Psychology is the scientific study of mind and behavior. Most psychologists work in research laboratories, hospitals, and other field settings where they study the behavior of humans and animals. Some psychologists are researchers and others are practitioners, but all psychologists use scientific methods to inform their work.

Although it is easy to think that everyday situations have commonsense answers, scientific studies have found that people are not always as good at predicting outcomes as they often think they are. The hindsight bias leads us to think that we could have predicted events that we could not actually have predicted.

Employing the scientific method allows psychologists to objectively and systematically understand human behavior.

Psychologists study behavior at different levels of explanation, ranging from lower biological levels to higher social and cultural levels. The same behaviors can be studied and explained within psychology at different levels of explanation.

The first psychologists were philosophers, but the field became more objective as more sophisticated scientific approaches were developed and employed. Some of the most important historical schools of psychology include structuralism, functionalism, behaviorism, and psychodynamic psychology. Cognitive psychology, evolutionary psychology, and social-cultural psychology are some important contemporary approaches.

Some of the basic questions asked by psychologists, both historically and currently, include those about the relative roles of nature versus nurture in behavior, free will versus determinism, accuracy versus inaccuracy, and conscious versus unconscious processing.

Psychological phenomena are complex, and making predictions about them is difficult because they are multiply determined at different levels of explanation. Research has found that people are frequently unaware of the causes of their own behaviors.

There are a variety of available career choices within psychology that provide employment in many different areas of interest.

Psychologists study the behavior of both humans and animals in order to understand and improve the quality of human lives.

Psychological research may be either basic or applied in orientation. Basic research and applied research inform each other, and advances in science occur more rapidly when both types of research are conducted.

The results of psychological research are reported primarily in research reports in scientific journals. These research reports have been evaluated, critiqued, and improved by other scientists through the process of peer review.

The methods used by scientists have developed over many years and provide a common framework through which information can be collected, organized, and shared.

The scientific method is the set of assumptions, rules, and procedures that scientists use to conduct research. In addition to requiring that science be empirical, the scientific method demands that the procedures used be objective, or free from personal bias.

Scientific findings are organized by theories, which are used to summarize and make new predictions, but theories are usually framed too broadly to be tested in a single experiment. Therefore, scientists normally use the research hypothesis as a basis for their research.

Scientists use operational definitions to turn the ideas of interest—conceptual variables—into measured variables.

Decisions about whether psychological research using human and animals is ethical are made using established ethical codes developed by scientific organizations and on the basis of judgments made by the local Institutional Review Board. These decisions are made through a cost-benefit analysis, in which the costs are compared to the benefits. If the potential costs of the research appear to outweigh any potential benefits that might come from it, then the research should not proceed.

Descriptive research is designed to provide a snapshot of the current state of affairs. Descriptive research allows the development of questions for further study but does not assess relationships among variables. The results of descriptive research projects are analyzed using descriptive statistics.

Correlational research assesses the relationships between and among two or more variables. It allows making predictions but cannot be used to draw inferences about the causal relationships between and among the variables. Linear relationships between variables are normally analyzed using the Pearson correlation coefficient.

The goal of experimental research is to assess the causal impact of one or more experimental manipulations on a dependent variable. Because experimental research creates initial equivalence among the participants in the different experimental conditions, it allows drawing conclusions about the causal relationships among variables. Experimental designs are not always possible because many important variables cannot be experimentally manipulated.

Because all research has the potential for invalidity, research never “proves” a theory or hypothesis.

Threats to construct validity involve potential inaccuracies in the measurement of the conceptual variables.

Threats to statistical conclusion validity involve potential inaccuracies in the statistical testing of the relationships among variables.

Threats to internal validity involve potential inaccuracies in assumptions about the causal role of the independent variable on the dependent variable.

Threats to external validity involve potential inaccuracy regarding the generality of observed findings.

Informed consumers of research are aware of the strengths of research but are also aware of its potential limitations.

All human behavior, thoughts, and feelings are produced by the actions of our brains, nerves, muscles, and glands.

The body is controlled by the nervous system, consisting of the central nervous system (CNS) and the peripheral nervous system (PNS) and the endocrine system, which is made up of glands that create and control hormones.

Neurons are the cells in the nervous system. Neurons are composed of a soma that contains the nucleus of the cell; a dendrite that collects information from other cells and sends the information to the soma; and a long segmented fiber, known as the axon, which transmits information away from the cell body toward other neurons and to the muscles and glands.

The nervous system operates using an electrochemical process. An electrical charge moves through the neuron itself, and chemicals are used to transmit information between neurons. Within the neuron, the electrical charge occurs in the form of an action potential. The action potential operates in an all-or-

nothing manner.

Neurons are separated by junction areas known as synapses. Neurotransmitters travel across the synaptic space between the terminal button of one neuron and the dendrites of other neurons, where they bind to the dendrites in the neighboring neurons. More than 100 chemical substances produced in the body have been identified as neurotransmitters, and these substances have a wide and profound effect on emotion, cognition, and behavior.

Drugs that we may ingest may either mimic (agonists) or block (antagonists) the operations of neurotransmitters.

The brains of all animals are layered, and generally quite similar in overall form.

The brain stem is the oldest and innermost region of the brain. It controls the most basic functions of life, including breathing, attention, and motor responses. The brain stem includes the medulla, the pons, and the reticular formation.

