

A Personal Journey to Psychology: The Way I Perceive

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Preface

A *personal* journey to psychology. A collection of quotes from different resources, e.g., psychological books, websites, forums, & Facebook psychological pages, etc., & some *personal* (again) thoughts about them.

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Chapter 1

Wikipedia's

1.1 Wikipedia/Psychology

“*Psychology* is the **scientific** study of **mind** & **behavior**. Psychology includes the study of **conscious** & **unconscious** phenomena, including **feelings** & **thoughts**. It is an academic discipline of immense scope, crossing the boundaries between the **natural** & **social sciences**. Psychologists seek an understanding of the **emergent** properties of **brains**, linking the discipline to **neuroscience**. As social scientists, psychologists aim to understand the behavior of individuals & groups. Ψ (or **psi**) is a **Greek letter** which is commonly associated with the science of psychology.

A professional practitioner or researcher involved in the discipline is called a **psychologist**. Some psychologists can also be classified as **behavioral** or **cognitive scientists**. Some psychologists attempt to understand the role of mental functions in individual & **social behavior**. Other explore the **physiological** & **neurobiological** processes that underline cognitive functions & behaviors.

Psychologists are involved in research on **perception**, **cognition**, **attention**, **emotion**, **intelligence**, **subjective experiences**, **motivation**, **brain functioning**, & **personality**. Psychologists' interests extend to **impersonal relationships**, **psychological resilience**, **family resilience**, & other areas within **social psychology**. They also consider the unconscious mind. Research psychologists employ **empirical methods** to infer **causal** & **correlational** relationships between psychological **variables**. Some, but not all, **clinical** & **counseling** psychologists rely on **symbolic interpretation**.

While psychological knowledge is often applied to the assessment & treatment of mental health problems, it is also directed towards understanding & solving problems in several spheres of human activity. By many accounts, psychology ultimately aims to benefit society. Many psychologists are involved in some kind of therapeutic role, practicing **psychotherapy** in clinical, counseling, or **school** settings. Other psychologists conduct scientific research on a wide range of topics related to mental processes & behavior. Typically the latter group of psychologists work in academic settings (e.g., universities, medical schools, or hospitals). Another group of psychologists is employed in **industrial & organizational** settings. Yet others are involved in work on **human development**, aging, **sports**, health, **forensic science**, **education**, & the **media**.” – Wikipedia/psychology

1.1.1 Etymology & Definitions

“The word **psychology** derives from the Greek word **psyche**, for spirit or **soul**. The latter part of the word “psychology” derives from $-\lambdaογία$ **-logia**, which refers to “study” or “research”. The **Latin** word *psychologia* was 1st used by the **croatian humanist** & **Latinist** Marko Marulić in his book, *Psichiologia de ratione animae humanae* (*Psychology, on the Nature of the Human Soul*) in the late 15th century or early 16th century. The earliest known reference to the word *psychology* in English was by **Steven Blankaart** in 1694 in *The Physical Dictionary*. The dictionary refers to “Anatomy, which treats the Body, & Psychology, which treats of the Soul.”

In 1890, **William James** defined *psychology* as “the science of mental life, both of its phenomena & their conditions.” This definition enjoyed widespread currency for decades. However, this meaning was contested, notably by radical **behaviorists** such as **John B. Watson**, who in 1913 asserted that the discipline is a “natural science,” the theoretical goal of which “is the prediction & control of behavior.” Since James defined “psychology”, the term more strongly implicates scientific **experimentation**. **Folk psychology** refers to **ordinary people's**, as contrasted with psychology professionals', understanding of the mental states & behaviors of people.” – Wikipedia/psychology/etymology & definitions

1.1.2 History

“Main article: **Wikipedia/history of psychology**. The ancient civilizations of Egypt, Greece, China, India, & Persia all engaged in the philosophical study of psychology. In Ancient Egypt the **Ebers Papyrus** mentioned **depression** & thought disorders. Historians note that Greek philosophers, including **Thales**, **Plato**, & **Aristotle** (especially in his **De Anima** treatise), addressed

the workings of the mind. As early as the 4th century BC, the Greek physician **Hippocrates** theorized that **mental disorders** had physical rather than supernatural causes. In 387 BCE, Plato suggested that the brain is where mental processes take place, & in 335 BCE Aristotle suggested that it was the heart.

In China, psychological understanding grew from the philosophical works of **Laozi** & **Confucius**, & later from the doctrines of **Buddhism**. This body of knowledge involves insights drawn from introspection & observation, as well as techniques for focused thinking & acting. It frames the universe in term of a division of physical reality & mental reality as well as the interaction between the physical & the mental. Chinese philosophy also emphasized purifying the mind in order to increase virtue & power. An ancient text known as **The Yellow Emperor's Classic of Internal Medicine** identifies the brain as the nexus of wisdom & sensation, includes theories of personality based on **yin-yang** balance, & analyzes mental disorder in terms of physiological & social disequilibria. Chinese scholarship that focused on the brain advanced during the **Qing Dynasty** with the work of Western-educated Fang Yizhi (1611–1671), **Liu Zhi** (1660–1730), & Wang Qingren (1768–1831). Wang Qingren emphasized the importance of the brain as the center of the nervous system, linked mental disorder with brain diseases, investigated the causes of dreams & **insomnia**, & advanced a theory of **hemispheric lateralization** in brain function.

Influenced by **Hinduism**, **Indian philosophy** explored distinctions in types of awareness. A central idea of the **Upanishads** & other **Vedic** texts that formed the foundations of Hinduism was the distinction between a person's transient mundane self & their **eternal, unchanging soul**. Divergent Hindu doctrines & **Buddhism** have challenged this hierarchy of selves, but have all emphasized the importance of reaching higher awareness. **Yoga** encompasses a range of techniques used in pursuit of this goal. **Theosophy**, a religion established by **Russian-American** philosopher **Helena Blavatsky**, drew inspiration from these doctrines during her time in **British India**.

Psychology was of interest to **Enlightenment thinkers** in Europe. In Germany, **Gottfried Wilhelm Leibniz** (1646–1716) applied his principles of calculus to the mind, arguing that mental activity took place on an indivisible continuum. He suggested that the difference between conscious & unconscious awareness is only a matter of degree. **Christian Wolff** identified psychology as its own science, writing *Psychologia Empirica* in 1732 & *Psychologia Rationalis* in 1734. **Immanuel Kant** advanced the idea of **anthropology** as a discipline, with psychology an important subdivision. Kant, however, explicitly rejected the idea of an **experimental psychology**, writing that “the empirical doctrine of the soul can also never approach chemistry even as a systematic art of analysis or experimental doctrine, for in it the manifold of inner observation can be separated only by mere division in thought, & cannot then be held separate & recombined at will (but still less does another thinking subject suffer himself to be experimented upon to suit our purpose), & even observation by itself already changes & displaces the state of the observed object.” In 1783, Ferdinand Ueberwasser (1752–1812) designated himself *Professor of Empirical Psychology & Logic* & gave lectures on scientific psychology, though these developments were soon overshadowed by the **Napoleonic Wars**. At the end of the Napoleonic era, Prussian authorities discontinued the Old University of Münster. Having consulted philosophers **Hegel** & **Herbart**, however, in 1825 **the Prussian state** established psychology as a mandatory discipline in its rapidly expanding & highly influential **educational system**. However, this discipline did not yet embrace experimentation. In England, early psychology involved **phrenology** & the response to social problems including alcoholism, violence, & the country's crowded “lunatic” asylums.” – [Wikipedia/psychology/history](#)

Beginning of experimental psychology

Fig. **Wilhelm Wundt** (seated) with colleagues in his psychological laboratory, the 1st of its kind.

“Philosopher **John Stuart Mill** believed that the human mind was open to scientific investigation, even if the science is in some ways inexact. Mill proposed a “mental **chemistry**” in which elementary thoughts could combine into ideas of greater complexity. **Gustave Fechner** began conducting **psychophysics** research in **Leipzig** in the 1830s. He articulated the principle that human perception of a stimulus varies **logarithmically** according to its intensity. The principle became known as the **Weber–Fechner law**. Fechner's 1860 *Elements of Psychophysics* challenged Kant's negative view with regard to conducting quantitative research on the mind. Fechner's achievement was to show that “mental processes could not only be given numerical magnitudes, but also that these could be measured by experimental methods.” In Heidelberg, **Hermann von Helmholtz** conducted parallel research on sensory perception, & trained physiologist **Wilhelm Wundt**. Wundt, in turn, came to Leipzig University, where he established th psychological **laboratory** that brought experimental psychology to the world. Wundt focused on breaking down mental processes into the most basic components, motivated in part by an analogy to recent advances in chemistry, & its successful investigation of the elements & structure of materials. **Paul Flechsig** & **Emil Kraepelin** soon created another influential laboratory at Leipzig, a psychology-related lab, that focused more on experimental psychiatry.

The German psychologist **Hermann Ebbinghaus**, a researcher at the **University of Berlin**, was another 19th-century contributor to the field. He pioneered the experimental study of memory & developed quantitative models of learning & forgetting. In the early 20th century, **Wolfgang Kohler**, **Max Wertheimer**, & **Kurt Koffka** co-founded the school of **Gestalt psychology** (not to be confused with the **Gestalt therapy** of **Fritz Perls**). The approach of Gestalt psychology is based upon the idea that individuals experience things as unified wholes. Rather than **reducing** thoughts & behavior into smaller component elements, as in structuralism, the Gestaltists maintained that whole of experience is important, & differs from the sum of its parts.

Psychologists in Germany, Denmark, Austria, England, & the United States soon followed Wundt in setting up lab-

oratories. **G. Stanley Hall**, an American who studied with Wundt, founded a psychology lab that became internationally influential. The lab was located at **Johns Hopkins University**. Hall, in turn, trained **Yujiro Motora**, who brought experimental psychology, emphasizing psychophysics, to the **Imperial University of Tokyo**. Wundt's assistant, **Hugo Münsterberg**, taught psychology at Harvard to students such as **Narendra Nath Sen Gupta** – who, in 1905, founded a psychology department & laboratory at the **University of Calcutta**. Wundt's students **Walter Dill Scott**, **Lightner Witmer**, & **James McKeen Cattell** worked on developing tests of mental ability. Cattell, who also studied with eugenicist **Francis Galton**, went on to found the **Psychological Corporation**. Witmer focused on the mental testing of children; Scott, on employee selection.

Another student of Wundt, the Englishman **Edward Titchener**, created the psychology program at **Cornell University** & advanced “**structuralist**” psychology. The idea behind structuralism was to analyze & classify different aspects of the mind, primarily through the method of **introspection**. William James, **John Dewey**, & **Harvey Carr** advanced the idea of **functionalism**, an expansive approach to psychology that underlined the Darwinian idea of a behavior's usefulness to the individual. In 1890, James wrote an influential book, **The Principles of Psychology**, which expanded on the structuralism. He memorably described “**stream of consciousness**.” James's ideas interested many American students in the emerging discipline. Dewey integrated psychology with societal concerns, most notably by promoting **progressive education**, inculcating moral values in children, & assimilating immigrants.

A different strain of experimentalism, with a greater connection to physiology, emerged in South America, under the leadership of Horacio G. Piñero at the **University of Buenos Aires**. In Russia, too, researchers placed greater emphasis on the biological basis for psychology, beginning with **Ivan Sechenov**'s 1873 essay, “Who Is to Develop Psychology & How?” Sechenov advanced the idea of brain **reflexes** & aggressively promoted a **deterministic** view of human behavior. The Russian-Soviet **physiologist Ivan Pavlov** discovered in dogs a learning process that was later termed “**classical conditioning**” & applied the process to human beings.

Fig. 1 of the dogs used in Pavlov's experiment with a surgically implanted **cannula** to measure **salivation**, **preserved** in the Pavlov Museum in **Ryazan**, Russia.” – [Wikipedia/history/beginning of experimental psychology](#)

Consolidation & funding

“1 of the earliest psychology societies was *La Société de Psychologie Physiologique* in France, which lasted from 1885 to 1893. The 1st meeting of the International Congress of Psychology sponsored by the **International Union of Psychological Science** took place in Paris, in Aug 1889, amidst **the World s Fair** celebrating the centennial of the French Revolution. William James was 1 of 3 Americans among the 400 attendees. The **American Psychological Association** (APA) was founded soon after, in 1892. The International Congress continued to be held at different locations in Europe & with wide international participation. The 6th Congress, held in Geneva in 1909, included presentations in Russian, Chinese, & Japanese, as well as **Esperanto**. After a hiatus for World War I, the 7th Congress met in Oxford, with substantially greater participation from the war-victorious Anglo-Americans. In 1929, the Congress took place at Yale University in New Haven, Connecticut, attended by hundreds of members of the APA. Tokyo Imperial University led the way in bringing new psychology to the East. New ideas about psychology diffused from Japan into China.

American psychology gained status upon the U.S.'s entry into World War I. A standing committee headed by **Robert Yerkes** administered mental tests (“**Army Alpha**” & “**Army Beta**”) to almost 1.8 million soldiers. Subsequently, the **Rockefeller family**, via the **Social Science Research Council**, began to provide funding for behavioral research. Rockefeller charities funded the National Committee on Mental Hygiene, which disseminated the concept of mental illness & lobbied for applying ideas from psychology to child rearing. Through the Bureau of Social Hygiene & later funding of **Alfred Kinsey**, Rockefeller foundations helped established research on sexuality in the U.S. Under the influence of the Carnegie-funded **Eugenics Record Office**, the Draper-funded **Pioneer Fund**, & other institutions, the **eugenics movement** also influenced American psychology. In the 1910s & 1920s, eugenics became a standard topic in psychology classes. In contrast to the US, in the UK psychology was met with antagonism by the scientific & medical establishments, & up until 1939, there were only 6 psychology chairs in universities in England.

During World War II & the Cold War, the U.S. military & intelligence agencies established themselves as leading funders of psychology by way of the armed forces & in the new **Office of Strategic Services** intelligence agency. University of Michigan psychologist Dorwin Cartwright reported that university researchers began large-scale propaganda research in 1939–1941. He observed that “the last few months of the war saw a social psychologist become chiefly responsible for determining the week-by-week-propaganda policy for the United States Government.” Cartwright also wrote that psychologists had significant roles in managing the domestic economy. The Army rolled out its new **General Classification Test** to assess the ability of millions of soldiers. The Army also engaged in large-scaled psychological research of **troop morale & mental health**. In the 1950s, the **Rockefeller Foundation** & **Ford Foundation** collaborated with the **Central Intelligence Agency** (CIA) to fund research on **psychological warfare**. In 1965, public controversy called attention to the Army's **Project Camelot**, the “Manhattan Project” of social science, an effort which enlisted psychologists & anthropologists to analyze the plans & policies of foreign countries for strategic purposes.

