Psychology

Psychology is the science\textsuperscript{[1]} of mind and behavior.\textsuperscript{[2]} Its immediate goal is to understand behavior and mental processes by researching and establishing both general principles and specific cases.\textsuperscript{[3]} For many practitioners, one goal of applied psychology is to benefit society.\textsuperscript{[4]}\textsuperscript{[5]} In this field, a professional practitioner or researcher is called a psychologist, and can be classified as a social scientist, behavioral scientist, or cognitive scientist. Psychologists attempt to understand the role of mental functions in individual and social behavior, while also exploring the physiological and neurobiological processes that underlie certain functions and behaviors.

Psychologists explore such concepts as perception, cognition, attention, emotion, phenomenology, motivation, brain functioning, personality, behavior, and interpersonal relationships. Some, especially depth psychologists, also consider the unconscious mind.\textsuperscript{[6]} Psychologists employ empirical methods to infer causal and correlational relationships between psychosocial variables. In addition, or in opposition, to employing empirical and deductive methods, some—especially clinical and counseling psychologists—at times rely upon symbolic interpretation and other inductive techniques. Psychology incorporates research from the social sciences, natural sciences, and humanities, such as philosophy.

While psychological knowledge is typically applied to the assessment and treatment of mental health problems, it is also applied to understanding and solving problems in many different spheres of human activity. Although the majority of psychologists are involved in some kind of therapeutic role (clinical, counseling, and school positions); many do scientific research on a wide range of topics related to mental processes and social behavior (typically in university psychology departments) and/or teach such knowledge in academic settings; and some are employed in industrial and organizational settings, and in other areas\textsuperscript{[6]} such as human development and aging, sports, health, the media, law, and forensics.

Etymology

The word psychology literally means, "study of the soul" (ψυχή, psukhē, meaning "breath", "spirit", or "soul"); and "-λογία" (-logia, translated as "study of" or "research").\textsuperscript{[7]} The Latin word psychologia was first used by the Croatian humanist and Latinist Marko Marulić in his book, Psychiologia de ratione animae humanae in the late 15th century or early 16th century.\textsuperscript{[9]} The earliest known reference to the word psychology in English was by Steven Blankaart in 1693 in The Physical Dictionary which refers to "Anatomy, which treats of the Body, and Psychology, which treats of the Soul."\textsuperscript{[10]}
History
The study of psychology in a philosophical context dates back to the ancient civilizations of Egypt, Greece, China, India, and Persia. Historians point to the writings of ancient Greek philosophers, such as Thales, Plato, and Aristotle (especially in his *De Anima* treatise), as the first significant body of work in the West to be rich in psychological thought.\(^{[11]}\)

Structuralism
German physician Wilhelm Wundt is credited with introducing psychological discovery into a laboratory setting. Known as the "father of experimental psychology," he founded the first psychological laboratory, at Leipzig University, in 1879. Wundt focused on breaking down mental processes into the most basic components. Edward Titchener was another major structuralist thinker.

Functionalism
Functionalism formed as a reaction to the theories of the structuralist school of thought and was heavily influenced by the work of the American philosopher and psychologist William James. James felt that psychology should have practical value, and that psychologists should find out how the mind can function to a person's benefit. In his book, *Principles of Psychology*, published in 1890, he laid the foundations for many of the questions that psychologists would explore for years to come. Other major functionalist thinkers included John Dewey and Harvey Carr.

Other 19th-century contributors to the field include the German psychologist Hermann Ebbinghaus, a pioneer in the experimental study of memory, who developed quantitative models of learning and forgetting at the University of Berlin; and the Russian-Soviet physiologist Ivan Pavlov, who discovered in dogs a learning process that was later termed "classical conditioning" and applied to human beings.\(^{[15]}\) Starting in the 1950s, the experimental techniques set forth by Wundt, James, Ebbinghaus, and others would be reiterated as experimental psychology became increasingly cognitive—concerned with information and its processing—and, eventually, constituted a part of the wider cognitive science.\(^{[17]}\) In its early years, this development had been seen as a "revolution," as it both responded to and reacted against strains of thought—including psychodynamics and behaviorism—that had developed in the meantime.