Above the brain stem are other parts of the old brain involved in the processing of behavior and emotions, including the thalamus, the cerebellum, and the limbic system. The limbic system includes the amygdala, the hypothalamus, and the hippocampus.

The cerebral cortex contains about 20 billion nerve cells and 300 trillion synaptic connections, and it’s supported by billions more glial cells that surround and link to the neurons. The cerebral cortex is divided into two hemispheres, and each hemisphere is divided into four lobes, each separated by folds known as fissures.

The frontal lobe is primarily responsible for thinking, planning, memory, and judgment. The parietal lobe is responsible for processing information about touch. The occipital lobe processes visual information, and the temporal lobe is responsible for hearing and language. The cortex also includes the motor cortex, the somatosensory cortex, the visual cortex, the auditory cortex, and the association areas.

The brain can develop new neurons, a process known as neurogenesis, as well as new routes for neural communications (neuroplasticity).

Psychologists study the brain using cadaver and lesion approaches, as well as through neuroimaging techniques that include electroencephalography (EEG), functional magnetic resonance imaging (fMRI), and transcranial magnetic stimulation (TMS).

Sensory (afferent) neurons carry information from the sensory receptors, whereas motor (efferent) neurons transmit information to the muscles and glands. Interneurons, by far the most common of neurons, are located primarily within the CNS and responsible for communicating among the neurons.

The peripheral nervous system is itself divided into two subsystems, one controlling internal responses (the autonomic nervous system, ANS) and one controlling external responses (the somatic nervous system). The sympathetic division of the ANS is involved in preparing the body for behavior by activating the organs and the glands in the endocrine system. The parasympathetic division of the ANS tends to calm the body by slowing the heart and breathing and by allowing the body to recover from the activities that the sympathetic system causes.

Glands in the endocrine system include the pituitary gland, the pancreas, the adrenal glands, and the male and female sex glands. The male sex hormone testosterone and the female sex hormones estrogen and progesterone play important roles in behavior and contribute to gender differences.

Sensation and perception work seamlessly together to allow us to detect both the presence of, and changes in, the stimuli around us.

The study of sensation and perception is exceedingly important for our everyday lives because the knowledge generated by psychologists is used in so many ways to help so many people.

Each sense accomplishes the basic process of transduction—the conversion of stimuli detected by receptor cells into electrical impulses that are then transported to the brain—in different, but related, ways.

Psychophysics is the branch of psychology that studies the effects of physical stimuli on sensory perceptions. Psychophysicists study the absolute threshold of sensation as well as the difference threshold, or just noticeable difference (JND). Weber’s law maintains that the JND of a stimulus is a constant proportion of the original intensity of the stimulus.

Most of our cerebral cortex is devoted to seeing, and we have substantial visual skills. The eye is a specialized system that includes the cornea, pupil, iris, lens, and retina. Neurons, including rods and cones, react to light landing on the retina and send it to the visual cortex via the optic nerve.

Images are perceived, in part, through the action of feature detector neurons.

The shade of a color, known as hue, is conveyed by the wavelength of the light that enters the eye. The Young-Helmholtz trichromatic color theory and the opponent-process color theory are theories of how the brain perceives color.

Depth is perceived using both binocular and monocular depth cues. Monocular depth cues are based on gestalt principles. The beta effect and the phi phenomenon are important in detecting motion.

The ear detects both the amplitude (loudness) and frequency (pitch) of sound waves.

Important structures of the ear include the pinna, eardrum, ossicles, cochlea, and the oval window.

The frequency theory of hearing proposes that as the pitch of a sound wave increases, nerve impulses of a corresponding frequency are sent to the auditory nerve. The place theory of hearing proposes that different areas of the cochlea respond to different frequencies.

Sounds that are 85 decibels or more can cause damage to your hearing, particularly if you are exposed to them repeatedly. Sounds that exceed 130 decibels are dangerous, even if you are exposed to them infrequently.

The tongue detects six different taste sensations, known respectively as sweet, salty, sour, bitter, piquancy (spicy), and umami (savory).

We have approximately 1,000 types of odor receptor cells and it is estimated that we can detect 10,000 different odors.

Thousands of nerve endings in the skin respond to four basic sensations: Pressure, hot, cold, and pain, but only the sensation of pressure has its own specialized receptors. The ability to keep track of where the body is moving is provided by the vestibular system.

Perception involves the processes of sensory interaction, selective attention, sensory adaptation, and perceptual constancy.

Although our perception is very accurate, it is not perfect. Our expectations and emotions color our perceptions and may result in illusions.

Consciousness is our subjective awareness of ourselves and our environment.

Consciousness is functional because we use it to reason logically, to plan activities, and to monitor our progress toward the goals we set for ourselves.

Consciousness has been central to many theories of psychology. Freud's personality theories differentiated between the unconscious and the conscious aspects of behavior, and present-day psychologists distinguish between automatic (unconscious) and controlled (conscious) behaviors and between implicit (unconscious) and explicit (conscious) cognitive processes.

The French philosopher René Descartes (1596–1650) was a proponent of dualism, the idea that the mind, a nonmaterial entity, is separate from (although connected to) the physical body. In contrast to the dualists, psychologists believe the consciousness (and thus the mind) exists in the brain, not separate from it.

The behavior of organisms is influenced by biological rhythms, including the daily circadian rhythms that guide the waking and sleeping cycle in many animals.