In Germany after World War I, psychology held institutional power through the military, which was subsequently expanded along with the rest of the military during **Nazi Germany**. Under the direction of **Hermann Göring**'s cousin **Matthias Göring**,

the [Berlin Psychoanalytic Institute](#) was renamed the Göring Institute. [Freudian psychoanalysts](#) were expelled & persecuted under the anti-Jewish policies of the [Nazi Party](#), & all psychologists had to distance themselves from [Freud](#) & [Adler](#), founders of [psychoanalysis](#) who were also Jewish. The Göring Institute was well-financed throughout the war with a mandate to create a “New German Psychotherapy.” This psychotherapy aimed to align suitable Germans with the overall goals of the Reich. As described by 1 physician, “Despite the importance of analysis, spiritual guidance & the active cooperation of the patient represent the best way to overcome individual mental problems & to subordinate them to the requirements of the [Volk](#) & the [Gemeinschaft](#).” Psychologists were to provide *Seelenführung* [lit., soul guidance], the leadership of the mind, to integrate people into the new vision of a German community. [Harald Schultz-Hencke](#) melded psychology with the Nazi theory of biology & racial origins, criticizing psychoanalysis as a study of the weak & deformed. [Johannes Heinrich Schultz](#), a German psychologist recognized for developing the technique of [autogenic training](#), prominently advocated sterilization & euthanasia of men considered genetically undesirable, & devised techniques for facilitating this process.

After the war, new institutions were created although some psychologists, because of their Nazi affiliation, were discredited. [Alexander Mitscherlich](#) founded a prominent applied psychoanalysis journal called *Psyche*. With funding from the Rockefeller Foundation, Mitscherlich established the 1st clinical psychosomatic medicine division at Heidelberg University. In 1970, psychology was integrated into the required studies of medical students.

After the [Russian Revolution](#), the [Bolsheviks](#) promoted psychology as a way to engineer the “New Man” of socialism. Consequently, university psychology departments trained large numbers of students in psychology. At the completion of training, positions were made available for those students at schools, workplaces, cultural institutions, & in the military. The Russian state emphasized [pedology](#) & the study of child development. [Lev Vygotsky](#) became prominent in the field of child development. The Bolsheviks also promoted [free love](#) & embraced the doctrine of psychoanalysis as an antidote to sexual repression. Although pedology & intelligence testing fell out of favor in 1936, psychology maintained its privileged position as an instrument of the Soviet Union. [Stalinist purges](#) took a heavy toll & instilled a climate of fear in the profession, as elsewhere in Soviet society. Following World War II, Jewish psychologists past & present, including [Lev Vygotsky](#), [A. R. Luria](#), & Aron Zalkind, were denounced; Ivan Pavlov (posthumously) & Stalin himself were celebrated as heroes of Soviet psychology. Soviet academics experienced a degree of liberalization during the [Khrushchev Thaw](#). The topics of cybernetics, linguistics, & genetics became acceptable again. The new field of [engineering psychology](#) emerged. The field involved the study of the mental aspects of complex jobs (such as pilot & cosmonaut). Interdisciplinary studies became popular & scholars such as [Georgy Shchedrovitsky](#) developed systems theory approaches to human behavior.

20th-century Chinese psychology originally modeled itself on U.S. psychology, with translations from American authors like William James, the establishment of university psychology departments & journals, & the establishment of groups including the Chinese Association of Psychological Testin (1930) & the [Chinese Psychological Society](#) (1937). Chinese psychologists were encouraged to focus on education & language learning. Chinese psychologists were drawn to the idea that education would enable modernization. John Dewey, who lectured to Chinese audiences between 1919 & 1921, had a significant influence on psychology in China. Chancellor [T'sai Yuan-p'ei](#) introduced him at [Peking University](#) as a greater thinker than Confucius. [Kuo Zing-yang](#) who received a PhD at the University of California, Berkeley, became President of [Zhejiang University](#) & popularized [behaviorism](#). After the [Chinese Communist Party](#) gained control of the country, the Stalinist Soviet Union became the major influence, with [Marxism–Leninism](#) the leading social doctrine & Pavlovian conditioning the approved means of behavior change. Chinese psychologists elaborated on Lenin's model of a “reflective” consciousness, envisioning an “active consciousness” ([pinyin](#): *tzu-chueh neng-tung-li*) able to transcend material conditions through hard work & ideological struggle. They developed a concept of “recognition” ([pinyin](#): *jen-shih*) which referred to the interface between individual perceptions & the socially accepted worldview; failure to correspond with party doctrine was “incorrect recognition.” Psychology education was centralized under the [Chinese Academy of Sciences](#), supervised by the [State Council](#). In 1951, the academy created a Psychology Research Office, which in 1956 became the Institute of Psychology. Because most leading psychologists were educated in the United States, the 1st concern of the academy was the re-education of these psychologists in the Soviet doctrines. Child psychology & pedagogy for the purpose of a nationally cohesive education remained a central goal of the discipline.” – [Wikipedia/history/consolidation & funding](#)

1.1.3 Disciplinary Organization

Institutions

“See also: [Wikipedia/list of psychology organizations](#). In 1920, [Édouard Claparède](#) & [Pierre Bovet](#) created a new applied psychology organization called the International Congress of Psychotechnics Applied to Vocational Guidance, later called the International Congress of Psychotechnics & then the [International Association of Applied Psychology](#). The IAAP is considered the oldest international psychology association. Today, at least 65 international groups deal with specialized aspects of psychology. In response to male predominance in the field, female psychologists in the U.S. formed the National Council of Women Psychologists in 1941. This organization became the International Council of Women Psychologists after World War II & the International Council of Psychologists in 1959. Several associations including the [Association of Black Psychologists](#) & the Asian American Psychological Association have arisen to promote the inclusion of non-European racial

groups in the profession.

The [International Union of Psychological Science](#) (IUPsyS) is the world federation of national psychological societies. The IUPsyS was founded in 1951 under the auspices of the [United Nations Educational, Cultural & Scientific Organization](#) (UNESCO). Psychology departments have since proliferated around the world, based primarily on the Euro-American model. Since 1966, the Union has published the *International Journal of Psychology*. IAAP & IUPsyS agreed in 1976 each to hold a congress every 4 years, on a staggered basis.

IUPsyS recognizes 66 national psychology associations & at least 15 others exist. The American Psychological Association is the oldest & largest. Its membership has increased from 5,000 in 1945 to 100,000 in the present day. The APA includes [54 divisions](#), which since 1960 have steadily proliferated to include more specialties. Some of these divisions, such as the [Society for the Psychological Study of Social Issues](#) & the [American Psychology–Law Society](#), began as autonomous groups.

The [Interamerican Psychological Society](#), founded in 1951, aspires to promote psychology across the Western Hemisphere. It holds the Interamerican Congress of Psychology & has had 1,000 members in year 2000. The European Federation of Professional Psychology Associations, founded in 1981, represents 30 national associations with a total of 100,000 individual members. At least 30 other international organizations represent psychologists in different regions.

In some places, governments legally regulate who can provide psychological services or represent themselves as a “psychologist.” The APA defines a psychologist as someone with a doctoral degree in psychology.” – [Wikipedia/psychology/disciplinary organization/institutions](#)

Boundaries

“Early practitioners of experimental psychology distinguished themselves from [parapsychology](#), which in the late 19th century enjoyed popularity (including the interest of scholars such as William James). Some people considered parapsychology to be part of “psychology.” Parapsychology, hypnotism, & [psychism](#) were major topics at the early International Congresses. But students of these fields were eventually ostracized, & more or less banished from the Congress in 1900–1905. Parapsychology persisted for a time at Imperial University in Japan, with publications such as *Clairvoyance & Thoughtography* by Tomokichi Fukurai, but it was mostly shunned by 1913.

As a discipline, psychology has long sought to fend off accusations that it is a “soft” science. Philosopher of science [Thomas Kuhn](#)’s 1962 critique implied psychology overall was in a pre-paradigm state, lacking agreement on the type of overarching theory found in mature sciences such as chemistry & physics. Because some areas of psychology rely on research methods such as surveys & questionnaires, critics asserted that psychology is not an objective science. Skeptics have suggested that personality, thinking, & emotion cannot be directly measured & are often inferred from subjective self-reports, which may be problematic. Experimental psychologists have devised a variety of ways to indirectly measure these elusive phenomenological entities.

Divisions still exist within the field, with some psychologists more oriented towards the unique experiences of individual humans, which cannot be understood only as data points within a larger population. Critics inside & outside the field have argued that mainstream psychology has become increasingly dominated by a “cult of empiricism,” which limits the scope of research because investigators restrict themselves to methods derived from the physical sciences. Feminist critiques have argued that claims to scientific objectivity obscure the values & agenda of (historically) mostly male researchers. Jean Grimshaw, e.g., argues that mainstream psychological research has advanced a [patriarchal](#) agenda through its efforts to control behavior.” – [Wikipedia/psychology/disciplinary organization/boundaries](#)

1.1.4 Major Schools of Thought

Biological

Fig. False-color representations of [cerebral fiber](#) pathways affected, per Van Horn et al.

“Main article: [Wikipedia/cognitive neuroscience](#). Psychologists generally consider biology the substrate of thought & feeling, & therefore an important area of study. Behavioral neuroscience, also known as *biological psychology*, involves the application of biological principles to the study of physiological & genetic mechanisms underlying behavior in humans & other animals. The allied field of [comparative psychology](#) is the scientific study of the behavior & mental processes of non-human animals. A leading question in behavioral neuroscience has been whether & how mental functions are [localized in the brain](#). From [Phineas Gage](#) to [H.M.](#) & [Clive Wearing](#), individual people with mental deficits traceable to physical brain damage have inspired new discoveries in this area. Modern behavioral neuroscience could be said to originate in the 1870s, when in France [Paul Broca](#) traced production of speech to the left frontal gyrus, thereby also demonstrating hemispheric lateralization of brain function. Soon after, [Carl Wernicke](#) identified a related area necessary for the understanding of speech.

The contemporary field of [behavioral neuroscience](#) focuses on the physical basis of behavior. Behavioral neuroscientists use animal models, often relying on rats, to study the neural, genetic, & cellular mechanisms that underlie behaviors involved in learning, memory, & fear responses. [Cognitive neuroscientists](#), by using neural imaging tools, investigate the neural correlates of psychological processes in humans. [Neuropsychologists](#) conduct psychological assessments to determine how an individual’s

behavior & cognition are related to the brain. The **biopsychosocial model** is a cross-disciplinary, holistic model that concerns the ways in which interrelationships of biological, psychological, & socio-environmental factors affect health & behavior.

Evolutionary psychology approaches thought & behavior from a modern **evolutionary** perspective. This perspective suggests that psychological adaptations evolved to solve recurrent problems in human ancestral environments. Evolutionary psychologists attempt to find out how human psychological traits are evolved adaptations, the results of **natural selection** or **sexual selection** over the course of human evolution.

The history of the biological foundations of psychology includes evidence of racism. The idea of white supremacy & indeed the modern concept of race itself arose during the process of world conquest by Europeans. **Carl von Linnaeus**'s 4-fold classification of humans classifies Europeans as intelligent & severe, Americans as contented & free, Asians as ritualistic, & Africans as lazy & capricious. Race was also used to justify the construction of socially specific mental disorders such as **drapetomania** & **dysaesthesia aethiopica** – the behavior of uncooperative African slaves. After the creation of experimental psychology, “ethnicity psychology” emerged as a subdiscipline, based on the assumption that studying primitive races would provide an important link between animal behavior & the psychology of more evolved humans.” – **Wikipedia/major schools of thought/biological**

Behaviorist

Fig. Skinner's **teaching machine**, a mechanical invention to automate the task of **programmed instruction**.

“Main article: **Wikipedia/behaviorism**, **Psychological behaviorism**, & **Radical behaviorism**. A tenet of behavior research is that a large part of both human & lower-animal behavior is learned. A principle associated with behavioral research is that the mechanisms involved in learning apply to humans & non-human animals. Behavioral researchers have developed a treatment known as **behavior modification**, which is used to help individuals replace undesirable behaviors with desirable ones.

Early behavioral researchers studied stimulus-response pairings, now known as **classical conditioning**. They demonstrated that when a biologically potent stimulus (e.g., food that elicits salivation) is paired with a previously neutral stimulus (e.g., a bell) over several learning trials, the neutral stimulus by itself can come to elicit the response the biologically potent stimulus elicits. **Ivan Pavlov** – known best for inducing dogs to salivate in the presence of a stimulus previously linked with food – became a leading figure in the Soviet Union & inspired followers to use his methods on humans. In the United States, **Edward Lee Thorndike** initiated “**connectionist**” studied by trapping animals in “puzzle boxes” & rewarding them for escaping. Thorndike wrote in 1911, “There can be no moral warrant for studying man's nature unless the study will enable us to control his acts.” From 1910 to 1913 the American Psychological Association went through a sea change of opinion, away from **mentalism** & towards “behaviorism.” In 1913, John B. Watson coined the term behaviorism for this school of thought. Watson's famous **Little Albert experiment** [Video. The film of the Little Albert experiment.] in 1920 was at 1st thought to demonstrate that repeated use of upsetting loud noises could instill **phobias** (aversions to other stimuli) in an infant human, although such a conclusion was likely an exaggeration. **Karl Lashley**, a close collaborator with Watson, examined biological manifestations of learning in the brain.

Clark L. Hull, **Edwin Guthrie**, & others did much to help behaviorism become a widely used paradigm. A new method of “instrumental” or “**operant**” conditioning added the concepts of **reinforcement** & **punishment** to the model of behavior change. **Radical behaviorists** avoided discussing the inner workings of the mind, especially the unconscious mind, which they considered impossible to assess scientifically. Operant conditioning was 1st described by Miller & Kanorski & popularized in the U.S. by **B.F. Skinner**, who emerged as a leading intellectual of the behaviorist movement.

Noam Chomsky published an influential critique of radical behaviorism on the grounds that behaviorist principles could not adequately explain the complex mental process of **language acquisition** & language use. The review, which was scathing, did much to reduce the status of behaviorism within psychology. **Martin Seligman** & his colleagues discovered that they could condition in dogs a state of “**learned helplessness**”, which was not predicted by the behaviorist approach to psychology. **Edward C. Tolman** advanced a hybrid “cognitive behavioral” model, most notably with his 1948 publication discussing the **cognitive maps** used by rats to guess at the location of food at the end of a maze. Skinner's behaviorism did not die, in part because it generated successful practical applications.

The **Association for Behavior Analysis International** was founded in 1974 & by 2003 had members from 42 countries. The field has gained a foothold in Latin America & Japan. **Applied behavior analysis** is the term used for the application of the principles of operant conditioning to change socially significant behavior (it supersedes the term, “behavior modification”).” – **Wikipedia/major schools of thought/behaviorist**

Cognitive

“Main article: **Wikipedia/cognitive psychology**. Cognitive psychology involves the study of **mental processes**, including **perception**, **attention**, language comprehension & production, **memory**, & problem solving. Researchers in the field of cognitive psychology are sometimes called **cognitivists**. They rely on an **information processing** model of mental functioning. Cognitivist research is informed by **functionalism** & experimental psychology.