Psychoanalysis
From the 1890s until his death in 1939, the Austrian physician Sigmund Freud developed psychoanalysis, a method of investigation of the mind and the way one thinks; a systematized set of theories about human behavior; and a form of psychotherapy to treat psychological or emotional distress, especially unconscious conflict. Freud's psychoanalytic theory was largely based on interpretive methods, introspection and clinical observations. It became very well-known, largely because it tackled subjects such as sexuality, repression, and the unconscious mind as general aspects of psychological development. These were largely considered taboo subjects at the time, and Freud provided a catalyst for them to be openly discussed in polite society. Clinically, Freud helped to pioneer the method of free association and a therapeutic interest in dream interpretation.\(^{[19]}\)\(^{[20]}\)
Freud had a significant influence on Swiss psychiatrist Carl Jung, whose analytical psychology became an alternative form of depth psychology. Other well-known psychoanalytic scholars of the mid-20th century included psychoanalysts, psychologists, psychiatrists, and philosophers. Among these thinkers were Erik Erikson, Melanie Klein, D.W. Winnicott, Karen Horney, Erich Fromm, John Bowlby and Sigmund Freud's daughter, Anna Freud. Throughout the 20th century, psychoanalysis evolved into diverse schools of thought, most of which may be classed as Neo-Freudian.

Psychoanalytic theory and therapy were criticized by psychologists and philosophers such as B.F. Skinner, Hans Eysenck, and Karl Popper. Popper, a philosopher of science, argued that Freud's, as well as Alfred Adler's, psychoanalytic theories included enough *ad hoc* safeguards against empirical contradiction to keep the theories outside the realm of scientific inquiry. By contrast, Eysenck maintained that although Freudian ideas could be subjected to experimental science, they had not withstood experimental tests. By the 20th century, psychology departments in American universities had become experimentally oriented, marginalizing Freudian theory and regarding it as a "desiccated and dead" historical artifact. Meanwhile, however, researchers in the emerging field of neuro-psychoanalysis defended some of Freud's ideas on scientific grounds, while scholars of the humanities maintained that Freud was not a "scientist at all, but ... an interpreter."

### Behaviorism

In the United States, behaviorism became the dominant school of thought during the 1950s. Behaviorism was founded in the early 20th century by John B. Watson, and embraced and extended by Edward Thorndike, Clark L. Hull, Edward C. Tolman, and later B.F. Skinner. Theories of learning emphasized the ways in which people might be predisposed, or conditioned, by their environments to behave in certain ways.

Classical conditioning was an early behaviorist model. It posited that behavioral tendencies are determined by immediate associations between various environmental stimuli and the degree of pleasure or pain that follows. Behavioral patterns, then, were understood to consist of organisms' conditioned responses to the stimuli in their environment. The stimuli were held to exert influence in proportion to their prior repetition or to the previous intensity of their associated pain or pleasure. Much research consisted of laboratory-based animal experimentation, which was increasing in popularity as physiology grew more sophisticated.

Skinner's behaviorism shared with its predecessors a philosophical inclination toward positivism and determinism. He believed that the contents of the mind were not open to scientific scrutiny and that scientific psychology should emphasize the study of observable behavior. He focused on behavior–environment relations and analyzed overt and covert (i.e., private) behavior as a function of the organism interacting with its environment. Behaviorists usually rejected or deemphasized dualistic explanations such as "mind" or "consciousness"; and, in lieu of probing an "unconscious mind" that underlies unawareness, they spoke of the "contingency-shaped behaviors" in which unawareness becomes outwardly manifest.

Among the behaviorists' most famous creations are John B. Watson's Little Albert experiment, which applied classical conditioning to the developing human child, and Skinner's notion of operant conditioning, which
acknowledged that human agency could affect patterns and cycles of environmental stimuli and behavioral responses.

Linguist Noam Chomsky's critique of the behaviorist model of language acquisition is widely regarded as a key factor in the decline of behaviorism's prominence. Martin Seligman and colleagues discovered that the conditioning of dogs led to outcomes ("learned helplessness") that opposed the predictions of behaviorism. But Skinner's behaviorism did not die, perhaps in part because it generated successful practical applications. The fall of behaviorism as an overarching model in psychology, however, gave way to a new dominant paradigm: cognitive approaches.