Sleep researchers have found that sleeping people undergo a fairly consistent pattern of sleep stages, each lasting about 90 minutes. Each of the sleep stages has its own distinct pattern of brain activity. Rapid eye movement (REM) accounts for about 25% of our total sleep time, during which we dream. Non-rapid eye movement (non-REM) sleep is a deep sleep characterized by very slow brain waves, and is further subdivided into three stages: stages N1, N2, and N3.

Sleep has a vital restorative function, and a prolonged lack of sleep results in increased anxiety, diminished performance, and if severe and extended, even death. Sleep deprivation suppresses immune responses that fight off infection, and can lead to obesity, hypertension, and memory impairment.

Some people suffer from sleep disorders, including insomnia, sleep apnea, narcolepsy, sleepwalking, and REM sleep behavior disorder.

Freud believed that the primary function of dreams was wish fulfillment, and he differentiated between the manifest and latent content of dreams. Other theories of dreaming propose that we dream primarily to help with consolidation—the moving of information into long-term memory. The activation-synthesis theory of dreaming proposes that dreams are simply our brain's interpretation of the random firing of neurons in the brain stem.

Psychoactive drugs are chemicals that change our states of consciousness, and particularly our perceptions and moods. The use (especially in combination) of psychoactive drugs has the potential to create very negative side effects, including tolerance, dependence, withdrawal symptoms, and addiction.

Stimulants, including caffeine, nicotine, cocaine, and amphetamine, are psychoactive drugs that operate by blocking the reuptake of dopamine, norepinephrine, and serotonin in the synapses of the central nervous system (CNS). Some amphetamines, such as Ecstasy, have very low safety ratios and thus are highly dangerous.

Depressants, including alcohol, barbiturates, benzodiazepines, and toxic inhalants, reduce the activity of the CNS. They are widely used as prescription medicines to relieve pain, to lower heart rate and respiration, and as anticonvulsants. Toxic inhalants are some of the most dangerous recreational drugs, with a safety index below 10, and their continued use may lead to permanent brain damage.

Opioids, including opium, morphine, heroin, and codeine, are chemicals that increase activity in opioid receptor neurons in the brain and in the digestive

system, producing euphoria, analgesia, slower breathing, and constipation.

Hallucinogens, including cannabis, mescaline, and LSD, are psychoactive drugs that alter sensation and perception and which may create hallucinations.

Even when we know the potential costs of using drugs, we may engage in using them anyway because the rewards from using the drugs are occurring right now, whereas the potential costs are abstract and only in the future. And drugs are not the only things we enjoy or can abuse. It is normal to refer to the abuse of other behaviors, such as gambling, sex, overeating, and even overworking as "addictions" to describe the overuse of pleasant stimuli.

Hypnosis is a trance-like state of consciousness, usually induced by a procedure known as hypnotic induction, which consists of heightened suggestibility, deep relaxation, and intense focus. Hypnosis also is frequently used to attempt to change unwanted behaviors, such as to reduce smoking, eating, and alcohol abuse.

Sensory deprivation is the intentional reduction of stimuli affecting one or more of the five senses, with the possibility of resulting changes in consciousness. Although sensory deprivation is used for relaxation or meditation purposes and to produce enjoyable changes in consciousness, when deprivation is prolonged, it is unpleasant and can be used as a means of torture.

Meditation refers to techniques in which the individual focuses on something specific, such as an object, a word, or one's breathing, with the goal of ignoring external distractions. Meditation has a variety of positive health effects.

Development begins at conception when a sperm from the father fertilizes an egg from the mother creating a new life. The resulting zygote grows into an embryo and then a fetus.

Babies are born prepared with reflexes and cognitive skills that contribute to their survival and growth.

Piaget's stage model of cognitive development proposes that children learn through assimilation and accommodation and that cognitive development follows specific sequential stages: sensorimotor, preoperational, concrete operational, and formal operational.

An important part of development is the attainment of social skills, including the formation of the self-concept and attachment.

Adolescence involves rapid physical changes, including puberty, as well as continued cognitive changes. Moral development continues in adolescence. In Western cultures, adolescence blends into emerging adulthood, the period from age 18 until the mid-20s.

Muscle strength, reaction time, cardiac output, and sensory abilities begin to slowly decline in early and middle adulthood. Fertility, particularly for women, also decreases, and women eventually experience menopause.

Most older adults maintain an active lifestyle—remaining as happy or happier than they were when they were younger—and increasingly value their social connections with family and friends.

Although older adults have slower cognitive processing overall (fluid intelligence), their experience in the form of crystallized intelligence, or existing knowledge about the world and the ability to use it, is maintained and even strengthened during aging. A portion of the elderly suffer from age-related brain diseases, such as dementia and Alzheimer's disease.

Classical conditioning was first studied by physiologist Ivan Pavlov. In classical conditioning a person or animal learns to associate a neutral stimulus

(the conditioned stimulus, or CS) with a stimulus (the unconditioned stimulus, or US) that naturally produces a behavior (the unconditioned response, or UR). As a result of this association, the previously neutral stimulus comes to elicit the same or similar response (the conditioned response, or CR).

Classically conditioned responses show extinction if the CS is repeatedly presented without the US. The CR may reappear later in a process known as spontaneous recovery.