Starting in the 1950s, the experimental techniques developed by Wundt, James, Ebbinghaus, & others re-emerged as experimental psychology became increasingly cognitivist &, eventually, constituted a part of the wider, interdisciplinary **cognitive science**. Some called this development the **cognitive revolution** because it rejected the anti-mentalist dogma of behaviorism as well as the strictures of psychoanalysis.

Fig. The Stroop effect is the fact that naming the color of the 1st set of words is easier & quicker than the 2nd. Fig. **Baddeley's model of working memory**.

Albert Bandura helped along the transition in psychology from behaviorism to cognitive psychology. Bandura & other **social learning theorists** advanced the idea of vicarious learning. In other words, they advanced the view that a child can learn by observing his or her social environment & not necessarily from having been reinforced for enacting a behavior, although they did not rule out the influence of reinforcement on learning a behavior.

Fig. The **Müller-Lyer illusion**. Psychologists make inferences about mental processes from shared phenomena such as optical illusions.

Technological advances also renewed interest in mental states & mental representations. English neuroscientist **Charles Sherrington** & Canadian psychologist **Donald O. Hebb** used experimental methods to link psychological phenomena to the structure & function of the brain. The rise of computer science, cybernetics, & artificial intelligence underlined the value of comparing information processing in humans & machines.

A popular & representative topic in this area is **cognitive bias**, or irrational thought. Psychologists (& economists) have classified & described a **sizeable catalogue of biases** which recur frequently in human thought. The **availability heuristic**, e.g., is the tendency to overestimate the importance of something which happens to come readily to mind.

Elements of behaviorism & cognitive psychology were synthesized to form **cognitive behavioral therapy**, a form of psychotherapy modified from techniques developed by American psychologist **Albert Ellis** & American psychiatrist **Aaron T. Beck**.

On a broader level, cognitive science is an interdisciplinary enterprise involving cognitive psychologists, cognitive neuroscientists, linguists, & researchers in artificial intelligence, human–computer interaction, & **computational neuroscience**. The discipline of cognitive science covers cognitive psychology as well as philosophy of mind, computer science, & neuroscience. Computer simulations are sometimes used to model phenomena of interest.” – **Wikipedia/major schools of thought/cognitive**

Social

“Main article: **Wikipedia/social psychology**. See also: **Wikipedia/social psychology (sociology)**. Social psychology is concerned with how **behaviors**, **thoughts**, **feelings**, & the social environment influence human interactions. Social psychologists study such topics as the influence of others on an individual’s behavior (e.g., **conformity**, **persuasion**) & the formation of beliefs, **attitudes**, & **stereotypes** about other people. **Social cognition** fuses elements of social & cognitive psychology for the purpose of understanding how people process, remember, or distort social information. The study of **group dynamics** involves research on the nature of leadership, organizational communication, & related phenomena. In recent years, social psychologists have become interested in **implicit** measures, **medicational** models, & the interaction of person & social factors in accounting for behavior. Some concepts that **sociologists** have applied to the study of psychiatric disorders, concepts such as the social role, sick role, social class, life events, culture, migration, & **total institution**, have influenced social psychologists.” – **Wikipedia/major schools of thought/social**

Psychoanalytic

Fig. Group photo 1909 in front of **Clark University**. Front row: Sigmund Freud, G. Stanley Hall, Carl Jung; back row: **Abraham A. Brill**, **Ernest Jones**, **Sándor Ferenczi**.

“Main articles: **Wikipedia/psychodynamics** & **Wikipedia/psychoanalysis**. Psychoanalysis refers to the theories & therapeutic techniques applied to the unconscious mind & its impact on everyday life. These theories & techniques inform treatments for mental disorders. Psychoanalysis originated in the 1890s, most prominently with the work of **Sigmund Freud**. Freud’s psychoanalytic theory was largely based on interpretive methods, **introspection**, & clinical observation. It became very well known, largely because it tackled subjects such as **sexuality**, **repression**, & the unconscious. Freud pioneered the methods of **free association** & **dream interpretation**.

Psychoanalytic theory is not monolithic. Other well-known psychoanalytic thinkers who diverged from Freud include **Alfred Adler**, **Carl Jung**, **Erik Erikson**, **Melanie Klein**, **D. W. Winnicott**, **Karen Horney**, **Erich Fromm**, **John Bowlby**, Freud’s daughter **Anna Freud**, & **Harry Stack Sullivan**. These individuals ensured that psychoanalysis would evolve into diverse schools of thought. Among these schools are **ego psychology**, **object relations**, & **interpersonal**, **Lacanian**, & **relational psychoanalysis**.

Psychologists such as **Hans Eysenck** & philosophers including **Karl Popper** sharply criticized psychoanalysis. Popper argued that psychoanalysis had been misrepresented as a scientific discipline, whereas Eysenck advanced the view that psychoanalytic tenets had been contradicted by **experimental** data. By the end of the 20th century, psychology departments in **American universities** mostly had marginalized Freudian theory, dismissing it as a “desiccated & dead” historical artifact. Researchers such as **António Damásio**, **Oliver Sacks**, & **Joseph LeDoux**; & individuals in the emerging field of **neuro-psychoanalysis** have defended some of Freud’s ideas on scientific grounds.” – **Wikipedia/major schools of thought/psychoanalytic**

Existential-humanistic

Fig. Psychologist Abraham Maslow in 1943 posited that humans have a hierarchy of needs, & it makes sense to fulfill the basic needs 1st (food, water, etc.) before higher-order needs can be met.

“Main articles: [Wikipedia/existential psychology](#) & [Wikipedia/humanistic psychology](#). Humanistic psychology, which has been influenced by existentialism & phenomenology, stresses [free will](#) & [self-actualization](#). It emerged in the 1950s as a movement within academic psychology, in reaction to both behaviorism & psychoanalysis. The humanistic approach seeks to view the whole person, not just fragmented parts of the personality or isolated cognitions. Humanistic psychology also focuses on personal growth, [self-identity](#), death, aloneness, & freedom. It emphasizes subjective meaning, the rejection of determinism, & concern for positive growth rather than pathology. Some founders of the humanistic school of thought were American psychologists [Abraham Maslow](#), who formulated a [hierarchy of human needs](#), & [Carl Rogers](#), who created & developed [client-centered therapy](#).

Later, [positive psychology](#) opened up humanistic themes to scientific study. Positive psychology is the study of factors which contribute to human happiness & well-being, focusing more on people who are currently healthy. In 2010, *Clinical Psychological Review* published a special issue devoted to positive psychological interventions, such as [gratitude journaling](#) & the physical expression of gratitude. It is, however, far from clear that positive psychology is effective in making people happier. Positive psychological interventions have been limited in scope, but their effects are thought to be somewhat better than [placebo](#) effects. The evidence, however, is far from clear that interventions based on positive psychology increase human happiness or resilience.

The *American Association for Humanistic Psychology*, formed in 1963, declared:

Humanistic psychology is primarily an orientation toward the whole of psychology rather than a distinct area or school. It stands for respect for the worth of persons, respect for differences of approach, open-mindedness as to acceptable methods, & interest in exploration of new aspects of human behavior. As a “3rd force” in contemporary psychology, it is concerned with topics having little place in existing theories & systems: e.g., love, creativity, self, growth, organism, basic need-gratification, self-actualization, higher values, being, becoming, spontaneity, play, humor, affection, naturalness, warmth, ego-transcendence, objectivity, autonomy, responsibility, meaning, fair-play, transcendental experience, peak experience, courage, & related concepts.

Existential psychology emphasizes the need to understand a client’s total orientation towards the world. Existential psychology is opposed to reductionism, behaviorism, & other methods that objectify the individual. In the 1950s & 1960s, influenced by philosophers [Søren Kierkegaard](#) & [Martin Heidegger](#), psychoanalytically trained American psychologist [Rollo May](#) helped to develop existential psychology. [Existential psychotherapy](#), which follows from existential psychology, is a therapeutic approach that is based on the idea that a person’s inner conflict arises from that individual’s confrontation with the givens of existence. Swiss psychoanalyst [Ludwig Binswanger](#) & American psychologist [George Kelly](#) may also be said to belong to the existential school. Existential psychologists tend to differ from more “humanistic” psychologists in the former’s relatively neutral view of human nature & relatively positive assessment of anxiety. Existential psychologists emphasized the humanistic themes of death, free will, & meaning, suggesting that meaning can be shaped by myths & narratives; meaning can be deepened by the acceptance of free will, which is requisite to living an [authentic](#) life, albeit often with anxiety with regard to death.

Austrian existential psychiatrist & [Holocaust](#) survivor [Viktor Frankl](#) drew evidence of meaning’s therapeutic power from reflections upon his own [internment](#). He created a variation of existential psychotherapy called [logotherapy](#), a type of [existentialist](#) analysis that focuses on a *will to meaning* (in one’s life), as opposed to Adler’s [Nietzschean](#) doctrine of *will to power* or Freud’s *will to pleasure*.” – [Wikipedia/major schools of thought/existential-humanistic](#)

1.1.5 Themes

Personality

“Main article: [Wikipedia/personality psychology](#). Personality psychology is concerned with enduring patterns of behavior, thought, & emotion. Theories of personality vary across different psychological schools of thought. Each theory carries different assumptions about such features as the role of the unconscious & the importance of childhood experience. According to Freud, personality is based on the dynamic interactions of the [id](#), [ego](#), & [super-ego](#). By contrast, [trait theorists](#) have developed taxonomies of personality constructs in describing personality in terms of key traits. Trait theorists have often employed statistical data-reduction methods, such as [factor analysis](#). Although the number of proposed traits has varied widely, [Hans Eysenck](#)’s early biologically-based model suggests at least 3 major trait constructs are necessary to describe human personality, [extraversion–introversion](#), [neuroticism–stability](#), & [psychoticism–normality](#). [Raymond Cattell](#) empirically derived a theory of [16 personality factors](#) at the primary-factor level & up to 8 broader second-stratum factors. Since 1980s, the [Big 5](#) ([openness to experience](#), [conscientiousness](#), [extraversion](#), [agreeableness](#), & [neuroticism](#)) emerged as an important trait theory of personality. Dimensional models of personality are receiving increasing support, & a version of dimensional assessment has been included in the [DSM-V](#). However, despite a plethora of research into the various versions of the “Big

5” personality dimensions, it appears necessary to move on from static conceptualizations of personality structure to a more dynamic orientation, acknowledging that personality constructs are subject to learning & change over the lifespan.

An early example of personality assessment was the [Woodworth Personal Data Sheet](#), constructed during World War I. The popular, although psychometrically inadequate, [Myers–Briggs Type Indicator](#) was developed to assess individuals’ “personality types” according to the [personality theories of Carl Jung](#). The [Minnesota Multiphasic Personality Inventory](#) (MMPI), despite its name, is more a dimensional measure of psychopathology than a personality measure. [California Psychological Inventory](#) contains 20 personality scales (e.g., independence, tolerance). The [International Personality Item Pool](#), which is in the public domain, has become a source of scales that can be used personality assessment.” – [Wikipedia/psychology/themes/personality](#)

Unconscious mind

“See also: [Wikipedia/unconscious mind/psychology](#). Study of the unconscious mind, a part of the psyche outside the individual’s awareness but that is believed to influence conscious thought & behavior, was a hallmark of early psychology. In 1 of the 1st psychology experiments conducted in the United States, [C.S. Peirce](#) & [Joseph Jastrow](#) found in 1884 that research subjects could choose the minutely heavier of 2 weights even if consciously uncertain of the difference. Freud popularized the concept of the unconscious mind, particularly when he referred to an uncensored intrusion of unconscious thought into one’s speech (a [Freudian slip](#)) or to his efforts [to interpret dreams](#). His 1901 book *The Psychopathology of Everyday Life* catalogues hundreds of everyday events that Freud explains in terms of unconscious influence. [Pierre Janet](#) advanced the idea of a subconscious mind, which could contain autonomous mental elements unavailable to the direct scrutiny of the subject.

The concept of unconscious processes has remained important in psychology. Cognitive psychologists have used a “filter” model of attention. According to the model, much information processing takes place below the threshold of consciousness, & only certain stimuli, limited by their nature & number, make their way through the filter. Much research has shown that subconscious [priming](#) of certain ideas can covertly influence thoughts & behavior. Because of the unreliability of self-reporting, a major hurdle in his type of research involves demonstrating that a subject’s conscious mind has not perceived a target stimulus. For this reason, some psychologists prefer to distinguish between [implicit](#) & [explicit](#) memory. In another approach, one can also describe a [subliminal stimulus](#) as meeting an *objective* but not a *subjective* threshold.

The [automaticity](#) model of [John Bargh](#) & others involves the ideas of automatically & unconscious processing in our understanding of [social behavior](#), although there has been dispute with regard to replication. Some experimental data suggest that the [brain begins to consider taking actions](#) before the mind becomes aware of them. The influence of unconscious forces on people’s choices bears on the philosophical question of free will. John Bargh, [Daniel Wegner](#), & [Ellen Langer describe free will as an illusion](#).” – [Wikipedia/psychology/themes/unconscious mind](#)

Motivation

“Main article: [Wikipedia/motivation](#). Some psychologist study motivation or the subject of why people or lower animals initiate a behavior at a particular time. It also involves the study of why humans & lower animals continue or terminate a behavior. Psychologists such as William James initially used the term *motivation* to refer to intention, in a sense similar to the concept of [will](#) in European philosophy. With the steady rise of Darwinian & Freudian thinking, instinct also came to be seen as a primary source of motivation. According to [drive theory](#), the forces of instinct combine into a single source of energy which exerts a constant influence. Psychoanalysis, like biology, regarded these forces as demands originating in the nervous system. Psychoanalysts believed that these forces, especially the sexual instincts, could become entangled & transmuted within the psyche. Classical psychoanalysis conceives of a struggle between the pleasure principle & the [reality principle](#), roughly corresponding to id & ego. Later, in *Beyond the Pleasure Principle*, Freud introduced the concept of the [death drive](#), a compulsion towards aggression, destruction, & [psychic repetition of traumatic events](#). Meanwhile, behaviorist researchers used simple dichotomous models (pleasure/pain, reward/punishment) & well-established principles such as the idea that a thirsty creature will take pleasure in drinking. [Clark Hull](#) formalized the latter idea with his [drive reduction](#) model.

Hunger, thirst, fear, sexual desire, & thermoregulation constitute fundamental motivations in animals. Humans seem to exhibit a more complex set of motivations – though theoretically these could be explained as resulting from desires for belonging, positive self-image, self-consistency, truth, love, & control.