**Humanism**

Humanistic psychology was developed in the 1950s in reaction to both behaviorism and psychoanalysis. By using phenomenology, intersubjectivity and first-person categories, the humanistic approach sought to glimpse the whole person—not just the fragmented parts of the personality or cognitive functioning. Humanism focused on fundamentally and uniquely human issues, such as individual free will, personal growth, self-actualization, self-identity, death, aloneness, freedom, and meaning. The humanistic approach was distinguished by its emphasis on subjective meaning, rejection of determinism, and concern for positive growth rather than pathology. Some of the founders of the humanistic school of thought were American psychologists Abraham Maslow, who formulated a hierarchy of human needs, and Carl Rogers, who created and developed client-centered therapy. Later, positive psychology opened up humanistic themes to scientific modes of exploration.

**Gestalt**

Wolfgang Kohler, Max Wertheimer and Kurt Koffka co-founded the school of Gestalt psychology. This approach is based upon the idea that individuals experience things as unified wholes. This approach to psychology began in Germany and Austria during the late 19th century in response to the molecular approach of structuralism. Rather than breaking down thoughts and behavior to their smallest element, the Gestalt position maintains that the whole of experience is important, and the whole is different than the sum of its parts. Gestalt psychology should not be confused with the Gestalt therapy of Fritz Perls, which is only peripherally linked to Gestalt psychology.

**Existentialism**

Influenced largely by the work of German philosopher Martin Heidegger and Danish philosopher Søren Kierkegaard, psychoanalytically-trained American psychologist Rollo May pioneered an existential branch of psychology, which included existential therapy, in the 1950s and 1960s. Existential psychologists differed from others often classified as humanistic in their comparatively neutral view of human nature and in their relatively positive assessment of anxiety. Existential psychologists emphasized the humanistic themes of death, free will, and meaning, suggesting that meaning can be shaped by myths, or narrative patterns, and that it can be
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encouraged by an acceptance of the free will requisite to an authentic, albeit often anxious, regard for death and other future prospects. Austrian existential psychiatrist and Holocaust survivor Viktor Frankl drew evidence of meaning's therapeutic power from reflections garnered from his own internment, and he created a variety of existential psychotherapy called logotherapy. In addition to May and Frankl, Swiss psychoanalyst Ludwig Binswanger and American psychologist George Kelly may be said to belong to the existential school.

Cognitivism

Cognitive psychology is the branch of psychology that studies mental processes including how people think, perceive, remember, and learn. As part of the larger field of cognitive science, this branch of psychology is related to other disciplines including neuroscience, philosophy, and linguistics.

Noam Chomsky helped to ignite a "cognitive revolution" in psychology when he criticized the behaviorists' notions of "stimulus," "response," and "reinforcement," arguing that such ideas—which Skinner had borrowed from animal experiments in the laboratory—could be applied to complex human behavior, most notably language acquisition, in only a vague and superficial manner. The postulation that humans are born with the instinct or "innate facility" for acquiring language posed a challenge to the behaviorist position that all behavior (including language) is contingent upon learning and reinforcement. Social learning theorists, such as Albert Bandura, argued that the child's environment could make contributions of its own to the behaviors of an observant subject.

Meanwhile, accumulating technology helped to renew interest and belief in the mental states and representations—i.e., the cognition—that had fallen out of favor with behaviorists. English neuroscientist Charles Sherrington and Canadian psychologist Donald O. Hebb used experimental methods to link psychological phenomena with the structure and function of the brain. With the rise of computer science and artificial intelligence, analogies were drawn between the processing of information by humans and information processing by machines. Research in cognition had proven practical since World War II, when it aided in the understanding of weapons operation. By the late 20th century, though, cognitivism had become the dominant paradigm of mainstream psychology, and cognitive psychology emerged as a popular branch.

Assuming both that the covert mind should be studied and that the scientific method should be used to study it, cognitive psychologists set such concepts as "subliminal processing" and "implicit memory" in place of the psychoanalytic "unconscious mind" or the behavioristic "contingency-shaped behaviors." Elements of behaviorism and cognitive psychology were synthesized to form the basis of cognitive behavioral therapy, a form of psychotherapy modified from techniques developed by American psychologist Albert
Ellis and American psychiatrist Aaron T. Beck. Cognitive psychology was subsumed along with other disciplines, such as philosophy of mind, computer science, and neuroscience, under the umbrella discipline of cognitive science.