Organisms may show stimulus generalization, in which stimuli similar to the CS may produce similar behaviors, or stimulus discrimination, in which the organism learns to differentiate between the CS and other similar stimuli.

Second-order conditioning occurs when a second CS is conditioned to a previously established CS.

Psychologist Edward Thorndike developed the law of effect: the idea that responses that are reinforced are “stamped in” by experience and thus occur more frequently, whereas responses that are punishing are “stamped out” and subsequently occur less frequently.

B. F. Skinner (1904–1990) expanded on Thorndike’s ideas to develop a set of principles to explain operant conditioning.

Positive reinforcement strengthens a response by presenting a something pleasant after the response, and negative reinforcement strengthens a response by reducing or removing something unpleasant. Positive punishment weakens a response by presenting something unpleasant after the response, whereas negative punishment weakens a response by reducing or removing something pleasant.

Shaping is the process of guiding an organism’s behavior to the desired outcome through the use of reinforcers.

Reinforcement may be either partial or continuous. Partial-reinforcement schedules are determined by whether the reward is presented on the basis of the time that elapses between rewards (interval) or on the basis of the number of responses that the organism engages in (ratio), and by whether the reinforcement occurs on a regular (fixed) or unpredictable (variable) schedule.

Not all learning can be explained through the principles of classical and operant conditioning. Insight is the sudden understanding of the components of a problem that makes the solution apparent, and latent learning refers to learning that is not reinforced and not demonstrated until there is motivation to do so.

Learning by observing the behavior of others and the consequences of those behaviors is known as observational learning. Aggression, altruism, and many other behaviors are learned through observation.

Learning theories can and have been applied to change behaviors in many areas of everyday life. Some advertising uses classical conditioning to associate a pleasant response with a product.

Rewards are frequently and effectively used in education but must be carefully designed to be contingent on performance and to avoid undermining interest in the activity.

Social dilemmas, such as the prisoner’s dilemma, can be understood in terms of a desire to maximize one’s outcomes in a competitive relationship.

Memory and cognition are the two major interests of cognitive psychologists. The cognitive school was influenced in large part by the development of the electronic computer. Psychologists conceptualize memory in terms of types, stages, and processes.

Explicit memory is assessed using measures in which the individual being tested must consciously attempt to remember the information. Explicit memory includes semantic and episodic memory. Explicit memory tests include recall memory tests, recognition memory tests, and measures of relearning (also known as savings).

Implicit memory refers to the influence of experience on behavior, even if the individual is not aware of those influences. Implicit memory is made up of procedural memory, classical conditioning effects, and priming. Priming refers both to the activation of knowledge and to the influence of that activation on behavior. An important characteristic of implicit memories is that they are frequently formed and used automatically, without much effort or awareness on our part.

Sensory memory, including iconic and echoic memory, is a memory buffer that lasts only very briefly and then, unless it is attended to and passed on for more processing, is forgotten.

Information that we turn our attention to may move into short-term memory (STM). STM is limited in both the length and the amount of information it can hold. Working memory is a set of memory procedures or operations that operates on the information in STM. Working memory's central executive directs the strategies used to keep information in STM, such as maintenance rehearsal, visualization, and chunking.

Long-term memory (LTM) is memory storage that can hold information for days, months, and years. The information that we want to remember in LTM must be encoded and stored, and then retrieved. Some strategies for improving LTM include elaborative encoding, relating information to the self, making use of the forgetting curve and the spacing effect, overlearning, and being aware of context- and state-dependent retrieval effects.

Memories that are stored in LTM are not isolated but rather are linked together into categories and schemas. Schemas are important in part because they help us encode and retrieve information by providing an organizational structure for it.

The ability to maintain information in LTM involves a gradual strengthening of the connections among the neurons in the brain, known as long-term potentiation (LTP). The hippocampus is important in explicit memory, the cerebellum is important in implicit memory, and the amygdala is important in emotional memory. A number of neurotransmitters are important in consolidation and memory. Evidence for the role of different brain structures in different types of memories comes in part from case studies of patients who suffer from amnesia.

Cognitive biases are errors in memory or judgment that are caused by the inappropriate use of cognitive processes. These biases are caused by the overuse of schemas, the reliance on salient and cognitive accessible information, and the use of rule-of-thumb strategies known as heuristics. These biases include errors in source monitoring, the confirmation bias, functional fixedness, the misinformation effect, overconfidence, and counterfactual thinking. Understanding the potential cognitive errors we frequently make can help us make better decisions and engage in more appropriate behaviors.

The French psychologist Alfred Binet and his colleague Henri Simon developed the first intelligence test in the early 1900s. Charles Spearman called the construct that the different abilities and skills measured on intelligence tests have in common the general intelligence factor, or simply "g."

There is also evidence for specific intelligences (s), measures of specific skills in narrow domains. Robert Sternberg has proposed a triarchic (three-part) theory of intelligence, and Howard Gardner has proposed that there are eight different specific intelligences.

Good intelligence tests both are reliable and have construct validity.

Intelligence tests are the most accurate of all psychological tests. IQ tests are standardized, which allows calculation of mental age and the intelligence quotient (IQ),

The Wechsler Adult lntelligence Scale (WAIS) is the most widely used intelligence test for adults. Other intelligence tests include aptitude tests such as the Scholastic Assessment Test (SAT), American College Test (ACT), and Graduate Record Examination (GRE), and structured tests used for personnel selection.