Motivation can be modulated or manipulated in many different ways. Researchers have found that [eating](#), e.g., depends not only on the organism’s fundamental need for [homeostatis](#) – an important factor causing the experience of hunger – but also on circadian rhythms, food availability, food palatability, & cost. Abstract motivations are also malleable, as evidenced by such phenomena as *goal contagion*: the adoption of goals, sometimes unconsciously, based on inferences about the goals of others. [Vohs](#) & [Baumeister](#) suggest that contrary to the need-desire-fulfillment cycle of animal instincts, human motivations sometimes obey a “getting begets wanting” rule: the more you get a reward such as self-esteem, love, drugs, or money, the more you want it. They suggest that this principle can even apply to food, drink, sex, & sleep.” – [Wikipedia/psychology/themes/motivation](#)

Development psychology

Fig. Developmental psychologists would engage a child with a book & then make observations based on how the child interacts with the object.

“Main article: [Wikipedia/developmental psychology](#). Developmental psychology refers to the scientific study of how & why the thought processes, emotions, & behaviors of humans change over the course of their lives. Some credit Charles Darwin with conducting the 1st systematic study within the rubric of developmental psychology, having published in 1877 a short paper detailing the development of innate forms of communication based on his observations of his infant son. The main origins of the discipline, however, are found in the work of [Jean Piaget](#). Like Piaget, developmental psychologists originally focused primarily on the development of cognition from infancy to adolescence. Later, development psychology extended itself to the study cognition over the life span. In addition to studying cognition, developmental psychologists have also come to focus on affective, behavioral, moral, social, & neural development.

Developmental psychologists who study children use a number of research methods. E.g., they make observations of children in natural settings such as preschools & engage them in experimental tasks. Such tasks often resemble specially designed games & activities that are both enjoyable for the child & scientifically useful. Developmental researchers have even devised clever methods to study the mental processes of infants. In addition to studying children, development psychologists also study aging & processes throughout the life span, including old age. These psychologists draw on the full range of psychological theories to inform their research.” – [Wikipedia/psychology/themes/development psychology](#)

Genes & environment

“Main article: [Wikipedia/behavioral genetics](#). All researched psychological traits are influenced by both [genes](#) & [environment](#), to varying degrees. These 2 sources of influence are often confounded in observational research of individuals & families. An example of this confounding can be shown in the transmission of [depression](#) from a depressed mother to her offspring. A theory based on environmental transmission would hold that an offspring, by virtue of his or her having a problematic rearing environment managed by a depressed mother, is at risk for developing depression. On the other hand, a hereditarian theory would hold that depression risk in an offspring is influenced to some extent by genes passed to the child from the mother. Genes & environment in these simple transmission models are completely confounded. A depressed mother may both carry genes that contribute to depression in her offspring & also create a rearing environment that increases the risk of depression in her child.

[Behavioral genetics](#) researchers have employed methodologies that help to disentangle this confound & understand the nature & origins of individual differences in behavior. Traditionally the research has involved [twin studies](#) & [adoption studies](#), 2 designs where genetic & environmental influences can be partially un-confounded. More recently, gene-focused research has contributed to understanding genetic contributions to the development of psychological traits.

The availability of [microarray molecular genetic](#) or [genome sequencing](#) technologies allows researchers to measure participant DNA variation directly, & test whether individual genetic variants within genes are associated with psychological traits & [psychopathology](#) through methods including [genome-wide association studies](#). 1 goal of such research is similar to that in [positional cloning](#) & its success in [Huntington's](#): once a causal gene is discovered biological research can be conducted to understand how that gene influences the phenotype. 1 major result of genetic association studies is the general finding that psychological traits & psychopathology, as well as complex medical diseases, are highly [polygenic](#), where a large number (on the order of hundreds to thousands) of genetic variants, each of small effect, contribute to individual differences in the behavioral trait or propensity to the disorder. Active research continues to work toward understanding the genetic & environmental bases of behavior & their interaction.” – [Wikipedia/psychology/themes/genes & environment](#)

1.1.6 Applications

“Further information: [Wikipedia/outline of psychology](#), [Wikipedia/list of psychology disciplines](#), [Wikipedia/applied psychology](#), & [Wikipedia/subfields of psychology](#). Psychology encompasses many subfields & includes different approaches to the study of mental processes & behavior.” – [Wikipedia/psychology/applications](#)

Psychological testing

“See also: [Wikipedia/psychometrics](#) & [Wikipedia/social statistics](#). Psychological testing has ancient origins, dating as far back as 2200 BC, in the [examinations for the Chinese civil service](#). Written exams began during the Han dynasty (202 BC – AD 200). By 1370, the Chinese system required a stratified series of tests, involving essay writing & knowledge of diverse topics. The system was ended in 1906. In Europe, mental assessment took a different approach, with theories of [physiognomy](#) – judgment of character based on the face – described by Aristotle in 4th century BC Greece. Physiognomy remained current through the Enlightenment, & added the doctrine of phrenology: a study of mind & intelligence based on simple assessment of neuroanatomy.

When experimental psychology came to Britain, Francis Galton was a leading practitioner. By virtue of his procedures for measuring reaction time & sensation, he is considered an inventor of modern mental testing (also known as *psychometrics*). James McKeen Cattell, a student of Wundt & Galton, brought the idea of psychological testing to the United States, & in fact coined the term “mental test”. In 1901, Cattell’s student **Clark Wissler** published discouraging results, suggesting that mental testing of Columbia & Barnard students failed to predict academic performance. In response to 1904 orders from the **Minister of Public Instruction**, French psychologists **Alfred Binet** & **Théodore Simon** developed & elaborated a new test of intelligence in 1905–1911. They used a range of questions diverse in their nature & difficulty. Binet & Simon introduced the concept of **mental age** & referred to the lowest scorers on their test as *idiots*. **Henry H. Goddard** put the Binet–Simon scale to work & introduced classifications of mental level such as *imbecile* & *feeble-minded*. In 1916, (after Binet’s death), Stanford professor **Lewis M. Terman** modified the Binet–Simon scale (renamed the **Stanford–Binet scale**) & introduced the **intelligence quotient** as a score report. Based on his test findings, & reflecting the racism common to that era, Terman concluded that intellectual disability “represents the level of intelligence which is very, very common among Spanish–Indians & Mexican families of the Southwest & also among negroes. Their dullness seems to be racial.”

Following the Army Alpha & Army Beta tests, which was developed by psychologist **Robert Yerkes** in 1917 & then used in World War I by industrial & organizational psychologists for large-scale employee testing & selection of military personnel. Mental testing also became popular in the U.S., where it was applied to schoolchildren. The federally created National Intelligence Test was administered to 7 million children in the 1920s. In 1926, the **College Entrance Examination Board** created the **Scholastic Aptitude Test** to standardize college admissions. The results of intelligence tests were used to argue for segregated schools & economic functions, including the preferential training of Black Americans for manual labor. These practices were criticized by Black intellectuals such as **Horace Mann Bond** & **Allison Davis**. Eugenists used mental testing to justify & organize compulsory sterilization of individuals classified as mentally retarded (now referred to as **intellectual disability**). In the United States, tens of thousands of men & women were sterilized. Setting a precedent that has never been overturned, the U.S. Supreme Court affirmed the constitutionality of this practice in the 1927 case **Buck v. Bell**.

Today mental testing is a routine phenomenon for people of all ages in Western societies. Modern testing aspires to criteria including standardization of procedure, **consistency of results**, output of an interpretable score, statistical norms describing population outcomes, &, ideally, **effective prediction** of behavior & life outcomes outside of testing situations. Developments in psychometrics include work on test & scale **reliability** & **validity**. Developments in **item-response theory**, **structural equation modeling**, & bifactor analysis have helped in strengthening test & scale construction.”

– [Wikipedia/psychology/applications/psychological testing](https://en.wikipedia.org/wiki/Wikipedia:Psychology/applications/psychological_testing)

Mental health care

“See also: [Wikipedia/clinical psychology](https://en.wikipedia.org/wiki/Wikipedia:clinical_psychology). The provision of psychological health services is generally called *clinical psychology* in the U.S. sometimes, however, members of the school psychology & counseling psychology professions engage in practices that resemble that of clinical psychologists. Clinical psychologists typically include people who have graduated from doctoral programs in clinical psychology. In Canada, some of the members of the abovementioned groups usually fall within the larger category of **professional psychology**. In Canada & the U.S., practitioners get bachelor’s degrees & doctorates; doctoral students in clinical psychology usually spend 1 year in a predoctoral internship & 1 year in postdoctoral internship. In Mexico & most other Latin American & European countries, psychologists do not get bachelor’s & doctoral degrees; instead, they take a 3-year professional course following high school. Clinical psychology is at present the largest specialization within psychology. It includes the study & application of psychology for the purpose of understanding, preventing, & relieving psychological distress, dysfunction, &/or **mental illness**. Clinical psychologists also try to promote subjective well-being & personal growth. Central to the practice of clinical psychology are psychological assessment & psychotherapy although clinical psychologists may also engage in research, teaching, consultation, forensic testimony, & program development & administration.

Credit for the 1st psychology clinic in the United States typically goes to **Lightner Witmer**, who established his practice in Philadelphia in 1896. Another modern psychotherapist was **Morton Prince**, an early advocate for the establishment of psychology as a clinical & academic discipline. In the 1st part of the 20th century, most mental health care in the United States was performed by psychiatrists, who are medical doctors. Psychology entered the field with its refinements of mental testing, which promised to improve the diagnosis of mental problems. For their part, some psychiatrists became interested in using **psychoanalysis** & other forms of **psychodynamic psychotherapy** to understand & treat the mentally ill.

Psychotherapy as conducted by psychiatrists blurred the distinction between psychiatry & psychology, & this trend continued with the rise of **community mental health facilities**. Some in the clinical psychology community adopted **behavioral therapy**, a thoroughly non-psychodynamic model that used behaviorist learning theory to change the actions of patients. A key aspect of behavior therapy is empirical evaluation of the treatment’s effectiveness. In the 1970s, **cognitive-behavior therapy** emerged with the work of **Albert Ellis** & **Aaron Beck**. Although there are similarities between behavior therapy & cognitive-behavior therapy, cognitive-behavior therapy required the application of cognitive constructs. Since the 1970s, the popularity of cognitive-behavior therapy among clinical psychologists increased. A key practice in behavioral & cognitive-behavioral therapy is exposing patients to things they fear, based on the premise that their responses (fear, panic, anxiety) can be deconditioned.

Mental health care today involves psychologists & **social workers** in increasing numbers. In 1977, National Institute of Mental Health director **Bertram Brown** described this shift as a source of “intense competition & role confusion.” Graduate programs issuing doctorates in clinical psychology emerged in the 1950s & underwent rapid increase through the 1980s. The PhD degree is intended to train practitioners who could also conduct scientific research. The PsyD degree is more exclusively designed to train practitioners.

Some clinical psychologists focus on the clinical management of patients with brain injury. This subspecialty is known as **clinical neuropsychology**. In many countries, clinical psychology is a regulated mental health profession. The emerging field of *disaster psychology* (see **crisis intervention**) involves professionals who respond to large-scale traumatic events.

The work performed by clinical psychologists tends to be influenced by various therapeutic approaches, all of which involve a formal relationship between professional & client (usually an individual, couple, family, or small group). Typically, these approaches encourage new ways of thinking, feeling, or behaving. 4 major theoretical perspectives are psychodynamic, cognitive behavioral, existential–humanistic, & 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, & sexual orientation. With the advent of more robust research findings regarding psychotherapy, there is evidence that most of the major therapies have equal effectiveness, with the key common element being a strong **therapeutic alliance**. Because of this, more training programs & psychologists are now adopting an **eclectic therapeutic orientation**.

Diagnosis in clinical psychology usually follows the *Diagnostic & Statistical Manual of Mental Disorders* (DSM). The study of mental illnesses is called **abnormal psychology**.” – [Wikipedia/psychology/applications/mental health care](#)

Education

Fig. An example of an item from a cognitive abilities test used in educational psychology.

“Main articles: [Wikipedia/educational psychology](#) & [Wikipedia/school psychology](#). **Educational psychology** is the study of how humans learn in educational settings, the effectiveness of educational interventions, the psychology of teaching, & the social psychology of **schools** as organizations. Educational psychologists can be found in preschools, schools of all levels including post secondary institutions, community organizations & learning centers, Government or private research firms, & independent or private consultant. The work of developmental psychologists such as Lev Vygotsky, **Jean Piaget**, & **Jerome Bruner** has been influential in creating teaching methods & educational practices. Educational psychology is often included in teacher education programs in places such as North America, Australia, & New Zealand.

School psychology combines principles from educational psychology & clinical psychology to understand & treat students with learning disabilities; to foster the intellectual growth of **gifted** students; to facilitate **prosocial behaviors** in adolescents; & otherwise to promote safe, supportive, & effective learning environments. School psychologists are trained in educational & behavioral assessment, intervention, prevention, & consultation, & many have extensive training in research.” – [Wikipedia/psychology/applications/education](#)

Work

“See also: [Wikipedia/industrial & organizational psychology](#) & [Wikipedia/organizational behavior](#). Industrial & organizational (I/O) psychology involves research & practices that apply psychological theories & principles to organizations & individuals’ work-lives. In the field’s beginnings, industrialists brought the nascent field of psychology to bear on the study of **scientific management** techniques for improving workplace efficiency. The field was at 1st called *economic psychology* or *business psychology*; later, *industrial psychology*, *employment psychology*, or *psychotechnology*. An influential early study examined workers at Western Electric’s Hawthorne plant in Cicero, Illinois from 1924 to 1932. Western Electric experimented on factory workers to assess their responses to changes in illumination, breaks, food, & wages. The researchers came to focus on workers’ responses to observation itself, & the term **Hawthorne effect** is now used to describe the fact that people work harder when they think they’re being watched. Although the Hawthorne research can be found in psychology textbooks, the research & its findings, however, were weak at best.

The name industrial & organizational psychology emerged in the 1960s. In 1973, it became enshrined in the name of the **Society for Industrial & Organizational Psychology**, Division 14 of the American Psychological Association. 1 goal of the discipline is to optimize human potential in the workplace. Personnel psychology is a subfield of I/O psychology. Personnel psychologists apply the methods & principles of psychology in selecting & evaluating workers. Another subfield, **organizational psychology**, examines the effects of work environments & management styles on worker motivation, job satisfaction, & productivity. Most I/O psychologists work outside of academia, for private & public organizations & as consultants. A psychology consultant working in business today might expect to provide executives with information & ideas about their industry, their target markets, & the organization of their company.