**Biopsychosocial model**

The biopsychosocial model is an integrated perspective toward understanding consciousness, behavior, and social interaction. It assumes that any given behavior or mental process affects and is affected by dynamically interrelated biological, psychological, and social factors.[38] The *psychological* aspect refers to the role that cognition and emotions play in any given psychological phenomenon—for example, the effect of mood or beliefs and expectations on an individual's reactions to an event. The *biological* aspect refers to the role of biological factors in psychological phenomena—for example, the effect of the prenatal environment on brain development and cognitive abilities, or the influence of genes on individual dispositions. The *socio-cultural* aspect refers to the role that social and cultural environments play in a given psychological phenomenon—for example, the role of parental or peer influence in the behaviors or characteristics of an individual.

**Subfields**

Psychology encompasses a vast domain, and includes many different approaches to the study of mental processes and behavior.

**Biological**

Biological psychology or behavioral neuroscience is the study of the biological substrates of behavior and mental processes. There are different specialties within behavioral neuroscience. For example, physiological psychologists use animal models (typically rats) to study the neural, genetic, and cellular mechanisms that underlie specific behaviors such as learning and memory and fear responses.[39] Cognitive neuroscientists investigate the neural correlates of psychological processes in humans using neural imaging tools, and neuropsychologists conduct psychological assessments to determine, for instance, specific aspects and extent of cognitive deficit caused by brain damage or disease.
Clinical

Clinical psychology includes the study and application of psychology for the purpose of understanding, preventing, and relieving psychologically-based distress or dysfunction and to promote subjective well-being and personal development. Central to its practice are psychological assessment and psychotherapy, although clinical psychologists may also engage in research, teaching, consultation, forensic testimony, and program development and administration. Some clinical psychologists may focus on the clinical management of patients with brain injury—this area is known as clinical neuropsychology. In many countries, clinical psychology is a regulated mental health profession.

The work performed by clinical psychologists tends to be influenced by various therapeutic approaches, all of which involve a formal relationship between professional and client (usually an individual, couple, family, or small group). The various therapeutic approaches and practices are associated with different theoretical perspectives and employ different procedures intended to form a therapeutic alliance, explore the nature of psychological problems, and encourage new ways of thinking, feeling, or behaving. Four major theoretical perspectives are psychodynamic, cognitive behavioral, existential-humanistic, and systems or family therapy. There has been a growing movement to integrate the various therapeutic approaches, especially with an increased understanding of issues regarding culture, gender, spirituality, and sexual-orientation. With the advent of more robust research findings regarding psychotherapy, there is evidence that most of the major therapies are about of equal effectiveness, with the key common element being a strong therapeutic alliance. Because of this, more training programs and psychologists are now adopting an eclectic therapeutic orientation.

Cognitive

The Stroop effect refers to the fact that naming the color of the first set of words is easier and quicker than the second.

Cognitive psychology studies cognition, the mental processes underlying mental activity. Perception, learning, problem solving, reasoning, thinking, memory, attention, language and emotion are areas of research. Classical cognitive psychology is associated with a school of thought known as cognitivism, whose adherents argue for an information processing model of mental function, informed by functionalism and experimental psychology.

On a broader level, cognitive science is an interdisciplinary enterprise of cognitive psychologists, cognitive neuroscientists, researchers in artificial intelligence, linguists, human–computer interaction, computational neuroscience, logicians and social scientists. Computational models are sometimes used to simulate phenomena of interest. Computational models provide a tool for studying the functional organization of the mind whereas neuroscience provides measures of brain activity.
Comparative

Comparative psychology refers to the study of the behavior and mental life of animals other than human beings. It is related to disciplines outside of psychology that study animal behavior such as ethology. Although the field of psychology is primarily concerned with humans, the behavior and mental processes of animals is also an important part of psychological research. This being either as a subject in its own right (e.g., animal cognition and ethology) or with strong emphasis about evolutionary links, and somewhat more controversially, as a way of gaining an insight into human psychology. This is achieved by means of comparison or via animal models of emotional and behavior systems as seen in neuroscience of psychology (e.g., affective neuroscience and social neuroscience).

Developmental

Mainly focusing on the development of the human mind through the life span, developmental psychology seeks to understand how people come to perceive, understand, and act within the world and how these processes change as they age. This may focus on intellectual, cognitive, neural, social, or moral development. Researchers who study children use a number of unique research methods to make observations in natural settings or to engage them in experimental tasks. Such tasks often resemble specially designed games and activities that are both enjoyable for the child and scientifically useful, and researchers have even devised clever methods to study the mental processes of small infants. In addition to studying children, developmental psychologists also study aging and processes throughout the life span, especially at other times of rapid change (such as adolescence and old age). Developmental psychologists draw on the full range of psychological theories to inform their research.