Smarter people have somewhat larger brains, which operate more efficiently and faster than the brains of the less intelligent. Although intelligence is not located in a specific part of the brain, it is more prevalent in some brain areas than others.

Intelligence has both genetic and environmental causes, and between 40% and 80% of the variability in IQ is heritable. Social and economic deprivation, including poverty, can adversely affect IQ, and intelligence is improved by education.

Emotional intelligence refers to the ability to identify, assess, manage, and control one’s emotions. However, tests of emotional intelligence are often unreliable, and emotional intelligence may be a part of g, or a skill that can be applied in some specific work situations.

About 3% of Americans score above an IQ of 130 (the threshold for giftedness), and about the same percentage score below an IQ of 70 (the threshold for mental retardation). Males are about 20% more common in these extremes than are women.

Women and men show overall equal intelligence, but there are sex differences on some types of tasks. There are also differences in which members of different racial and ethnic groups cluster along the IQ line. The causes of these differences are not completely known. These differences have at times led to malicious, misguided, and discriminatory attempts to try to correct for them, such as eugenics.

Language involves both the ability to comprehend spoken and written words and to create communication in real time when we speak or write. Language can be conceptualized in terms of sounds (phonemes), meaning (morphemes and syntax), and the environmental factors that help us understand it (contextual information).

Language is best learned during the critical period between 3 and 7 years of age.

Broca’s area, an area of the brain in front of the left hemisphere near the motor cortex, is responsible for language production, and Wernicke’s area, an area of the brain next to the auditory cortex, is responsible for language comprehension.

Children learn language quickly and naturally, progressing through stages of babbling, first words, first sentences, and then a rapid increase in vocabulary. Children often make overextensions of concepts.

Some theories of language learning are based on principles of learning. Noam Chomsky argues that human brains contain a language acquisition device that includes a universal grammar that underlies all human language and that allows generativity. Chomsky differentiates between the deep structure and the surface structure of an idea.

Bilingualism is becoming more and more frequent in the modern world. Bilingual children may show more cognitive function and flexibility than do monolingual children.

Nonhuman animals have a wide variety of systems of communication. But efforts to teach animals to use human language have had only limited success. Although many animals communicate, none of them have a true language.

Affect guides behavior, helps us make decisions, and has a major impact on our mental and physical health. Affect is guided by arousal—our experiences of the bodily responses created by the sympathetic division of the autonomic nervous system.

Emotions are the mental and physiological feeling states that direct our attention and guide our behavior. The most fundamental emotions, known as the basic emotions, are those of anger, disgust, fear, happiness, sadness, and surprise. A variety of secondary emotions are determined by the process of cognitive appraisal. The distinction between the primary and the secondary emotions is paralleled by two brain pathways: a fast pathway and a slow pathway.

There are three primary theories of emotion, each supported by research evidence. The Cannon-Bard theory of emotion proposed that the experience of an emotion is accompanied by physiological arousal. The James-Lange theory of emotion proposes that our experience of an emotion is the result of the arousal that we experience. The two-factor theory of emotion asserts that the experience of emotion is determined by the intensity of the arousal we are experiencing, but that the cognitive appraisal of the situation determines what the emotion will be. When people incorrectly label the source of the arousal that they are experiencing, we say that they have misattributed their arousal.

We communicate and perceive emotion in part through nonverbal communication and through facial expressions. The facial feedback hypothesis proposes that we also experience emotion in part through our own facial expressions.

Stress refers to the physiological responses that occur when an organism fails to respond appropriately to emotional or physical threats. When it is extreme or prolonged, stress can create substantial health problems.

The general adaptation syndrome describes the three phases of physiological change that occur in response to long-term stress: alarm, resistance, and exhaustion. Stress creates a long-term negative effect on the body by activating the HPA axis, which produces the stress hormone cortisol. The HPA reactions to persistent stress lead to a weakening of the immune system. Chronic stress is also a major contributor to heart disease.

The stress that we experience in our everyday lives, including daily hassles, can be taxing. People who experience strong negative emotions as a result of these hassles exhibit more negative stress responses those who react in a less negative way.

On average, men are more likely than are women to respond to stress by activating the fight-or-flight response, whereas women are more likely to respond using the tend-and-befriend response.

Attempting to ignore or suppress our stressors is not effective, in part because it is difficult to do. It is healthier to let out the negative thoughts and feelings by expressing them, either to ourselves or to others. It is easier to respond to stress if we can interpret it in more positive ways—for instance, as a challenge rather than a threat.

The ability to successfully control our emotions is known as emotion regulation. Regulating emotions takes effort, but the ability to do so can have important positive health outcomes.

The best antidote for stress is to think positively, have fun, and enjoy the company of others. People who express optimism, self-efficacy, and hardiness cope better with stress and experience better health overall. Happiness is determined in part by genetic factors such that some people are naturally

happier than others, but it is also facilitated by social support—our positive social relationships with others.

People do not often know what will make them happy. After a minimum level of wealth is reached, more money does not generally buy more happiness. Although people think that positive and negative events will make a huge difference in their lives, and although these changes do make at least some difference in life satisfaction, they tend to be less influential than we think they are going to be.

A motivation is a driving force that initiates and directs behavior. Motivations are often considered in psychology in terms of drives and goals, with the goal of maintaining homeostasis.

