "the act of deciding upon and initiating a course of action. Synonym: will" (English & English 1958). Volitional acts can be either overt behaviors or further cognitive acts. Volitional cognitive acts can include such things as deciding what to attend to (for example, the textbook rather than the TV), deciding what to imagine, deciding what to rehearse for memorization, and deciding what facts or experiences to retrieve from memory.

Volitional acts are accompanied by a *feeling of volition*, a conscious feeling or belief that our actions are the result of a personal choice between viable alternatives, in which we are consciously aware of those alternatives. The choice may involve *what* to do, *when* to do it, or both. Once the choice is made, there is the feeling that it could have been otherwise.

Reflexive responses, such as withdrawing your hand from a hot flame, do not involve any decision making. Thus, reflexive responses are not volitional acts, and they are not accompanied by a feeling of volition. However, volition is involved when you inhibit a reflexive response; for example, if you were to hold your hand in a flame and resist the impulse to withdraw it. Likewise, many automatic or habitual behaviors occur without a conscious decision. Volition is needed to counteract a habit. For example, volition (or willpower) is required for a nicotine addict to resist the impulse to smoke a cigarette.

The role of consciousness in volition. Traditionally, it has been assumed that volition is equivalent to making a *conscious* decision, in which consciousness is the decision maker, the executive part of the mind/brain system. However, doubts have been raised about the traditional view. Logically it would seem that if consciousness makes a decision, then consciousness should know—and be able to report—why it made the decision. Yet research in recent years indicates that people often cannot introspectively report the causes or reasons for their behavior (Chapter 7). The implication is that consciousness *per se* is not the decision maker. Decisions may be made

largely, or entirely, by nonconscious computational processes. This is not to deny that consciousness plays an important role in decision making. However, the exact role of consciousness is still a matter of research and debate. If consciousness is more of a monitoring system than a decision-making system, then probably one role of consciousness has to do with perception, selection, and organization of some of the data relevant to decision making. Another role has to do with being aware of decisions in order to be able to communicate them, to evaluate the effectiveness of our actions in carrying them out, and to influence further decision-making processes.

Thus, in the monitoring-system view of consciousness, to make a conscious decision means, at a minimum, to be aware of the decision and able to report it. To act intentionally or volitionally means to be consciously aware of the decision to act before the action is initiated. The *feeling of volition* is an aspect of conscious experience. Volition—making decisions about actions—is not necessarily a direct function of consciousness *per se*. However, decision making is a function of the individual's personal mind/brain system. Therefore people are morally responsible for their volitional acts.

Consciousness and the motivational sequence. Much of human behavior is *purposive*, that is, it is done in the pursuit of conscious goals. Purposive behavior involves anticipation of the future, selection of goals, and the planning and execution of actions intended to bring about the desired goals. Purposive behavior is part of a *motivational sequence*.

An idealized fully-conscious motivational sequence could be described as follows: (1) you consciously feel a need or desire (such as for food, companionship, sex, prestige); (2) you consciously choose a specific goal (object, person, situation) to satisfy the need or desire; (3) you consciously plan a course of action to reach the goal; (4) you consciously assign priorities to different goals, which in turn affects the priorities of different actions; (5) you consciously initiate the action at the appropriate time; and (6) you consciously control the action while it is in progress, using feedback information to modify the action as needed until the goal is reached.

In fact, most motivational sequences are not fully conscious. Conscious choice among goals and actions occurs mainly in novel or complex situations. In relatively simple or familiar situations much of our behavior is more a matter of automatic habit than conscious choice.