**Educational and school**

Educational psychology is the study of how humans learn in educational settings, the effectiveness of educational interventions, the psychology of teaching, and the social psychology of schools as organizations. The work of child psychologists such as Lev Vygotsky, Jean Piaget, Bernard Luskin and Jerome Bruner has been influential in creating teaching methods and educational practices. Educational psychology is often included in teacher education programs, in places such as North America, Australia, and New Zealand.

School psychology combines principles from educational psychology and clinical psychology to understand and treat students with learning disabilities; to foster the intellectual growth of “gifted” students; to facilitate prosocial behaviors in adolescents; and otherwise to promote safe, supportive, and effective learning environments. School psychologists are trained in educational and behavioral assessment, intervention, prevention, and consultation, and many have extensive training in research. [48]

**Industrial–organizational**

Industrial and organizational psychology (I–O) applies psychological concepts and methods to optimize human potential in the workplace. Personnel psychology, a subfield of I–O psychology, applies the methods and principles of psychology in selecting and evaluating workers. I–O psychology's other subfield, organizational psychology, examines the effects of work environments and management styles on worker motivation, job satisfaction, and productivity. [49]

**Personality**

Personality psychology is concerned with enduring patterns of behavior, thought, and emotion in individuals, commonly referred to as personality. Theories of personality vary across different psychological schools and orientations. They carry different assumptions about such issues as the role of the unconscious and the importance of childhood experience. According to Freud, personality is based on the dynamic interactions of the id, ego, and super-ego. [50] Trait theorists, in contrast, attempt to analyze personality in terms of a discrete number of key traits by the statistical method of factor analysis. The number of proposed traits has varied widely. An early model proposed by Hans Eysenck suggested that there are three traits that comprise human personality: extraversion–introversion, neuroticism, and psychoticism. Raymond Cattell proposed a theory of 16 personality factors. The "Big Five," or Five Factor Model, proposed by Lewis Goldberg, currently has strong support among trait theorists.
Social

Social psychology is the study of how humans think about each other and how they relate to each other. Social psychologists study such topics as the influence of others on an individual’s behavior (e.g. conformity, persuasion), and the formation of beliefs, attitudes, and stereotypes about other people. Social cognition fuses elements of social and cognitive psychology in order to understand how people process, remember, and distort social information. The study of group dynamics reveals information about the nature and potential optimization of leadership, communication, and other phenomena that emerge at least at the microsocial level. In recent years, many social psychologists have become increasingly interested in implicit measures, mediational models, and the interaction of both person and social variables in accounting for behavior.

Professional Psychology

Professional psychology is a broad term referring to the application of principles of the above areas of psychology in clinical, educational, organizational, and other settings. It is closely related to applied psychology. People involved in the practice of professional psychology hold doctoral degrees (Psy.D., Ph.D., or Ed.D.). The degree is usually in the area of clinical, counseling, or school psychology. Professional Psychologists are typically licensed to provide the above services in one or more states. Professional psychologists often provide personality, intelligence, aptitude, or neuropsychological assessment. They may also conduct individual, family, marital, and group therapy. While many may diagnose psychological problems, others focus on optimizing people's potential in an area. For instance, executive coaching, organizational consultation, and sports psychology are focused on the further enhancement skills. Psychologists' roles also include consultation, management, supervision, and education. Psychologists in many states are working to attain prescription privileges. The American Psychological Association has a journal that focuses on this area, entitled Professional Psychology: Research and Practice[^51].

Research methods

Psychology tends to be eclectic, drawing on knowledge from other fields to help explain and understand psychological phenomena. Additionally, psychologists make extensive use of the three modes of inference that were identified by C. S. Peirce: deduction, induction, and abduction (hypothesis generation). While often employing deductive–nomological reasoning, they also rely on inductive reasoning to generate explanations. For example, evolutionary psychologists attempt to explain psychological traits—such as memory, perception, or language—as adaptations, that is, as the functional products of natural selection or sexual selection.