Eating is a primary motivation determined by hormonal and social factors. Cultural norms about appropriate weights influence eating behaviors. The desire to be thin can lead to eating disorders including anorexia nervosa and bulimia nervosa.

Uncontrolled obesity leads to health problems including cardiovascular disease, diabetes, sleep apnea, arthritis, Alzheimer's disease, and some types of cancer. It is a leading preventable cause of death worldwide. The two approaches to controlling weight are eating less and exercising more.

Sex is a fundamental motivation that involves the coordination of a wide variety of behaviors, including courtship, sex, household arrangements, parenting, and child care. The sexual response cycle is similar in men and women. The sex hormone testosterone is particularly important for sex drive, in both men and women.

Sexual behavior varies widely, not only between men and women but within each sex.

The vast majority of human beings have a heterosexual orientation, but a smaller minority is primarily homosexual or bisexual. The love and sexual lives of homosexuals and bisexual are little different from those of heterosexuals, except where their behaviors are constrained by cultural norms and local laws.

Personality is defined as an individual's consistent patterns of feeling, thinking, and behaving. Early theories of personality, including phrenology and somatology, are now discredited, but there is at least some research evidence for physiognomy—the idea that it is possible to assess personality from facial characteristics.

Personalities are characterized in terms of traits, which are relatively enduring characteristics that influence our behavior across many situations. Psychologists have investigated hundreds of traits using the self-report approach.

The utility of self-report measures of personality depends on their reliability and construct validity. Some popular measures of personality, such as the Myers-Briggs Type Indicator (MBTI), do not have reliability or construct validity and therefore are not useful measures of personality.

The trait approach to personality was pioneered by early psychologists, including Allport, Cattell, and Eysenck, and their research helped produce the Five-Factor (Big Five) Model of Personality. The Big Five dimensions are cross-culturally valid and accurately predict behavior. The Big Five factors are also increasingly being used to help researchers understand the dimensions of psychological disorders.

A difficulty of the trait approach to personality is that there is often only a low correlation between the traits that a person expresses in one situation and those that he or she expresses in other situations. However, psychologists have

also found that personality predicts behavior better when the behaviors are averaged across different situations.

People may believe in the existence of traits because they use their schemas to judge other people, leading them to believe that traits are more stable than they really are. An example is the Barnum effect—the observation that people tend to believe in descriptions of their personality that supposedly are descriptive of them but could in fact describe almost anyone.

An important personality test is the Minnesota Multiphasic Personality Inventory (MMPI) used to detect personality and psychological disorders. Another approach to measuring personality is to use projective measures, such as the Rorschach Inkblot Test and the Thematic Apperception Test (TAT). The advantage of projective tests is that they are less direct, but empirical evidence supporting their reliability and construct validity is mixed.

There are behaviorist, social-cognitive, psychodynamic, and humanist theories of personality.

The psychodynamic approach to understanding personality, begun by Sigmund Freud, is based on the idea that all behaviors are predetermined by motivations that lie outside our awareness, in the unconscious. Freud proposed that the mind is divided into three components: id, ego, and superego, and that the interactions and conflicts among the components create personality. Freud also believed that psychological disorders, and particularly the experience of anxiety, occur when there is conflict or imbalance among the motivations of the id, ego, and superego and that people use defense mechanisms to cope with this anxiety.

Freud argued that personality is developed through a series of psychosexual stages, each focusing on pleasure from a different part of the body, and that the appropriate resolution of each stage has implications for later personality development.

Freud has probably exerted a greater impact on the public’s understanding of personality than any other thinker, but his theories have in many cases failed to pass the test of empiricism.

Freudian theory led to a number of followers known as the neo-Freudians, including Adler, Jung, Horney, and Fromm.

Humanistic theories of personality focus on the underlying motivations that they believed drive personality, focusing on the nature of the self-concept and the development of self-esteem. The idea of unconditional positive regard championed by Carl Rogers has led in part to the positive psychology movement, and it is a basis for almost all contemporary psychological therapy.

Personality traits of humans and animals are determined in large part by their genetic makeup. Personality is not determined by any single gene, but rather by the actions of many genes working together.

The role of nature and nurture in personality is studied by means of behavioral genetics studies including family studies, twin studies, and adoption studies. These studies partition variability in personality into the influence of genetics (known as heritability), shared environment, and nonshared environment. Although these studies find that many personality traits are highly heritable, genetics does not determine everything. The major influence on personality is nonshared environmental influences.

In addition to the use of behavioral genetics, our understanding of the role of biology in personality recently has been dramatically increased through the use of molecular genetics, the study of which genes are associated with which personality traits in animals and humans.

More psychologists are involved in the diagnosis and treatment of psychological

disorder than in any other aspect of psychology.

About 1 in every 4 Americans (over 78 million people) are estimated to be affected by a psychological disorder during any one year. The impact of mental illness is particularly strong on people who are poorer, of lower socioeconomic class, and from disadvantaged ethnic groups.

A psychological disorder is an unusual, distressing, and dysfunctional pattern of thought, emotion, or behavior. Psychological disorders are often comorbid, meaning that a given person suffers from more than one disorder.

The stigma of mental disorder affects people while they are ill, while they are healing, and even after they have healed. But mental illness is not a “fault,” and it is important to work to help overcome the stigma associated with disorder.

All psychological disorders are multiply determined by biological, psychological, and social factors.