Conscious choice is more important for the selection of actions than for the actual initiation and control of them. We may select automatic programs that in turn trigger the actions when certain internal or external conditions are met (Heckhausen & Beckman 1990; Norman & Shallice 1986). For example, at a swimming race the racers must be prepared to dive immediately when they hear the "Bang!" of the starter's gun; they don't have time to think "There's the gun, now go!" Perhaps you have had the experience of lying in bed in the morning after having shut off the alarm, and thinking "I must get up!" But you don't move, you just lie there like a dead raccoon for several minutes. Then suddenly you spring out of bed, but you have no awareness of initiating the movement. It seems to happen by itself. Apparently some sort of nonconscious timer prompts you to spring out of bed when you have loafed too long after the alarm. Such odd happenings are not

evidence against volition, but they show the complexity of the processes involved. Motivational sequences, from the emergence of needs and the selection of goals through the initiation and control of actions, typically involve a mixture of conscious and nonconscious processes.

Free will and determinism. The concept of volition has often been equated with the idea of *free will*, insofar as people feel that they are able to choose any one of several conceivable courses of action. Free will has traditionally been contrasted with determinism. *Determinism* is the notion that whatever happens in the world—including people's actions—is due to certain antecedent (prior) causes. Free will has been taken to mean that people's voluntary actions follow from free choices that are not determined by antecedent causes, as if the mind could function independently of the physical world of cause-and-effect. But this contrast of free will and determinism is a misconception. Donald Hebb made the point:

Free will is not a violation of scientific law; it doesn't mean indeterminism; it's not mystical. What it is, simply, is a control of behavior by the thought process (Hebb 1974, p. 75).

Free will is not opposed to determinism. In fact, free will or volition *requires* that we live in a world that operates to a large degree on deterministic—cause and effect—principles. This is not to say that volitional choices and behavior are produced in a rigid, mechanistic manner. Determinism is not absolute. Rather, determinism is probabilistic: a particular cause will produce a particular effect with some degree of probability. Understanding the relationships between causes and effects is complicated because of both their probabilistic nature and the multiplicity of causes that influence decision making and behavior. But if we could not count on a large degree of consistency in the way the world works—including natural and man-made objects, the behavior of other people, and the functioning of our own minds and bodies—then we would be incapable of carrying out our plans with voluntary actions.

The contrast between free will and determinism is a false dichotomy. The opposite of free will or volition is reflex behavior. The opposite of determinism is randomness. Volition involves decisions based on the integration of a variety of information from both the immediate situation and from our prior knowledge and experience, and influenced by our personal temperaments, desires, and interests. Our choices are necessarily limited by our knowledge, our powers of reason and imagination, and constraints of the current situation. We have freedom to make choices within those limits.

Self-Awareness

Self-awareness refers to having a *self-concept*—your sense of personal identity and your knowledge and beliefs about yourself—and to being aware that your actions and experiences *belong* to the person to whom the self-concept refers. Your self-concept influences—either implicitly or explicitly—your interpretation of your experiences and your choice of actions.

The self-concept appears at some point during development when you become aware that you are a unique person, separate from other persons, with your own unique personal history and your own desires, interests, values, knowledge, abilities and limitations. You come to think and speak of yourself as "I." Based on evidence from language and other behavior, Kagan (1981) concluded that self-awareness emerges in most children during the second half of the second year. For example, when a twenty-month-old child says "I can't do that," these words imply that the child has a self-concept, with knowledge of his or her own abilities and limitations. Your *body image*—knowledge of your personal appearance and of the shape and movement skills of your body—is another aspect of your self-concept. Though your self-concept is relatively fixed over the short run, it can change as a result of new experiences.

Your self-concept is based on selected information about yourself. The way you see yourself is not the same way that other people see you, since other people have different information about you than you do about yourself. You know your intentions, whereas other people know only your behavior. And as psychotherapists are well aware, people's self-images are sometimes based on delusory beliefs about themselves. For example, people suffering from major depression usually have undeservedly negative self-concepts.

Self-awareness depends critically upon episodic memory and the capacity for reflective consciousness. We oscillate between primary consciousness and reflective consciousness, between being the acting, experiencing subject and being the object whose actions and experiences are thought about. When you think "Why did I do that?" or "What do I want to do?", the "I" of reflective awareness is not just your physical body, but your self-concept. Reflective awareness relates and integrates your mind and body action here and now with your self-concept. A frightening feeling of *depersonalization* can occur under certain conditions (such as stress or drugs) when it seems that one's actions are not one's own. In amnesic patients the loss of episodic memory can alter or destroy the self-concept.