Psychologists may conduct basic research aiming for further understanding in a particular area of interest in psychology, or conduct applied research to solve problems in the clinic, workplace or other areas. Masters level clinical programs aim to train students in both research methods and evidence-based practice. Professional associations have established guidelines for ethics, training, research methodology and professional practice. In addition, depending on the country, state or region, psychological services and the title "psychologist" may be governed by statute and psychologists who offer services to the public are usually required to be licensed.
Qualitative and quantitative research

Research in most areas of psychology is conducted in accord with the standards of the scientific method. Psychological researchers seek the emergence of theoretically interesting categories and hypotheses from data, using qualitative or quantitative methods (or both).

Qualitative psychological research methods include interviews, first-hand observation, and participant observation. Qualitative researchers sometimes aim to enrich interpretations or critiques of symbols, subjective experiences, or social structures. Similar hermeneutic and critical aims have also been served by "quantitative methods," as in Erich Fromm’s study of Nazi voting or Stanley Milgram's studies of obedience to authority.

Quantitative psychological research lends itself to the statistical testing of hypotheses. Quantitatively oriented research designs include the experiment, quasi-experiment, cross-sectional study, case-control study, and longitudinal study. The measurement and operationalization of important constructs is an essential part of these research designs. Statistical methods include the Pearson product–moment correlation coefficient, the analysis of variance, multiple linear regression, structural equation modeling, and hierarchical linear modeling.

Controlled experiments

Experimental psychological research is conducted in a laboratory under controlled conditions. This method of research relies on the application of the scientific method to understand behavior. Experimenters use several types of measurements, including rate of response, reaction time, and various psychometric measurements. Experiments are designed to test specific hypotheses (deductive approach) or evaluate functional relationships (inductive approach). A true experiment with random allocation of subjects to conditions allows researchers to infer causal relationships between different aspects of behavior and the environment. In an experiment, one or more variables of interest are controlled by the experimenter (independent variable) and another variable is measured in response to different conditions (dependent variable). Experiments are one of the primary research methods in many areas of psychology, particularly cognitive/psychonomics, mathematical psychology, psychophysiology and biological psychology/cognitive neuroscience.

Experiments on humans have been put under some controls, namely informed and voluntary consent. After World War II, the Nuremberg Code was established, because of Nazi abuses of experimental subjects. Later, most countries (and scientific journals) adopted the Declaration of Helsinki. In the U.S., the National Institutes of Health established the Institutional Review Board in 1966, and in 1974 adopted the National Research Act (HR 7724). All of these measures encouraged researchers to obtain informed consent from human participants in experimental studies. A number of influential studies led to the establishment of this rule; such studies included the MIT and Fernald School radioisotope studies, the Thalidomide tragedy, the Willowbrook hepatitis study, and Stanley Milgram's studies of obedience to authority.
Survey questionnaires
Statistical surveys are used in psychology for measuring attitudes and traits, monitoring changes in mood, checking the validity of experimental manipulations, and for a wide variety of other psychological topics. Most commonly, psychologists use paper-and-pencil surveys. However, surveys are also conducted over the phone or through e-mail. Increasingly, web-based surveys are being used in research. Similar methodology is also used in applied setting, such as clinical assessment and personnel assessment.

Longitudinal studies
Longitudinal studies are often used in psychology to study developmental trends across the life span, and in sociology to study life events throughout lifetimes or generations. The reason for this is that unlike cross-sectional studies, longitudinal studies track the same people, and therefore the differences observed in those people are less likely to be the result of cultural differences across generations. Because of this benefit, longitudinal studies make observing changes more accurate and they are applied in various other fields.

Because most longitudinal studies are observational, in the sense that they observe the state of the world without manipulating it, it has been argued that they may have less power to detect causal relationships than do experiments. They also suffer methodological limitations such as from selective attrition because people with similar characteristics maybe more likely to drop out of the study making it difficult to analyze.

Some longitudinal studies are experiments, called repeated-measures experiments. Psychologists often use the crossover design to reduce the influence of confounding covariates and to reduce the number of subjects.

Observation in natural settings
In the same way Jane Goodall studied the role of chimpanzee social and family life, psychologists conduct similar observational studies in human social, professional and family lives. Sometimes the participants are aware they are being observed and other times it is covert: the participants do not know they are being observed. Ethical guidelines need to be taken into consideration when covert observation is being carried out.