Organizational behavior (OB) is an allied field involved in the study of human behavior within organizations. 1 way to differentiate I/O psychology from OB is to note that I/O psychologists train in university psychology departments & OB specialists, in business schools.” – [Wikipedia/psychology/applications/work](#)

Military & intelligence

“1 role for **psychologists in the military** has been to evaluate & counsel soldiers & other personnel. In the U.S., this function began during World War I, when Robert Yerkes established the School of Military Psychology at **Fort Oglethorpe** in Georgia. The school provided psychological training for military staff. Today, U.S. Army psychologists perform psychological screening, clinical psychotherapy, **suicide prevention**, & treatment for post-traumatic stress, as well as provide prevention-related services, e.g., smoking cessation. The United States Army’s Mental Health Advisory Teams implement psychological interventions to help combat troops experiencing mental problems.

Psychologists may also work on a diverse set of campaigns known broadly as psychological warfare. Psychological warfare chiefly involves the use of propaganda to influence enemy soldiers & civilians. This so-called *black propaganda* is designed to seem as if it originates from a source other than the Army. The CIA’s **MKULTRA** program involved more individualized efforts at **mind control**, involving techniques such as hypnosis, torture, & covert involuntary administration of **LSD**. The U.S. military used the name **Psychological Operations** (PSYOP) until 2010, when these activities were reclassified as Military Information Support Operations (MISO), part of **Information Operations** (IO). Psychologists have sometimes been involved in assisting the interrogation & torture of suspects, staining the records of the psychologists involved.” – [Wikipedia/psychology/applications/military & intelligence](#)

Health, well-being, & social change

“See also: [Wikipedia/health psychology](#), [Wikipedia/social issues](#), & [Wikipedia/occupational health psychology](#).

Social change. An example of the contribution of psychologists to social change involves the research of **Kenneth B. Clark & Mamie Phipps Clark**. These 2 African American psychologists studied segregation’s adverse psychological impact on Black children. Their research findings played a role in the desegregation case **Brown v. Board of Education** (1954).

The impact of psychology on social change includes the discipline’s broad influence on teaching & learning. Research has shown that compared to the “whole word” or “whole language” approach, the phonics approach to reading instruction is more efficacious.

Medical applications. Medical facilities increasingly employ psychologists to perform various roles. 1 aspect of health psychology is the **psychoeducation** of patients: instructing them in how to follow a medical regimen. Health psychologists can also educate doctors & conduct research on patient compliance. Psychologists in the field of public health use a wide variety of interventions to influence human behavior. These range from public relations campaigns & outreach to governmental laws & policies. Psychologists study the composite influence of all these different tools in an effort to influence whole **populations** of people.

Worker health, safety & wellbeing. Psychologists work with organizations to apply findings from psychological research to improve the health & well-being of employees. Some work as external consultants hired by organizations to solve specific problems, whereas others are full-time employees of the organization. Applications include conducting surveys to identify issues & designing interventions to make work healthier. Some of the specific health areas include:

- Accidents & injuries: A major contribution is the concept of **safety climate**, which is employee shared perceptions of the behaviors that are encouraged (e.g., wearing safety gear) & discouraged (not following safety rules) at work. Organizations with strong safety climates have fewer **work accidents** & injuries.
- **Cardiovascular disease**: Cardiovascular disease has been related to lack of **job control**.
- Mental health: Exposure to **occupational stress** is associated with mental health disorder.
- **Musculoskeletal disorder**: These are injuries in bones, nerves & tendons due to overexertion & repetitive strain. They have been linked to job satisfaction & workplace stress.
- Physical health symptoms: Occupational stress has been linked to physical symptoms such as digestive distress & headache.
- **Workplace violence**: Violence prevention climate is related to being physically assaulted & psychologically mistreated at work.

Interventions that improve climates are a way to address accidents & violence. Interventions that reduce stress at work or provide employees with tools to better manage it can help in areas where stress is an important component.

Industrial psychology became interested in worker fatigue during World War I, when government ministers in Britain were concerned about the impact of fatigue on workers in munitions factories but not other types of factories. In the U.K. some interest in worker **well-being** emerged with the efforts of **Charles Samuel Myers** & his National Institute of Industrial

Psychology (NIIP) during the inter-War years. In the U.S. during the mid-20th century industrial psychologist [Arthur Kornhauser](#) pioneered the study of occupational mental health, linking industrial working conditions to mental health as well as the spillover of an unsatisfying job into a worker's personal life. Zickar accumulated evidence to show that "no other industrial psychologist of his era was as devoted to advocating management & labor practices that would improve the lives of working people."

Occupational health psychology. As interest in the worker health expanded toward the end of the 20th century, the field of [occupational health psychology](#) (OHP) emerged. OHP is a branch of psychology that is interdisciplinary. OHP is concerned with the health & safety of workers. OHP addresses topic areas such as the impact of occupational stressors on physical & mental health, mistreatment of workers (e.g., bullying & violence), work-family balance, the impact of [involuntary unemployment](#) on physical & mental health, the influence of psychosocial factors on safety & accidents, & interventions designed to improve/protect worker health. OHP grew out of [health psychology](#), [industrial & organizational psychology](#), & [occupational medicine](#). OHP has also been informed by disciplines outside psychology, including [industrial engineering](#), [sociology](#), & [economics](#)." – [Wikipedia/psychology/applications/health, well-being, & social change](#)

1.1.7 Research Methods

"Main articles: [Wikipedia/psychological research](#) & [Wikipedia/list of psychological research methods](#). [Quantitative psychological research](#) lends itself to the statistical testing of hypotheses. Although the field makes abundant use of randomized & controlled experiments in laboratory settings, such research can only assess a limited range of short-term phenomena. Some psychologists rely on less rigorously controlled, but more [ecologically valid](#), [field experiments](#) as well. Other research psychologists rely on statistical methods to glean knowledge from population data. The statistical methods research psychologists employ include the [Pearson product-moment correlation coefficient](#), the [analysis of variance](#), [multiple linear regression](#), [logical regression](#), [structural equation modeling](#), & [hierarchical linear modeling](#). The [measurement & operationalization](#) of important [constructs](#) is an essential part of these research designs.

Although this type of psychological research is much less abundant than quantitative research, some psychologists conduct [qualitative research](#). This type of research can involve interviews, questionnaires, & 1st-hand observation. While hypothesis testing is rare, virtually impossible, in qualitative research, qualitative studies can be helpful in theory & hypothesis generation, interpreting seemingly contradictory quantitative findings, & understanding why some interventions fail & others succeed." – [Wikipedia/psychology/research methods](#)

Controlled experiments

Fig. Flowchart of 4 phrases (enrollment, intervention allocation, follow-up, & data analysis) of a parallel randomized trial of 2 groups, modified from the [CONSORT 2010 Statement](#).

"Main article: [Wikipedia/experiment](#). A [true experiment](#) with [random](#) assignment of research participants (sometimes called *subjects*) to rival conditions allows researchers to make strong inferences about causal relationships. When there are large numbers of research participants, the random assignment (also called *random allocation*) of those participants to rival conditions ensures that the individuals in those conditions will, on average, be similar on most characteristics, including characteristics that went unmeasured. In an experiment, the researcher alters 1 or more variables of influence, called [independent variables](#), & measures resulting changes in the factors of interest, called [dependent variables](#). Prototypical experimental research is conducted in a laboratory with a carefully controlled environment.

A [quasi-experiment](#) refers to a situation in which there are rival conditions under study but random assignment to the different conditions is not possible. Investigators must work with preexisting groups of people. Researchers can use common sense to consider how much the nonrandom assignment threatens the study's [validity](#). E.g., in research on the best way to affect reading achievement in the 1st 3 grades of school, school administrators may not permit educational psychologists to randomly assign children to phonics & whole language classrooms, in which case the psychologists must work with preexisting classroom assignments. Psychologists will compare the achievement of children attending phonics & whole language classes &, perhaps, statistically adjust for any initial differences in reading level.

Fig. The experimenter (E) orders the teacher (T), the subject of the experiment, to give what the latter believes are painful electric shocks to a learner (L), who is actually an actor & [confederate](#). The subject believes that for each wrong answer, the learner was receiving actual electric shocks, though in reality there were no such punishments. Being separated from the subject, the confederate set up a tape recorder integrated with the electro-shock generator, which played pre-recorded sounds for each shock level etc.

Experimental researchers typically use a [statistical hypothesis testing](#) model which involves making predictions before conducting the experiment, then assessing how well the data collected are consistent with the predictions. These predictions are likely to originate from 1 or more abstract scientific [hypotheses](#) about how the phenomenon under study actually works." – [Wikipedia/psychology/research methods/controlled experiments](#)

Other types of studies

“**Surveys** are used in psychology for the purpose of measuring **attitudes** & **traits**, monitoring changes in **mood**, & checking the validity of experimental manipulations (checking research participants’ perception of the condition they were assigned to). Psychologists have commonly used paper-&-pencil surveys. However, surveys are also conducted over the phone or through e-mail. Web-based surveys are increasingly used to conveniently reach many subjects.

Observational studies are commonly conducted in psychology. In **cross-sectional** observational studies, psychologists collect data at a single point in time. The goal of many cross-sectional studies is the assess the extent factors are correlated with each other. By contrast, in **longitudinal studies** psychologists collect data on the same sample at 2 or more points in time. Sometimes the purpose of longitudinal research is to study trends across time such as the stability of traits or age-related changes in behavior. Because some studies involve endpoints that psychologists cannot ethically study from an experimental standpoint, such as identifying the causes of depression, they conduct longitudinal studies a large group of depression-free people, periodically assessing what is happening in the individuals’ lives. In this way psychologists have an opportunity to test causal hypotheses regarding conditions that commonly arise in people’s lives that put them at risk for depression. Problems that affect longitudinal studies include **slection attrition**, the type of problem in which bias is introduced when a certain type of research participant disproportionately leaves a study.

Expoloratory data analysis refers to a variety of practices that researchers use to reduce a great many variables to a small number overarching factors. In **Peirce’s 3 modes of inference**, exploratory data analysis corresponds to **abduction**. **Meta-analysis** is the technique research psychologists use to integrate results from many studies of the same variables & arriving at a grand average of the findings.” – [Wikipedia/psychology/research methods/other types of studies](#)

Direct brain observation/manipulation

Fig. An EEG recording setup.

“A classic & popular tool used to relate mental & neural activity is the **electroencephalogram** (EEG), a technique using amplified electrodes on a person’s scalp to measure voltage changes in different parts of the brain. **Hans Berger**, the 1st researcher to use EEG on an unopened skull, quickly found that brains exhibit signature “brain waves”: electric oscillations which correspond to different states of consciousness. Researchers subsequently refined statistical methods for synthesizing the electrode data, & identified unique brain wave patterns such as the **delta wave** observed during non-REM sleep.

Newer **functional neuroimaging** techniques include **functional magnetic resonance imaging** & **position emission tomogra-phy**, both of which track the flow of blood through the brain. These technologies provide more localized information about activity in the brain & create representations of the brain with widespread appeal. They also provide insight which avoids the classic problems of subjective self-reporting. It remains challenging to draw hard conclusions about where in the brain specific thoughts originate – or even how usefully such localization corresponds with reality. However, neuroimaging has delivered unmistakable results showing the existence of correlations between mind & brain. Some of these draw on a systemic **neural network** model rather than a localized function model.

Interventions such as **transcranial magnetic stimulation** & drugs also provide information about brain-mind interactions. **Psychopharmacology** is the study of drug-induced mental effects.” – [Wikipedia/psychology/research methods/direct brain observation/manipulation](#)

Computer simulation

Fig. **Artificial neural network** with 2 layers, an interconnected group of nodes, akin to the vast network of neurons in the human brain.

“See also: [Wikipedia/computational cognition](#), [Wikipedia/graph theory](#), & [Wikipedia/network theory](#). Computational modeling is a tool used in **mathematical psychology** & cognitive psychology to simulate behavior. This method has several advantages. Since modern computers process information quickly, simulations can be run in a short time, allowing for high 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. Computational neuroscience uses mathematical models to simulate the brain. Another method is symbolic modeling, which represents many mental objects using variables & rules. Other types of modeling include **dynamic systems** & **stochastic modeling**.” – [Wikipedia/psychology/research methods/computer simulation](#)

Animal studies

Fig. A rat undergoing a **Morris water navigation test** used in **behavioral neuroscience** to study the role of the **hippocampus** in **spatial learning** & memory.

“Animal experiments aid in investigating many aspects of human psychology, including perception, emotion, learning, memory, & thought, to name a few. In the 1890s, Russian psychologist Ivan Pavlov famously used dogs to demonstrate classical conditioning. Non-human primates, cats, dogs, pigeons, & rats & other rodents are often used in psychological experiments. Ideally, controlled experiments introduce only 1 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 & genetic backgrounds vary so widely, & depend upon so many factors, that it is difficult to control important **variables** for human subjects. There are pitfalls, however, in generalizing findings from animal studies to humans through animal models.

Comparative psychology refers to the scientific study of the behavior & mental processes of non-human animals, especially as these relate to the phylogenetic history, adaptive significance, & development of behavior. Research in this area explores the behavior of many species, from insects to primates. It is closely related to other disciplines that study animal behavior such as **ethology**. Research in comparative psychology sometimes appears to shed light on human behavior, but some attempts to connect the 2 have been quite controversial, e.g. the **Sociobiology** of **E.O. Wilson**. Animal models are often used to study neural processes related to human behavior, e.g. in cognitive neuroscience.” – [Wikipedia/psychology/research methods/animal studies](#)

Qualitative research

“Qualitative research is often designed to answer questions about the thoughts, feelings, & behaviors of individuals. Qualitative research involving 1st-hand observation can help describe events as they occur, with the goal of capturing the richness of everyday behavior & with the hope of discovering & understanding phenomena that might have been missed if only more cursory examinations are made.

Qualitative psychological research methods include interviews, 1st-hand observation, & participant observation. Creswell (2003) identified 5 main possibilities for qualitative research, including narrative, phenomenology, **ethnography**, **case study**, & **grounded theory**. Qualitative researchers sometimes aim to enrich our understanding of symbols, subjective experiences, or social structures. Sometimes **hermeneutic** & critical aims can give rise to quantitative research, as in **Erich Fromm**’s application of psychological & sociological theories, in his book *Escape from Freedom*, to understanding why many ordinary Germans supported Hitler.

Fig. **Phineas P. Gage** survived an accident in which a large iron rod was driven completely through his head, destroying much of his brain’s left frontal lobe, & is remembered for that injury’s reported effects on his personality & behavior.