According to self theory, the self-concept is a major long-term guiding principle for our actions, since we tend to make our actions more-or-less consistent with our values and our beliefs about our abilities and the sort of person that we are. Albert Bandura (1986) has developed the concept of *perceived self-efficacy*—people's beliefs about their skills and abilities—and has shown that the actions that people attempt, and their success at those attempts, are related to their perceived self-efficacy. Furthermore, the self-concept or self-image is the basis for self-referential attitudes such as pride, guilt, conscience, and the sense of personal responsibility for our actions (Kinget 1975).

THE UNITY OF CONSCIOUSNESS

Despite the enormous variety of sensory percepts and thoughts and their ever-changing nature, we have an overall impression that our conscious experience is unified. At one moment, or in a rapid succession of moments,

you may be looking out the window, listening to a lecture, writing notes, feeling a headache, recalling yesterday's picnic, and imagining what you hope to do next weekend. Subjectively, it does not seem that each of these experiences represents a different consciousness. Rather, they all seem to go together in a single unified, indivisible consciousness—your own.

It has traditionally been assumed that the feeling of conscious unity is an immediately given aspect of conscious experience. The feeling of conscious unity has been interpreted by some people (dualists) as evidence for a unified, indivisible soul that is the basis of conscious experience. Others (some materialists) have interpreted it as evidence that a single brain structure or system is responsible for conscious experience. An alternative view is that conscious unity is an illusion. Different aspects of conscious experience—different sensory modalities and modes of thought and memory—may be functions of different brain subsystems, each with its own separate and limited capacity for awareness.

If conscious unity is an illusion, the feeling of conscious unity may result from an interpretation of the variety of conscious experiences—an interpretation influenced by certain beliefs and constraints on our experience. O'Keefe (1985) suggested three influences on the feeling of conscious unity.

(1) There is usually a short-term stability in the background or context of experience. We can distinguish between the foreground or central object of consciousness and the background or physical and mental context of the experience. (William James, 1890/1983, referred to the "halo" or "fringe" of consciousness.) For example, in the last few minutes I have had a variety of sensory perceptions and thoughts. All of them have occurred in the physical context of my office (including some glances out the window) and the mental context of writing this chapter (plus some daydreams about an upcoming canoe trip). Though the momentary focus of awareness is constantly changing, the relatively constant context contributes to a feeling of conscious unity.

(2) Temporal gaps between experiences are bridged by memory. I have already discussed the role of episodic memory in maintaining the continuity of consciousness over time. Each experience is part of the story of our life, a personal narrative that is being continuously updated. Where memory is incomplete we can bridge the gaps by constructing plausible accounts, aided by our knowledge of *scripts* (descriptions of typical sequences of events for various occasions, such as a typical day at work, going to a restaurant, and so forth).

(3) We have a sense of ownership of our subjective experiences: *my* percepts, *my* thoughts, *my* actions. One source of this sense of ownership is that the experiences all relate to the same body: objects seen with my eyes, thoughts in my brain, actions by my hands. More important is the ability to relate personal episodes to an ongoing self-concept.

The bottom line is that the feeling of conscious unity derives from a variety of sources. Our overall conscious experience seems to be the result of a constructive process in which a variety of data are interpreted and related to each other to produce a coherent, unified experience. But if this is the case, what part of the mind/brain system is responsible for the processes of interpretation and construction? We'll consider a possible answer to this

question in Chapter 5 on split-brain research and its implications for consciousness.

SUMMARY

It seems unlikely that a science of consciousness could ever explain, much less predict, the moment to moment changes in the contents of consciousness in one individual in any detail. A more reasonable goal is to try to describe certain abstract features of consciousness, and to try to explain the processes that produce them and the conditions under which they vary.