Qualitative and descriptive research
Research designed to answer questions about the current state of affairs such as the thoughts, feelings and behaviors of individuals is known as descriptive research. Descriptive research can be qualitative or quantitative in orientation. Qualitative research is descriptive research that is focused on observing and describing events as they occur, with the goal of capturing all of the richness of everyday behavior and with the hope of discovering and understanding phenomena that might have been missed if only more cursory examinations have been made.
Neuropsychological methods

Neuropsychology seeks to connect aspects of behavior and mental activity with the structure and function of the brain. Cognitive neuropsychology and cognitive neuropsychiatry study neurological or mental impairment in an attempt to infer theories of normal mind and brain function. This typically involves looking for differences in patterns of remaining ability (known as "functional disassociations") which can give clues as to whether abilities are composed of smaller functions, or are controlled by a single cognitive mechanism.

In addition, experimental techniques are often used to study the neuropsychology of healthy individuals. These include behavioral experiments, brain-scanning or functional neuroimaging, used to examine the activity of the brain during task performance, and techniques such as transcranial magnetic stimulation, which can safely alter the function of small brain areas to reveal their importance in mental operations.

Computational modeling

Computational modeling[55] is a tool often used in mathematical psychology and cognitive psychology to simulate a particular behavior using a computer. This method has several advantages. Since modern computers process extremely quickly, many simulations can be run in a short time, allowing for a great deal of statistical power. Modeling also allows psychologists to visualize hypotheses about the functional organization of mental events that couldn't be directly observed in a human.

Several different types of modeling are used to study behavior. Connectionism uses neural networks to simulate the brain. Another method is symbolic modeling, which represents many different mental objects using variables and rules. Other types of modeling include dynamic systems and stochastic modeling.
Animal studies

Animal learning experiments aid in investigating the biological basis of teaching, memory and behavior. In the 1890s, Russian physiologist Ivan Pavlov famously used dogs to demonstrate classical conditioning. Non-human primates, cats, dogs, pigeons, rats and other rodents are often used in psychological experiments. Ideally, controlled experiments introduce only one independent variable at a time, in order to ascertain its unique effects upon dependent variables. These conditions are approximated best in laboratory settings. In contrast, human environments and genetic backgrounds vary so widely, and depend upon so many factors, that it is difficult to control important variables for human subjects. Of course, there are pitfalls in generalizing findings from animal studies to humans although animal models can be helpful in developing an understanding of human behavior (e.g., addiction research).[56]

Criticism

Theory

Criticisms of psychology often come from perceptions that it is a "soft" science. Philosopher of science Thomas Kuhn's 1962 critique[57] implied psychology overall was in a pre-paradigm state, lacking the agreement on overarching theory found in mature sciences such as chemistry and physics.

Because some areas of psychology rely on research methods such as surveys and questionnaires, critics have asserted that psychology is not an objective science. Other phenomena that psychologists are interested in, such as personality, thinking, and emotion, cannot be directly measured[58] and are often inferred from subjective self-reports, which may be problematic.[59][60]

Misuses of hypothesis-testing in psychology, and the use of hypothesis testing at all is controversial. Research has documented that many psychologists confuse statistical significance with practical importance. Statistically significant but practically unimportant results are common with large samples.[61] Some psychologists have responded with an increased use of effect size statistics, rather than sole reliance on the Fisherian $p < .05$ significance criterion (whereby an observed difference is deemed "statistically significant" if an effect of that size or larger would occur with 5% (or less) probability in independent replications, assuming the truth of the null-hypothesis of no difference between the treatments).

Sometimes the debate comes from within psychology, for example between laboratory-oriented researchers and practitioners such as clinicians. In recent years, and particularly in the U.S., there has been increasing debate about the nature of therapeutic effectiveness and about the relevance of empirically examining psychotherapeutic strategies.[62] One argument states that some therapies are based on discredited theories and are unsupported by empirical evidence. The other side points to recent research suggesting that all mainstream therapies are of about equal effectiveness, while also arguing that controlled studies often do not take into consideration real-world conditions.
Practice

Some observers perceive a gap between scientific theory and its application—in particular, the application of unsupported or unsound clinical practices. Critics say there has been an increase in the number of mental health training programs that do not instill scientific competence. One skeptic asserts that practices, such as "facilitated communication for infantile autism"; memory-recovery techniques including body work; and other therapies, such as rebirthing and reparenting, may be dubious or even dangerous, despite their popularity. In 1984, Allen Neuringer had made a similar point regarding the experimental analysis of behavior.