Psychologists diagnose disorder using the Diagnostic and Statistical Manual of Mental Disorders (DSM). The DSM organizes the diagnosis of disorder according to five dimensions (or axes) relating to different aspects of disorder or disability. The DSM uses categories, and patients with close approximations to the prototype are said to have that disorder.

One critique of the DSM is that many disorders—for instance, attention-deficit/hyperactivity disorder (ADHD), autistic disorder, and Asperger’s disorder—are being diagnosed significantly more frequently than they were in the past.

Anxiety disorders are psychological disturbances marked by irrational fears, often of everyday objects and situations. They include generalized anxiety disorder (GAD), panic disorder, phobia, obsessive-compulsive disorder (OCD), and posttraumatic stress disorder (PTSD). Anxiety disorders affect about 57 million Americans every year.

Dissociative disorders are conditions that involve disruptions or breakdowns of memory, awareness, and identity. They include dissociative amnesia, dissociative fugue, and dissociative identity disorder.

Mood disorders are psychological disorders in which the person’s mood negatively influences his or her physical, perceptual, social, and cognitive processes. They include dysthymia, major depressive disorder, and bipolar disorder. Mood disorders affect about 30 million Americans every year.

Schizophrenia is a serious psychological disorder marked by delusions, hallucinations, loss of contact with reality, inappropriate affect, disorganized speech, social withdrawal, and deterioration of adaptive behavior. About 3 million Americans have schizophrenia.

A personality disorder is a long-lasting but frequently less severe disorder characterized by inflexible patterns of thinking, feeling, or relating to others that causes problems in personal, social, and work situations. They are characterized by odd or eccentric behavior, by dramatic or erratic behavior, or by anxious or inhibited behavior. Two of the most important personality disorders are borderline personality disorder (BPD) and antisocial personality disorder (APD).

Somatization disorder is a psychological disorder in which a person experiences numerous long-lasting but seemingly unrelated physical ailments that have no identifiable physical cause. Somatization disorders include conversion disorder, body dysmorphic disorder (BDD), and hypochondriasis.

Patients with factitious disorder fake physical symptoms in large part because

they enjoy the attention and treatment that they receive in the hospital.

Sexual disorders refer to a variety of problems revolving around performing or enjoying sex. Sexual dysfunctions include problems relating to loss of sexual desire, sexual response or orgasm, and pain during sex.

Gender identity disorder (GID, also called transsexualism) is diagnosed when the individual displays a repeated and strong desire to be the other sex, a persistent discomfort with one's sex, and a belief that one was born the wrong sex, accompanied by significant dysfunction and distress. The classification of GID as a mental disorder has been challenged because people who suffer from GID do not regard their own cross-gender feelings and behaviors as a disorder and do not feel that they are distressed or dysfunctional.

A paraphilia is a sexual deviation where sexual arousal is obtained from a consistent pattern of inappropriate responses to objects or people, and in which the behaviors associated with the feelings are distressing and dysfunctional.

Psychological disorders create a tremendous individual, social, and economic drain on society. Psychologists work to reduce this burden by preventing and treating disorder. Psychologists base this treatment and prevention of disorder on the bio-psycho-social model, which proposes that disorder has biological, psychological, and social causes, and that each of these aspects can be the focus of reducing disorder.

Treatment for psychological disorder begins with a formal psychological assessment. In addition to the psychological assessment, the patient is usually seen by a physician to gain information about potential Axis III (physical) problems.

One approach to treatment is psychotherapy. The fundamental aspect of psychotherapy is that the patient directly confronts the disorder and works with the therapist to help reduce it.

Psychodynamic therapy (also known as psychoanalysis) is a psychological treatment based on Freudian and neo-Freudian personality theories. The analyst engages with the patient in one-on-one sessions during which the patient verbalizes his or her thoughts through free associations and by reporting on his or her dreams. The goal of the therapy is to help the patient develop insight—that is, an understanding of the unconscious causes of the disorder.

Humanistic therapy is a psychological treatment based on the personality theories of Carl Rogers and other humanistic psychologists. Humanistic therapies attempt to promote growth and responsibility by helping clients consider their own situations and the world around them and how they can work to achieve their life goals.

The humanistic therapy promotes the ideas of genuineness, empathy, and unconditional positive regard in a nurturing relationship in which the therapist actively listens to and reflects the feelings of the client; this relationship is probably the most fundamental part of contemporary psychotherapy

Cognitive-behavior therapy (CBT) is a structured approach to treatment that attempts to reduce psychological disorders through systematic procedures based on cognitive and behavioral principles. CBT is a very broad approach used for the treatment of a variety of problems.

Behavioral aspects of CBT may include operant conditioning using reward or punishment. When the disorder is anxiety or phobia, then the goal of the CBT is to reduce the negative affective responses to the feared stimulus through exposure therapy, flooding, or systematic desensitization. Aversion therapy is a type of behavior therapy in which positive punishment is used to reduce the frequency of an undesirable behavior.

Cognitive aspects of CBT include treatment that helps clients identify incorrect or distorted beliefs that are contributing to disorder.

The most commonly used approaches to therapy are eclectic, such that the therapist uses whichever techniques seem most useful and relevant for a given patient.

Biomedical therapies are treatments designed to reduce psychological disorder by influencing the action of the central nervous system. These therapies primarily involve the use of medications but also include direct methods of brain intervention, including electroconvulsive therapy (ECT), transcranial magnetic stimulation (TMS), and psychosurgery.