Just as **Jane Goodall** studied chimpanzee social & family life by careful observation of chimpanzee behavior in the field, psychologists conduct **naturalistic observation** of ongoing human social, professional, & family life. Sometimes the participants are aware they are being observed, & other times the participants do not know they are being observed. Strict ethical guidelines must be followed when covert observation is being carried out.” – [Wikipedia/psychology/research methods/qualitative research](#)

Program evaluation

“**Program evaluation** involves the systematic collection, analysis, & application of information to answer questions about projects, policies & programs, particularly about their effectiveness. In both the public & private sectors, stakeholders often want to know the extent which the programs they are funding, implementing, voting for, receiving, or objecting to are producing the intended effects. While program evaluation 1st focuses on effectiveness, important considerations often include how much the program costs per participant, how the program could be improved, whether the program is worthwhile, whether there are better alternatives, if there are unintended outcomes, & whether the program goals are appropriate & useful.” – [Wikipedia/psychology/research methods/program evaluation](#)

1.1.8 Contemporary issues in methodology & practice

Meta science

“Metascience involves the application of scientific methodology to study science itself. The field of **metascience** has revealed problems in psychological research. Some psychological research has suffered from **bias**, problematic **reproducibility**, & **misuse of statistics**. These findings have led to calls for reform from within & from outside the scientific community.

Confirmation bias. In 1959, statistician Theodore Sterling examined the results of psychological studies & discovered that 97% of them supported their initial hypotheses, implying possible **publication bias**. Similarly, Fanelli (2010) found that 91.5% of psychiatry/psychology studies confirmed the effects they were looking for, & concluded that the odds of this happening (a positive result) was around 5 times higher than in fields such as **space science** or **geosciences**. Fanelli argued that this is because researchers in “softer” sciences have fewer constraints to their conscious & unconscious biases.

Replication. Further information: [Wikipedia/replication crisis/in psychology](#). A **replication crisis** in psychology has emerged. Many notable findings in the field have not been replicated. Some researchers were even accused of publishing fraudulent results. Systematic efforts, including efforts by the **Reproducibility Project** of the **Center for Open Science**, to assess the extent of the problem found that as many as $\frac{2}{3}$ of highly publicized findings in psychology failed to be replicated. Reproducibility has generally been stronger in cognitive psychology (in studies & journals) than social psychology & subfields of **differential**

psychology. Other subfields of psychology have also been implicated in the replication crisis, including clinical psychology, developmental psychology, & a field closely related to psychology, **educational research**.

Focus on the replication crisis has led to other renewed efforts in the discipline to re-test important findings. In response to concerns about publication bias & **data dredging** (conducting a large number of statistical tests on a great many variables but restricting reporting to the results that were statistically significant), 295 psychology & medical journals have adopted **result-blind peer review** where studies are accepted not on the basis of their findings & after the studies are completed, but before the studies are conducted & upon the basis of the methodological rigor of their experimental designs & the theoretical justifications for their proposed statistical analysis before data collection or analysis is conducted. In addition, large-scale collaborations among researchers working in multiple labs in different countries have taken place. The collaborators regularly make their data openly available for different researchers to assess. Allen & Mehler estimated that 61% of result-blind studies have yielded **null results**, in contrast to an estimated 5–20% in traditional research.

Misuse of statistics. Further information: **Wikipedia/misuse of statistics** & **Wikipedia/misuse of *p*-values**. Some critics view **statistical hypothesis testing** as misplaced. Psychologist & statistician **Jacob Cohen** wrote in 1994 that psychologists routinely confuse statistical significance with practical importance, enthusiastically reporting great certainty in unimportant facts. Some psychologists have responded with an increased use of **effect size** statistics, rather than sole reliance on *p*-values.” – **Wikipedia/psychology/contemporary issues in methodology & practice/metascience**

WEIRD bias

“See also: **Wikipedia/cultural psychology**, **Wikipedia/indigenous psychology**, **Wikipedia/transnational psychology**, & **Wikipedia/cross-cultural psychology**. In 2008, Arnett pointed out that most articles in American Psychological Association journals were about U.S. populations when U.S. citizens are only 5% of the world’s population. He complained that psychologists had no basis for assuming psychological processes to be universal & generalizing research findings to the rest of the global population. In 2010, Henrich, Heine, & Norenzayan reported a bias in conducting psychology studies with participants from “**WEIRD**” (“Western, Educated, Industrialized, Rich, & Democratic”) societies. Henrich et al. found that “96% of psychological samples come from countries with only 12% of the world’s populations” (p. 63). The article gave examples of results that differ significantly between people from WEIRD & tribal cultures, including the **Müller-Lyer illusion**. Arnett (2008), **Altmajer** & hall (2008) & Morgan-Consoli et al. (2018) view the Western bias in research & theory as a serious problem considering psychologists are increasingly applying psychological principles developed in WEIRD regions in their research, clinical work, & consultation with populations around the world. In 2018, Rad, Martingano, & Ginges showed that nearly a decade after Henrich et al.’s paper, over 80% of the samples used in studies published in the journal **Psychological Science** employed WEIRD samples. Moreover, their analysis showed that several studies did not fully disclose the origin of their samples; the authors offered a set of recommendations to editors & reviewers to reduce WEIRD bias.” – **Wikipedia/psychology/contemporary issues in methodology & practice/WEIRD bias**

Unscientific mental health training

“Some observers perceive a gap between scientific theory & 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. Practices such as “**facilitated communication** for infantile autism”; memory-recovery techniques including **body work**; & other therapies, such as **rebirthing** & **reparenting**, may be dubious or even dangerous, despite their popularity. These practices, however, are outside the mainstream practices taught in clinical psychology doctoral programs.” – **Wikipedia/psychology/contemporary issues in methodology & practice/unscientific mental health training**

1.1.9 Ethics

“Ethical standards in the discipline have changed over time. Some famous past studies are today considered unethical & in violation of **established codes** (the Canadian Code of Conduct for Research Involving Humans, & the **Belmont Report**). The American Psychological Association has advanced a set of ethical principles & a code of conduct for the profession.

The most important contemporary standards include informed & voluntary consent. After World War II, the **Nuremberg Code** was established because of Nazi abuses of experimental subjects. Later, most countries (& scientific journals) adopted the **Declaration of Helsinki**. In the U.S., the **National Institutes of Health** established the **Institutional Review Board** in 1966, & 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 but ethically dubious studies led to the establishment of this rule; such studies included the **MIT–Harvard Fernald School radioisotope studies**, the **Thalidomide tragedy**, the **Willowbrook hepatitis study**, & **Stanley Milgram’s studies of obedience to authority**.” – **Wikipedia/psychology/ethics**

Humans

“Universities have ethics committees dedicated to protecting the rights (e.g., voluntary nature of participation in the research, privacy) & well-being (e.g., minimizing distress) of research participants. University ethics committees evaluate proposed research to ensure that researchers protect the rights & well-being of participants; an investigator’s research project cannot be conducted unless approved by such an ethics committee.

The ethics code of the American Psychological Association originated in 1951 as “Ethical Standards of Psychologists”. This code has guided the formation of licensing laws in most American states. It has changed multiple times over the decades since its adoption. In 1989, the APA revised its policies on advertising & referral fees to negotiate the end of an investigation by the Federal Trade Commission. The 1992 incarnation was the 1st to distinguish between “aspirational” ethical standards & “enforceable” ones. Members of the public have a 5-year window to file ethics complaints about APA members with the APA ethics committee; members of the APA have a 3-year window.

Some of the ethical issues considered most important are the requirement to practice only within the area of competence, to maintain confidentiality with the patients, & to avoid sexual relations with them. Another important principle is **informed consent**, the idea that a patient or research subject must understand & freely choose a procedure they are undergoing. Some of the most common complaints against clinical psychologists include sexual misconduct.” – [Wikipedia/psychology/ethics/humans](#)

Other animals

“Research on other animals is also governed by university ethics committees. Research on nonhuman animals cannot proceed without permission of the ethics committee of the researcher’s home institution. 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 certain research techniques on animals that could not be used on humans.

- Comparative psychologist **Harry Harlow** drew moral condemnation for **isolation 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 & 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.” – [Wikipedia/psychology/ethics/other animals](#)

1.2 Wikipedia/Critical Thinking

“*Critical thinking* is the analysis of available **facts**, **evidence**, **observations**, & **arguments** to form a judgment. The subject is complex; several different **definitions** exist, which generally include the **rational**, **skeptical**, & **unbiased** analysis or evaluation of factual **evidence**. Critical thinking is **self-directed**, **self-disciplined**, **self-monitored**, & **self-corrective** thinking. It presupposes assent to rigorous standards of **excellence** & mindful command of their use. It entails effective communication & problem-solving abilities as well as a commitment to overcome native **egocentrism** & **sociocentrism**.

1.2.1 History

Fig. Sculpture of Socrates.

“The earliest records of critical thinking are the teachings of **Socrates** recorded by **Plato**. These included a part in Plato’s early dialogues, where Socrates engages with 1 or more interlocutors on the issue of ethics such as question whether it was right for Socrates to escape from prison. The philosopher considered & reflected on this question & came to the conclusion that escape violates all the things that he holds higher than himself: the laws of Athens & the guiding voice that Socrates claims to hear.

Socrates established the fact that one cannot depend upon those in “authority” to have sound knowledge & insight. He demonstrated that persons may have power & high position & yet be deeply confused & irrational. Socrates maintained that for an individual to have a good life or to have one that is worth living, he must be a critical questioner & possess an interrogative soul. He established the importance of asking deep questions that probe profoundly into thinking before we accept ideas as worthy of belief.

Socrates established the importance of “seeking evidence, close examining reasoning & assumptions, analyzing basic concepts, & tracing out implications not only of what is said but of what is done as well”. His method of questioning is now known as “**Socratic questioning**” & is the best known critical thinking teaching strategy. In his mode of questioning, Socrates highlighted the need for thinking for clarity & logical consistency. He asked people questions to reveal their irrational thinking or lack of reliable knowledge. Socrates demonstrated that having authority does not ensure accurate knowledge.

He established the method of questioning beliefs, closely inspecting assumptions & relying on evidence & sound rationale. Plato recorded Socrates' teachings & carried on the tradition of critical thinking. Aristotle & subsequent Greek skeptics refined Socrates' teachings, using systematic thinking & asking questions to ascertain the true nature of reality beyond the way things appear from a glance.

Socrates set the agenda for the tradition of critical thinking, namely, to reflectively question common beliefs & explanations, carefully distinguishing beliefs that are reasonable & logical from those that – however appealing to our native egocentrism, however much they serve our vested interests, however comfortable or comforting they may be – lack adequate evidence or rational foundation to warrant belief.

Critical thinking was described by Richard W. Paul as a movement in 2 waves (1994). The “1st wave” of critical thinking is often referred to as a ‘critical analysis’ that is clear, rational thinking involving critique. Its details vary amongst those who define it. According to Barry K. Beyer (1995), critical thinking means making clear, reasoned judgments. During the process of critical thinking, ideas should be reasoned, well thought out, & judged. The U.S. National Council for Excellence in Critical Thinking defines critical thinking as the “intellectually disciplined process of actively & skillfully conceptualizing, applying, analyzing, synthesizing, or evaluating information gathered on, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief & action.”” – Wikipedia/critical thinking/history

1.2.2 Etymology & origin of critical thinking

“In the term *critical thinking*, the word critical, (Grk. κριτικός = *kritikos* = “critic”) derives from the word *critic* & implies a critique; it identifies the intellectual capacity & the means “of judging”, “of judgment”, “for judging”, & of being “able to discern.” The intellectual roots of critical thinking are as ancient as its etymology, traceable, ultimately, to the teaching practice & vision of Socrates 2,500 years ago who discovered by a method of probing questioning that people could not rationally justify their confident claims to knowledge.” – Wikipedia/critical thinking/etymology & origin of critical thinking

1.2.3 Definitions

“Traditionally, critical thinking has been variously defined as follows:

- “The intellectually disciplined process of actively & skillfully conceptualizing, applying, analyzing, synthesizing, &/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief & action.”
- “Disciplined thinking that is clear, rational, open-minded, & informed by evidence.”
- “Purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, & inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based”
- “Includes a commitment to using reason in the formulation of our beliefs”
- The skill & propensity to engage in an activity with reflective scepticism (McPeck, 1981)
- Thinking about one’s thinking in a manner designed to organize & clarify, raise the efficiency of, & recognize errors & biases in one’s own thinking. Critical thinking is not ‘hard’ thinking nor is it directed at solving problems (other than ‘improving’ one’s own thinking). Critical thinking is inward-directed with the intent of maximizing the rationality of the thinker. One does not use critical thinking to solve problems – one uses critical thinking to improve one’s process of thinking.
- “An appraisal based on careful analytical evaluation”
- “Critical thinking is a type of thinking pattern that requires people to be reflective, & pay attention to decision-making which guides their beliefs & actions. Critical thinking allows people to deduct with more logic, to process sophisticated information & look at various sides of an issue so they can produce more solid conclusions.”
- Critical thinking has 7 critical features: being inquisitive & curious, being open-minded to different sides, being able to think systematically, being analytical, being persistent to truth, being confident about critical thinking itself, & lastly, being mature.
- Although critical thinking could be defined in several different ways, there is a general agreement in its key component – the desire to reach for a satisfactory result, & this should be achieved by rational thinking & result-driven manner. Halpern thinks that critical thinking 1stly involves learned abilities such as problem-solving, calculation & successful probability application. It also includes a tendency to engage the thinking process. In recent times, Stanovich believed that modern IQ testing could hardly measure the ability of critical thinking.

- “Critical thinking is essentially a questioning, challenging approach to knowledge & perceived wisdom. It involves ideas & information from an objective position & then questioning this information in the light of our own values, attitudes & personal philosophy.”

Contemporary critical thinking scholars have expanded these traditional definitions to include qualities, concepts, & processes such as creativity, imagination, discovery, reflection, empathy, connecting knowing, feminist theory, subjectivity, ambiguity, & inconclusiveness. Some definitions of critical thinking exclude these subjective practices.

1. According to Ennis, “Critical thinking is the intellectually disciplined process of actively & skillfully conceptualizing, applying, analyzing, synthesizing, &/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief & action.” This definition Ennis provided is highly agreed by Harvey Siegel, Peter Facione, & Deanna Kuhn.
2. According to Ennis’ definition, critical thinking requires a lot of attention & brain function. When a critical thinking approach is applied to education, it helps the student’s brain function better & understand texts differently.
3. Different fields of study may require different types of critical thinking. Critical thinking provides more angles & perspectives upon the same material.” – [Wikipedia/critical thinking/definitions](#)

1.2.4 Logic & rationality

“Main article: [Wikipedia/logic & rationality](#). The study of logical argumentation is relevant to the study of critical thinking. Logic is concerned with the analysis of arguments, including the appraisal of their correctness or incorrectness. In the field of [epistemology](#), critical thinking is considered to be logically correct thinking, which allows for differentiation between logically true & logically false statements.