Current ethical standards of psychology would not permit the following studies to be conducted today. These human studies would violate the Ethics Code of the American Psychological Association, the Canadian Code of Conduct for Research Involving Humans, and the Belmont Report. Current ethical guidelines state that using non-human animals for scientific purposes is only acceptable when the harm (physical or psychological) done to animals is outweighed by the benefits of the research. Keeping this in mind, psychologists can use on animals research techniques that would not necessarily be performed on humans.

- An experiment by Stanley Milgram raised questions about the ethics of scientific experimentation because of the extreme emotional stress suffered by the participants. It measured the willingness of study participants to obey an authority figure who instructed them to perform acts that conflicted with their personal conscience.

- Harry Harlow drew condemnation for his "pit of despair" experiments on rhesus macaque monkeys at the University of Wisconsin–Madison in the 1970s. The aim of the research was to produce an animal model of clinical depression. Harlow also devised what he called a "rape rack," to which the female isolates were tied in normal monkey mating posture. In 1974, American literary critic Wayne C. Booth wrote that, "Harry Harlow and his colleagues go on torturing their nonhuman primates decade after decade, invariably proving what we all knew in advance—that social creatures can be destroyed by destroying their social ties." He writes that Harlow made no mention of the criticism of the morality of his work.

University psychology departments have ethics committees dedicated to the rights and well-being of research subjects. Researchers in psychology must gain approval of their research projects before conducting any experiment to protect the interests of human participants and laboratory animals.

Systemic Bias

In November 2010, New Scientist Magazine reported a systemic bias in psychology studies towards WEIRD ("western, educated, industrialised, rich and democratic") subjects. Although only 1/8 people worldwide fall into the WEIRD classification, New Scientist claimed that 60%-90% of psychology studies are performed on WEIRD subjects. The article gave examples of results that differ significantly between WEIRD subjects and tribal cultures, including the Müller-Lyer illusion.
Notes

- **a** Although psychoanalysis and other forms of depth psychology are most typically associated with the unconscious mind, behaviorists consider such phenomena as classical conditioning and operant conditioning, while cognitivists explore implicit memory, automaticity, and subliminal messages, all of which are understood either to bypass or to occur outside of conscious effort or attention. Indeed, cognitive-behavioral therapists counsel their clients to become aware of maladaptive thought patterns, the nature of which the clients previously had not been conscious.

- **b** Among these schools are ego psychology, object relations, and interpersonal, Lacanian, and relational psychoanalysis. Modification of Jung’s theories led to the archetypal and process-oriented schools.

- **c** For example, scientists have related brain structures to Freudian concepts such as libido, drives, the unconscious, and repression. The contributors to neuro-psychoanalysis include António Damásio,[74] [75] [76] [77] Eric Kandel, Joseph E. LeDoux,[78] Jaak Panksepp,[79] Oliver Sacks,[80] Mark Solms,[81] [82] and Douglas Watt.

- **d** Gregg Henriques of James Madison University, for example, published his Tree of Knowledge System in 2003 as a proposal for the theoretical unification of psychology.[83] For a general discussion and critique, see also Mark Jarzombek's book, *The Psychologizing of Modernity.[84]*

References


[7] wiktionary:psychology


Psychology Department” by Patricia Cohen, November 25, 2007.


[51] (http://www.apa.org/pubs/journals/proc)


[69] Blum 1994, p. 95, Blum 2002, pp. 218–219. Blum 1994, p. 95: "... the most controversial experiment to come out of the Wisconsin laboratory, a device that Harlow insisted on calling the "pit of despair."


[71] Booth, Wayne C. Modern Dogma and the Rhetoric of Assent, Volume 5, of University of Notre Dame, Ward-Phillips lectures in English language and literature, University of Chicago Press, 1974, p. 114. Booth is explicitly discussing this experiment. His next sentence is, "His most recent outrage consists of placing monkeys in “solitary” for twenty days—what he calls a "vertical chamber apparatus ... designed on an intuitive basis" to produce "a state of helplessness and hopelessness, sunken in a well of despair."


[73], http://www.newscientist.com/article/mg20827862.300-how-weird-are-you-oddball-minds-of-the-western-world.html (registration required)


External links

- Psychology (http://www.dmoz.org/Science/Social_Sciences/Psychology/) at the Open Directory Project
- American Psychological Association (http://www.apa.org/)
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