Following William James, I described five higher-order characteristics that apply regardless of the particular contents of consciousness. (1) *Subjectivity*: every thought is part of a personal and private consciousness. (2) *Change*: the contents of consciousness are continuously changing, and no momentary conscious state ever recurs in exactly the same way as before. (3) *Continuity*: James's famous metaphor, the *stream of consciousness*, portrays the idea that while the specific contents of consciousness change from moment to moment, consciousness itself seems to be continuous. Continuity is maintained in the short run by working memory and in the long run by long-term episodic memory. (4) *Intentionality* ("aboutness"): consciousness has contents; it is about something. (5) *Selectivity*: at any moment we are consciously aware of only a limited part of all of the stimuli—external and internal—of which we might potentially be aware. Selective attention is necessary because of the limited capacity of consciousness.

I also discussed eight specific aspects of conscious experience that relate to some, but not necessarily all, of the contents of consciousness. (1) *Sensory perception* of objects and events, both external (exteroception) and internal (interoception), is the most fundamental aspect of consciousness. (2) *Mental imagery*, or thinking in mental images, involves quasi-perceptual experiences that exist in the absence of the stimuli known to produce their genuine perceptual counterparts. The most distinctive aspect of visual mental images is *spatialization*, in which the shapes of objects and their positions and movements in space are represented. We can imagine alternative actions and their consequences. (3) *Inner speech*—thinking in words—constitutes a major part of adult conscious experience. Our ongoing commentary on our own experience is termed *narratization*. Inner speech is critically involved in two characteristically human traits, conceptual thought and reflective consciousness. (4) *Conceptual thought* involves thinking in terms of abstract categories (sets of objects or events based on certain shared features) and making inferences. (5) *Remembering* as a conscious experience can be distinguished from memory as a system for information storage. Tulving distinguished three interrelated long-term memory systems—procedural, semantic, and episodic—each of which is associated with a different type of conscious experience. (6) *Emotional feeling* is one of three aspects of emotion, along with a pattern of physiological reactions and overt expression (especially facial expression). Fundamental human emotions include: happiness, sadness, anger, fear, surprise, disgust, and possibly others. (7) *Volition* is the act of deciding upon and initiating a course of action. It is problematic whether con-

consciousness *per se* is the decision maker or action initiator, since nonconscious processes are also involved. The *feeling of volition*—the belief that our actions are the result of personal choice—is an aspect of conscious experience. (8) *Self-awareness* refers to having a self-concept and being aware that one's actions and conscious experiences belong to the person to whom the self-concept refers. Self-awareness depends critically upon episodic memory and our capacity for reflective consciousness.

Despite the wide variety of ever-changing conscious contents, they all seem to be part of a unified consciousness. It has traditionally been assumed that the feeling of conscious unity is a directly given aspect of conscious experience. Alternatively, the apparent unity of consciousness may be an illusion. It appears that our conscious experience is the result of a constructive process in which a variety of data are interpreted and related to each other to produce a coherent, unified experience.

ENDNOTES

¹Nowadays psychologists more commonly use “state of consciousness” in a different, broader sense having to do with an overall pattern of subjective experiences that is maintained over an extended period of time. When the pattern of experience is distinctly different than normal it is termed an “altered state of consciousness,” as in sleep (Chapter 9). You can interpret the different senses of “conscious state”—momentary or extended—from the context in which it is used.

²To be sure, you could consciously analyze this (book) perception into its elements, which might be described in terms of white rectangular surfaces (the pages), or trapezoids or irregular quadrilaterals, depending upon your angle of view. This process of backward conscious analysis of perceptions, from objects and events to simple shapes and surfaces, is a case of *reflective perceptual awareness*. Gibson made the distinction between primary and reflective awareness this way: “The modern adult can adopt a naive attitude or a perspective attitude. He can attend to visible things or to visual sensations” (Gibson 1982, p. 279; discussed in Natsoulas, 1985).