In “1st wave” logical thinking, the [thinker](#) is removed from the train of thought, & the analysis of connections between concepts or points in thought is ostensibly free of any bias. In his essay *Beyond Logicism & Critical Thinking* [Kerry S. Walters](#) describes this ideology thus: “A logistic approach to critical thinking conveys the message to students that thinking is legitimate only when it conforms to the procedures of informal (&, to a lesser extent, formal) logic & that the good thinker necessarily aims for styles of examination & appraisal that are analytical, abstract, universal, & objective. This model of thinking has become so entrenched in conventional academic wisdom that many educators accept it as canon.” Such principles are concomitant with the increasing dependence on a *quantitative* understanding of the world.

In the ‘2nd wave’ of critical thinking, authors consciously moved away from the logocentric mode of critical thinking characteristic of the ‘1st wave’. Although many scholars began to take a less exclusive view of what constitutes critical thinking, rationality & logic remain widely accepted as essential bases for critical thinking. Walters argues that exclusive logicism in the 1st wave sense is based on “the unwarranted assumption that good thinking is reducible to logical thinking.”

– [Wikipedia/critical thinking/logic & rationality](#)

Deduction, abduction & induction

Fig. [Argument](#) terminology used in [logic](#).

“Main article: [Wikipedia/logical reasoning](#). There are 3 types of [logical reasoning](#). Informally, 2 kinds of logical reasoning can be distinguished in addition to formal [deduction](#), which are [induction](#) & [abduction](#).

Deduction. [Deduction](#) is the conclusion drawn from the structure of an argument’s [premises](#), by use of [rules of inference](#) formally those of [propositional calculus](#). E.g.: X is human & all humans have a face, so X has a face.

Induction. [induction](#) is drawing a conclusion from a pattern that is guaranteed by the strictness of the structure to which it applies. E.g.: The sum of even integers is even. Let $x, y, z \in \mathbb{Z}$ then $2x, 2y, 2z$ are even by definition. $2x + 2y = 2(x + y) = 2z$, which is even; so summing 2 even numbers results in an even number.

Abduction. [Abduction](#) is drawing a conclusion using a [heuristic](#) that is likely, but not inevitable given some foreknowledge. E.g.: I observe sheep in a field, & they appear white from my viewing angle, so sheep are white. Contrast with the deductive statement: Some sheep are white on at least 1 side.” – [Wikipedia/critical thinking/logic & rationality/deduction, abduction & induction](#)

Critical thinking & rationality

“Kerry S. Walters, an emeritus philosophy professor from Gettysburg College, argues that rationality demands more than just logical or traditional methods or problem solving & analysis or what he calls the “calculus of justification” but also considers “cognitive acts such as imagination, conceptual creativity, intuition & insight” (p. 63). These “functions” are focused on discovery, on more abstract processes instead of linear, rules-based approaches to problem-solving. The linear & non-sequential mind must both be engaged in the rational mind.

The ability to critically analyze an argument – to dissect structure & components, thesis & reasons – is essential. But so is the ability to be flexible & consider non-traditional alternatives & perspectives. These complementary functions are what allow for critical thinking to be a practice encompassing imagination & intuition in cooperation with traditional modes of deductive inquiry.” - [Wikipedia/critical thinking/logic & rationality/critical thinking & rationality](#)

1.2.5 Functions

“The list of core critical thinking skills includes observation, interpretation, analysis, inference, evaluation, explanation, & metacognition. According to Reynolds (2011), an individual or group engaged in a strong way of critical thinking gives due consideration to establish e.g.:

- Evidence through reality
- Context skills to isolate the problem from context
- Relevant criteria for making the judgment well
- Applicable methods or techniques for forming the judgment
- Applicable theoretical constructs for understanding the problem & the question at hand

In addition to possessing strong critical-thinking skills, one must be disposed to engage problems & decisions using those skills. Critical thinking employs not only logic but broad intellectual criteria such as clarity, credibility, accuracy, precision, relevance, depth, breadth, significance, & fairness.

Critical thinking calls for the ability to:

- Recognize problems, to find workable means for meeting those problems
- Understand the importance of prioritization & order of precedence in problem-solving
- Gather & marshal pertinent (relevant) information
- Recognize unstated assumptions & values
- Comprehend & use language with accuracy, clarity, & discernment
- Interpret data, to appraise evidence & evaluate arguments
- Recognize the existence (or non-existence) of logical relationships between propositions
- Draw warranted conclusions & generalizations
- Put to test the conclusions & generalizations at which one arrives
- Reconstruct one’s patterns of beliefs on the basis of wider experience
- Render accurate judgments about specific things & qualities in everyday life

In sum: “A persistent effort to examine any belief or supposed form of knowledge in the light of the evidence that supports or refutes it & the further conclusions to which it tends.” – [Wikipedia/critical thinking/functions](#)

1.2.6 Habits or traits of the mind

“The habits of **mind** that characterize a person strongly disposed toward critical thinking include a desire to follow reason & evidence wherever they may lead, a systematic approach to problem solving, **inquisitiveness**, even-handedness, & confidence in **reasoning**.

According to a definition analysis by Kompf & Bond (2001), critical thinking involves problem solving, decision making, **metacognition**, rationality, rational thinking, **reasoning**, **knowledge**, **intelligence** & also a moral component such as reflective thinking. Critical thinkers therefore need to have reached a level of maturity in their development, possess a certain attitude as well as a set of taught skills.

There is a postulation by some writers that the tendencies from habits of mind should be thought as virtues to demonstrate the characteristics of a critical thinker. These **intellectual virtues** are ethical qualities that encourage motivation to think in particular ways towards specific circumstances. However, these virtues have also been criticized by skeptics, who argue that there is lacking evidence for this specific mental basis that are causative to critical thinking.” – [Wikipedia/critical thinking/habits or traits of the mind](#)

1.2.7 Research in critical thinking

“Edwawrd M. Glaser proposed that the ability to think critically involves 3 elements:

1. An attitude of being disposed to consider in a thoughtful way the problems & subjects that come within the range of one’s experiences
2. Knowledge of the methods of logical **inquiry** & reasoning
3. Some skill in applying those methods.

Educational programs aimed at developing critical thinking in children & adult learners, individually or in group problem solving & decision making contexts, continue to address the same 3 central elements.

The Critical Thinking project at Human Science Lab, **London**, is involved in the scientific study of all major **educational systems** in prevalence today to assess how the systems are working to promote or impede critical thinking.

Contemporary cognitive psychology regards human reasoning as a complex process that is both reactive & reflective. This presents a problem which is detailed as a division of a critical mind in juxtaposition to sensory data & memory.

The psychological theory disposes of the absolute nature of the rational mind, in reference to conditions, abstract problems & discursive limitations. Where the relationship between critical thinking skills & critical thinking dispositions is an empirical question, the ability to attain causal domination exists, for which Socrates was known to be largely disposed against as the practice of **Sophistry**. Accounting for a measure of “critical thinking dispositions” is the California Measure of Mental Motivation & the California Critical Thinking Dispositions Inventory. The Critical Thinking Toolkit is an alternative measure that examines student beliefs & attitudes about critical thinking.” – [Wikipedia/critical thinking/research in critical thinking](#)

1.2.8 Education

“**John Dewey** is 1 of many educational leaders who recognized that a curriculum aimed at building thinking skills would benefit the individual learner, the community, & the entire democracy.

Critical thinking is significant in the learning process of **internalization**, in the construction of basic ideas, principles, & theories inherent in content. & critical thinking is significant in the learning process of application, whereby those ideas, principles, & theories are implemented effectively as they become relevant in learners’ lives.

Each discipline adapts its use of critical thinking concepts & principles. The core concepts are always there, but they are embedded in subject-specific content. For students to learn content, intellectual engagement is crucial. All students must do their own thinking, their own construction of knowledge. Good teachers recognize this & therefore focus on the questions, readings, activities that stimulate the mind to take ownership of key concepts & principles underlying the subject.

Historically, the teaching of critical thinking focused only on logical procedures such as formal & informal logic. This emphasized to students that good thinking is equivalent to logical thinking. However, a 2nd wave of critical thinking, urges educators to value conventional techniques, meanwhile expanding what it means to be a critical thinker. In 1994, Kerry Walters compiled a conglomeration of sources surpassing this logical restriction to include many different authors’ research regarding connected knowing, empathy, gender-sensitive ideals, collaboration, world views, intellectual autonomy, morality & enlightenment. These concepts invite students to incorporate their own perspectives & experiences into their thinking.

In the English & Welsh school systems, *Critical Thinking* is offered as a subject that 16- to 18-year-olds can take as an **A-Level**. Under the **OCR exam board**, students can sit 2 exam papers for the AS: “Credibility of Evidence” & “Assessing & Developing Argument”. The full Advanced **GCE** is now available: in addition to the 2 AS units, candidates sit the 2 papers “Resolution of Dilemmas” & “Critical Reasoning”. The A-level tests candidates on their ability to think critically about, & analyze, arguments on their deductive or inductive validity, as well as producing their own arguments. It also tests their

ability to analyze certain related topics such as credibility & ethical decision-making. However, due to its comparative lack of subject content, many universities do not accept it as a main A-level for admissions. Nevertheless, the AS is often useful in developing reasoning skills, & the full Advanced GCE is useful for degree courses in politics, philosophy, history or **theology**, providing the skills required for critical analysis that are useful, e.g., in biblical study.

There used to also be an **Advanced Extension Award** offered in Critical Thinking in the UK, open to any A-level student regardless of whether they have a Critical Thinking A-level. **Cambridge International Examinations** have an A-level in Thinking Skills.

From 2008, **Assessment & Qualifications Alliance** has also been offering an A-level Critical Thinking specification. **OCR exam board** have also modified theirs for 2008. Many examinations for university entrance set by universities, on top of A-level examinations, also include a critical thinking component, such as the **LNAT**, the **UKCAT**, the **BioMedical Admissions Test** & the **Thinking Skills Assessment**.

In **Qatar**, critical thinking was offered by **AL-Bairaq** – an outreach, non-traditional educational program that targets high school students & focuses on a curriculum based on **STEM fields**. The idea behind **AL-Bairaq** is to offer high school students the opportunity to connect with the research environment in the Center for Advanced Materials (CAM) at Qatar University. Faculty members train & mentor the students & help develop & enhance their critical thinking, problem-solving, & teamwork skills.” – [Wikipedia/critical thinking/education](#)

Effectiveness

“In 1995, a meta-analysis of the literature on teaching effectiveness in higher **education** was undertaken. The study noted concerns from higher **education**, **politicians**, & **business** that higher education was failing to meet society’s requirements for well-educated citizens. It concluded that although faculty may aspire to develop students’ **thinking** skills, in practice they have tended to aim at facts & concepts utilizing lowest levels of **cognition**, rather than developing intellect or **values**.

In a more recent meta-analysis, researchers reviewed 341 quasi- or true-experimental studies, all of which used some form of standardized critical thinking measure to assess the outcome variable. The authors describe the various methodological approaches & attempt to categorize the differing assessment tools, which include standardized tests (& 2nd-source measures), tests developed by teachers, tests developed by researchers, & tests developed by teachers who also serve the role as the **researcher**. The results emphasized the need for exposing students to real-world problems & the importance of encouraging open dialogue within a supportive environment. Effective strategies for teaching critical thinking are thought to be possible in a wide variety of **educational** settings. 1 attempt to assess the **humanities**’ role in teaching critical thinking & reducing belief in **pseudoscientific** claims was made at **North Carolina State University**. Some success was noted & the researchers emphasized the value of the humanities in providing the skills to evaluate current events & qualitative data in context.

Scott Lilienfeld notes that there is some evidence to suggest that basic critical thinking skills might be successfully taught to children at a younger age than previously thought.” – [Wikipedia/critical thinking/education/effectiveness](#)

1.2.9 Importance in academics

“Critical thinking is an important element of all professional fields & academic disciplines (by referencing their respective sets of permissible questions, evidence sources, criteria, etc.). Within the framework of **scientific skepticism**, the process of critical thinking involves the careful acquisition & interpretation of information & use of it to reach a **well-justified** conclusion. The concepts & principles of critical thinking can be applied to any context or case but only by reflecting upon the nature of that application. Critical thinking forms, therefore, a system of related, & overlapping, modes of thought such as anthropological thinking, sociological thinking, historical thinking, political thinking, **psychological** thinking, philosophical thinking, mathematical thinking, chemical thinking, biological thinking, ecological thinking, legal thinking, ethical thinking, musical thinking, thinking like a painter, sculptor, engineer, business person, etc. In other words, though critical thinking principles are universal, their application to disciplines requires a process of reflective **contextualization**. Psychology offerings, e.g., have included courses such as Critical Thinking about the **Paranormal**, in which students are subjected to a series of **cold readings** & tested on their belief of the “psychic”, who is eventually announced to be a fake.

Critical thinking is considered important in the academic fields for enabling one to analyze, evaluate, explain, & restructure thinking, thereby ensuring the act of thinking without false belief. However, even with knowledge of the methods of logical inquiry & reasoning, mistakes occur, & due to a thinker’s inability to apply the methodology consistently, & because of overruling character traits such as **egocentrism**. Critical thinking includes identification of **prejudice**, **bias**, propaganda, self-deception, distortion, **misinformation**, etc. Given research in **cognitive psychology**, some **educators** believe that schools should focus on teaching their students critical thinking **skills** & cultivation of intellectual traits.

Critical thinking skills can be used to help nurses during the assessment process. Through the use of critical thinking, nurses can question, evaluate, & reconstruct the nursing care process by challenging the established theory & practice. Critical thinking skills can help nurses problem solve, reflect, & make a conclusive decision about the current situation they face. Critical thinking creates “new possibilities for the development of the nursing knowledge”. Due to the sociocultural, environmental, & political issues that are affecting healthcare delivery, it would be helpful to embody new techniques in

nursing. Nurses can also engage their critical thinking skills through the Socratic method of dialogue & reflection. This practice standard is even part of some regulatory organizations such as the College of Nurses of Ontario's Professional Standards for Continuing Competencies (2006). It requires nurses to engage in **Reflective Practice** & keep records of this continued professional development for possible review by the college.

Critical thinking is also considered important for **human rights education** for **toleration**. The **Declaration of Principle on Tolerance** adopted by **UNESCO** in 1995 affirms that “education for tolerance could aim at countering factors that lead to fear & exclusion of others, & could help young people to develop capacities for independent judgment, *critical thinking* & ethical **reasoning**.” – [Wikipedia/critical thinking/importance in academics](#)

1.2.10 Online communication

“The advent & rising popularity of online courses have prompted some to ask if computer-mediated communication (CMC) promotes, hinders, or has no effect on the amount & quality of critical thinking in a course (relative to face-to-face communication). There is some evidence to suggest a 4th, more nuanced possibility: that CMC may promote some aspects of critical thinking but hinder others. E.g., Guiller et al. (2008) found that, relative to face-to-face discourse, online discourse featured more justifications, while face-to-face discourse featured more instances of students expanding on what others had said. The increase in justifications may be due to the asynchronous nature of online discussions, while the increase in expanding comments may be due to the spontaneity of ‘real-time’ discussion. Newman et al. (1995) showed similar differential effects. They found that while CMC boasted more important statements & linking of ideas, it lacked novelty. The authors suggests that this may be due to difficulties participating in a brainstorming-style activity in an asynchronous environment. Rather, the asynchrony may promote users to put forth “considered, thought out contributions”.