Attention-deficit/hyperactivity disorder (ADHD) is treated using low doses of psychostimulants, including Ritalin, Adderall, and Dexedrine.

Mood disorders are most commonly treated with the antidepressant medications known as selective serotonin reuptake inhibitors (SSRIs), including Prozac, Paxil, and Zoloft. The SSRIs selectively block the reuptake of serotonin at the synapse. Bipolar disorder is treated with mood stabilizing medications.

Antianxiety medications, including the tranquilizers Ativan, Valium, and Xanax, are used to treat anxiety disorders.

Schizophrenia is treated with antipsychotic drugs, including Thorazine, Haldol, Clozaril, Risperdal, and Zyprexa. Some of these drugs treat the positive symptoms of schizophrenia, and some treat both the positive, negative, and cognitive symptoms.

Practitioners frequently incorporate the social setting in which disorder occurs by conducting therapy in groups, with couples, or with families. One way for people to gain this social support is by joining a self-help group.

Community mental health services refer to psychological treatments and interventions that are distributed at the community level. These centers provide primary, secondary, and tertiary prevention.

Psychologists use outcome research to determine the effectiveness of different therapies. These studies help determine if improvement is due to natural improvement, nonspecific treatment effects, or placebo effects. Research finds that psychotherapy and biomedical therapies are both effective in treating disorder, but there is not much evidence that any one type of therapy is more effective than any other type. What all good therapies have in common is that they give people hope; help them think more carefully about themselves and about their relationships with others; and provide a positive, empathic, and trusting relationship with the therapist—the therapeutic alliance.

One problem with drug therapies is that although they provide temporary relief, they don’t treat the underlying cause of the disorder. Once the patient stops taking the drug, the symptoms often return in full force.

Data suggest that although some community prevention programs are successful, the changes brought about by even the best of these programs are, on average, modest.

Our initial judgments of others are based in large part on what we see. The physical features of other people—particularly their sex, race, age, and physical attractiveness—are very salient, and we often focus our attention on these dimensions. At least in some cases, people can draw accurate conclusions about others on the basis of physical appearance.

Youth, symmetry, and averageness have been found to be cross-culturally consistent determinants of perceived attractiveness, although different cultures

may also have unique beliefs about what is attractive.

We frequently use people's appearances to form our judgments about them, and these judgments may lead to stereotyping, prejudice, and discrimination. We use our stereotypes and prejudices in part because they are easy and we may be evolutionarily disposed to stereotyping. We can change and learn to avoid using them through positive interaction with members of other groups, practice, and education.

Liking and loving in friendships and close relationships are determined by variables including similarity, disclosure, proximity, intimacy, interdependence, commitment, passion, and responsiveness.

Causal attribution is the process of trying to determine the causes of people's behavior. Attributions may be made to the person, to the situation, or to a combination of both. Although people are reasonably accurate in their attributions, they may make self-serving attributions and fall victim to the fundamental attribution error.

Attitudes refer to our relatively enduring evaluations of people and things. Attitudes are important because they frequently (but not always) predict behavior. Attitudes can be changed through persuasive communications. Attitudes predict behavior better for some people than for others, and in some situations more than others.

Our behaviors also influence our attitudes through the cognitive processes of self-perception and the more emotional process of cognitive dissonance.

The tendency to help others in need is in part a functional evolutionary adaptation. We help others to benefit ourselves and to benefit the others. Reciprocal altruism leads us to help others now with the expectation those others will return the favor should we need their help in the future. The outcome of the reinforcement and modeling of altruism is the development of social norms about helping, including the reciprocity norm and the social responsibility norm. Latané and Darley's model of helping proposes that the presence of others can reduce noticing, interpreting, and responding to emergencies.

Aggression may be physical or nonphysical. Aggression is activated in large part by the amygdala and regulated by the prefrontal cortex. Testosterone is associated with increased aggression in both males and females. Aggression is also caused by negative experiences and emotions, including frustration, pain, and heat. As predicted by principles of observational learning, research evidence makes it very clear that, on average, people who watch violent behavior become more aggressive.

The social norm that condones and even encourages responding to insults with aggression, known as the culture of honor, is stronger among men who live or were raised in the South and West than among men who are from or living in the North and East.

We conform not only because we believe that other people have accurate information and we want to have knowledge (informational conformity) but also because we want to be liked by others (normative conformity). The typical outcome of conformity is that our beliefs and behaviors become more similar to those of others around us. Studies demonstrating the power of conformity include those by Sherif and Asch, and Milgram's work on obedience.

Although majorities are most persuasive, numerical minorities that are consistent and confident in their opinions may in some cases be able to be persuasive.

The tendency to perform tasks better or faster in the presence of others is known as social facilitation, whereas the tendency to perform tasks more poorly

or more slowly in the presence of others is known as social inhibition. Zajonc explained the influence of others on task performance using the concept of physiological arousal.

Working in groups involves both costs and benefits. When the outcome of group performance is better than we would expect given the individuals who form the group, we call the outcome a group process gain, and when the group outcome is worse that we would have expected given the individuals who form the group, we call the outcome a group process loss.

Process losses are observed in phenomena such as social loafing, groupthink. Process losses can be reduced by better motivation and coordination among the group members, by keeping contributions identifiable, and by providing difficult but attainable goals.