Researchers assessing critical thinking in online discussion forums often employ a technique called Content Analysis, where the text of online discourse (or the transcription of face-to-face discourse) is systematically coded for different kinds of statements relating to critical thinking. E.g., a statement might be coded as “Discuss ambiguities to clear them up” or “Welcoming outside knowledge” as positive indicators of critical thinking. Conversely, statements reflecting poor critical thinking may be labeled as “Sticking to prejudice or assumptions” or “Squashing attempts to bring in outside knowledge”. The frequency of these codes in CMC & face-to-face discourse can be compared to draw conclusions about the quality of critical thinking.

Searching for evidence of critical thinking in discourse has roots in a definition of critical thinking put forth by Kuhn (1991), which emphasizes the social nature of discussion & knowledge construction. There is limited research on the role of social experience in critical thinking development, but there is some evidence to suggest it is an important factor. E.g., research has shown that 3- to 4-year-old children can discern, to some extent, the differential creditability & expertise of individuals. Further evidence for the impact of social experience on the development of critical thinking skills comes from work that found that 6- to 7-year-olds from China have similar levels of skepticism to 10- & 11-year-olds in the United States. If the development of critical thinking skills was solely due to maturation, it is unlikely we would see such dramatic differences across cultures.” – [Wikipedia/critical thinking/online communication](#)

Chapter 2

Ness Labs

2.1 Ness Labs

Slogan. “*Make the most of your mind.* Build a lab for your mind with neuroscience-based¹ content² & conversations³. Join a community⁴ of curious⁵ humans who want to achieve more without sacrificing their mental health⁶. 1 weekly email with mindful⁷ productivity & creativity⁸ tips.”

“*When learning is purposeful⁹, creativity blossoms¹⁰. When creativity blossoms, thinking emanates¹¹. When thinking emanates, knowledge is fully lit¹².*” – A.P.J. Abdul Kalam (1931–2015), Aerospace Scientist

“*The consistency¹³ & thoughtfulness¹⁴ of Ness Labs inspires¹⁵ me to question the ordinary¹⁶ & iterate¹⁷ towards¹⁸ being a better version of myself.*” – Steph Smith, Founder, Integral Labs

¹**neuroscience** [n] [uncountable] the science that deals with the structure & function of the brain & the nervous system.

²**content** [n] **1. (content)** [plural] **content (of something)** the things that are contained in something; **2. (contents)** [plural] the different sections that are contained in a book, magazine, journal or website; a list of these sections; **3.** [singular] the subject matter of a book, speech, programme, etc.; **4.** [singular] (following a noun or an adjective) the amount of a substance that is contained in something else; **5.** [uncountable] the information or other material contained on a website, CD-ROM, etc.; [a] [not before noun] satisfied & happy with what you have; willing to do or accept something; [v] **content yourself with something** to accept & be satisfied with something & not try to have or do something better.

³**conversation** [n] [countable, uncountable] an informal talk involving a small group of people or only 2; the activity of talking in this way.

⁴**community** [n] (plural **communities**) **1.** (often **the community**) [singular] all the people who live in a particular area, country, etc. when considered as a group; **2.** [countable] (used in compounds) a group of people who share the same religion, race, job, etc.; **3.** [uncountable] (*approving*) the feeling or sharing things & belonging to a group in the place where you live; **4.** [countable] (*biology*) a group of plants & animals growing or living in the same place or environment; **the global/international community** [idiom] the countries of the world, considered as a group.

⁵**curious** [a] **1.** having a strong desire to know about something; **2.** strange & unusual.

⁶**mental health** [n] [uncountable] **1.** the state of health of somebody's mind; **2.** the system for treating people with mental health problems.

⁷**mindful** [a] **1.** [not before noun] (*formal*) remembering somebody/something & considering them or it when you do something, SYNONYM: **conscious**; **2.** concentrating on the present moment, especially as a technique to help you relax.

⁸**creativity** [n] [uncountable] the ability to produce something new, using skill & imagination.

⁹**purposeful** [a] having a useful purpose; acting with a clear aim & with determination.

¹⁰**blossom** [n] [countable, uncountable] a flower or a mass of flowers, especially on a fruit tree or bush; [v] **1.** [intransitive] (of a tree or bush) to produce blossom; **2.** [intransitive] to become more healthy, confident or successful.

¹¹**emanate** [v] **emanate from something** to come from something or somewhere, SYNONYM: **issue from something**.

¹²**lit** past tense, past participle of **light**.

¹³**consistency** [n] (plural **consistencies**) **1.** [uncountable] (*often approving*) the quality of always behaving in the same way or of having the same opinions or standards; the quality of being consistent; **2.** [countable, uncountable] the consistency of a mixture or a substance, especially a liquid, is how thick, firm or smooth it is.

¹⁴**thoughtfulness** [n] [uncountable] **1.** the quality of being quiet, because you are thinking; **2. thoughtfulness (for somebody)** (*approving*) the quality of thinking about & caring for other people, SYNONYM: **consideration, kindness**; **3.** careful thought that is put into doing something.

¹⁵**inspire** [v] **1.** to make somebody feel confident excited about doing something; **2.** [usually passive] to give somebody the idea for something; to be the reason why somebody does something; **3.** to make somebody have a particular feeling or emotion.

¹⁶**ordinary** [a] not unusual or different in any way.

¹⁷**iterate** [v] [intransitive] to repeat a mathematical or computing process or set of instructions again & again, each time applying it to the result of the previous stage.

¹⁸**towards** [prep] (also **toward** *especially in North American English*) **1.** in the direction of somebody/something; **2.** aiming to achieve something; moving closer to achieving something; **3.** close or closer to a point in time; **4.** in relation to somebody/something.

“Anne-Laure is skilled¹⁹ at researching²⁰ complex²¹ topics²², & condensing²³ her findings²⁴ into a digestible²⁵ format²⁶ that both entertains²⁷ & makes you smarter.” – Leandro, Co-Founder, Unubo

“This was the resource²⁸ I didn’t know I needed – SO badly. Bite-sized²⁹ but in-depth³⁰ insights³¹ into my brain. Anne-Laure’s writing has changed the way I approach work.” – Kelly Miller, Director, BPA

2.2 Ness Labs/Are you a taker, a giver, or a matcher?

“Some people only help when it benefits³² themselves, other foster³³ transactional³⁴ relationships, while yet others are generous³⁵ with their time & energy³⁶, without asking for anything in return³⁷. Whether in their personal or professional³⁸

¹⁹**skilled** [a] **1.** having enough ability, experience & knowledge to be able to do something well, SYNONYM: **expert**; **2.** having special experience or training in doing a particular job, OPPOSITE: **unskilled**; **3.** (of a job) needing special abilities or training, OPPOSITE: **unskilled**.

²⁰**research** [n] [countable] careful study of a subject, especially in order to discover new facts or information about it. The plural form **researches** is also sometimes used in British English, but is much less frequent.; [v] **1.** [transitive, intransitive] to study something carefully & try to discover new facts about it; **2.** [transitive] to collect information for an article, a book, etc.

²¹**complex** [a] **1.** made of many different things or parts that are connected, SYNONYM: **complicated**; **2.** difficult to understand or deal with; [n] **1. complex of something** a large number of things that are connected, often in a way that is confusing or difficult to understand; **2.** a group of buildings of a similar type together in 1 place; **3.** (*chemistry*) an ion or molecule in which 1 or more groups are bonded to a metal atom by shared pairs of electrons provided by atoms in the group.

²²**topic** [n] a particular subject that is studied, written about or discussed.

²³**condense** [v] **1.** [intransitive, transitive] to change from a gas into a liquid; to make a gas change into a liquid; **2.** [intransitive, transitive] to fill a smaller amount of space; to put something into a smaller amount of space; **3.** [transitive] to put something such as a piece of writing into fewer words; to put a lot of information into a small space.

²⁴**finding** [n] **1.** [usually plural] information that is discovered as the result of research into something; **2.** (*law*) a decision made by the judge or jury in a court case.

²⁵**digestible** [a] **1.** (of food) easy to digest, OPPOSITE: **indigestible**; **2.** (of information) easy to understand, OPPOSITE: **indigestible**.

²⁶**format** [n] [countable, uncountable] **1.** the general arrangement, plan or design of something; **2.** a particular way in which data is processed, stored or displayed; the form in which information or recordings are made available; [v] **1. format something** to prepare a computer disk so that data can be recorded on it; **2. format something (to do something)** to arrange text, etc. in a particular way on a page or screen.

²⁷**entertain** [v] **1.** [transitive, intransitive] to interest & be enjoyed by somebody; **2.** [transitive] (not used in the progressive tenses) **entertain something** to consider an idea, a hope, a feeling, etc.; **3.** [intransitive, transitive] to invite people to eat or drink with you as your guests, especially in your home.

²⁸**resource** [n] **1.** [countable, usually plural] a supply of something that a country, an organization or a person has & can use; **2.** [countable] something that can be used to help achieve an aim, especially as a part of work or study; **3.** (**resources**) [plural] personal qualities that help you deal with a situation.

²⁹**bite-sized** [a] (also **bite-size**) [usually before noun] **1.** small enough to put into the mouth & eat; **2.** (*informal*) very small or short.

³⁰**in-depth** [a] [usually before noun] very thorough & detailed.

³¹**insight** [n] **1.** [countable, uncountable] an understanding of a particular situation or thing; **2.** [uncountable] the ability to see & understand the truth about people or situations.

³²**benefit** [n] **1.** [countable, uncountable] a helpful & useful effect that something has; an advantage that something provides; **2.** [uncountable, countable] (*British English*) money provided by the government to people who need financial help because they are unemployed, sick, etc.; **give somebody the benefit of the doubt** [idiom] to accept that somebody has told the truth or has not done something wrong because you cannot prove that they have not told the truth/have done something wrong; [v] **1.** [intransitive] to be in a better position because of something; **2.** [transitive] **benefit somebody/something** to be useful or provide an advantage to somebody/something.

³³**foster** [v] **1. foster something** to encourage something to develop, SYNONYM: **promote**; **2. foster somebody** (*especially British English*) to take another person’s child into your home for a period of time, without becoming the child’s legal parent; [a] [only before noun] used with some nouns in connection with the fostering of a child.

³⁴**transactional** [a] **1.** relating to the process of buying or selling; **2.** relating to communication between people.

³⁵**generous** [a] (*approving*) **1.** giving or willing to give time, money, etc. freely; given freely; **2.** more than is necessary; large; **3.** kind in the way you treat people; willing to see what is good about somebody/something.

³⁶**energy** [n] **1.** [uncountable, countable] the ability of matter or radiation to perform work because of its mass, movement, electrical charge, etc.; **2.** [uncountable] a source of power that can be used by somebody/something, e.g. to provide light & heat, or to work machines; **3.** [uncountable] the effort needed to do work or other physical or mental activities; **4. (energies)** [plural] the physical & mental effort that you use to do something.

³⁷**return** [v] **1.** [intransitive] **return (to ...)** (**from ...**) to come or go back from 1 place to another; **2.** [transitive] to bring, give, put or send something/somebody back to a particular person or place; **3.** [intransitive] to come back again, SYNONYM: **reappear**; **4.** [intransitive] **return (to something)** to start discussing a subject you were discussing earlier, or doing an activity you were doing earlier; **5.** [intransitive, transitive] to go back, or to make something go back, to a previous state; **6.** [transitive] **return something** to do something or give something to somebody because they have done or given the same to you 1st; **7.** [transitive] **return something** to give or produce something such as a response, a result, a particular amount of money, etc.; **8.** [transitive, often passive] **return somebody (to something)** | **return somebody (as something)** (*British English*) to elect somebody to a political position; **9.** [transitive] **return a verdict** to give a decision about something in court; [n] **1.** [singular] the action of arriving in or coming back to a place that you were in before; **2.** [singular, uncountable] the action of giving, putting or sending something/somebody back; **3.** [singular] **return (of something)** the situation when a feeling or state that has not been experienced for some time starts again, SYNONYM: **reappearance**; **4.** [singular] **return to something** the action of going back to an activity that you used to do, or to a situation that you used to be in; **5.** [uncountable, countable, usually plural] **return (on something)** the amount of profit that you get from something, SYNONYM: **earnings, yield**; **6.** [countable] an official report or statement that gives particular information to the government or another body; **in return (for something)** [idiom] as an exchange or a reward for something; as a response to something.

³⁸**professional** [a] **1.** [only before noun] connected with a job that needs special training or skill, especially one that needs a high level of education; **2.** (of people) having a job that needs special training & a high level of education; **3.** showing that somebody is well trained & extremely skilled, SYNONYM: **competent**; **4.** suitable or appropriate for somebody working in a particular profession; **5.** doing something as a paid job rather than just for pleasure; [n] a person who does a job that needs special training & a high level of education.

relationships, takers³⁹, givers⁴⁰, & matchers achieve different outcomes⁴¹. Surprisingly⁴², givers display⁴³ the most radically⁴⁴ distinctive⁴⁵ results. *Are you a taker, a giver, or a matcher? & how can you shift⁴⁶ your reciprocity⁴⁷ style⁴⁸ to have a positive impact⁴⁹ on your work, your relationships, & the world in general⁵⁰?*

2.2.1 Takers, Givers, Matchers

In his book **Give & Take**, psychologist⁵¹ & Wharton's top-rated⁵² professor ADAM GRANT divides⁵³ people into 3 groups: takers, givers, & matchers. He explains: "Whereas takers strive⁵⁴ to get as much as possible from others & matchers aim⁵⁵ to

³⁹**taker** [n] **1.** [usually plural] a person who is willing to accept something that is being offered; **2.** (often in compounds) a person who takes something.

⁴⁰**giver** [n] a person or an organization that gives something, especially money.

⁴¹**outcome** [n] the result or effect of an action or event.

⁴²**surprisingly** [adv] in a way that causes surprise.

⁴³**display** [v] **1.** [transitive] to put something in a place where people can see it easily; to show something to people, SYNONYM: **exhibit**; **2.** [transitive] **display something** to show signs of something, especially a quality, characteristic or feeling; **3.** [transitive] **display something** (of a computer, notice, table, etc.) to show information; **4.** [intransitive] (of male birds & animals) to show a special pattern of behavior that is intended to attract a female bird or animal; [n] **1.** [countable] an arrangement of things in a public place to give information or entertain people or advertise something for sale. Things that are **on display** are put in a place where people can look at them.; **2.** [countable, uncountable] **display of something** behavior that shows a particular quality, feeling or ability; **3.** [uncountable] **display of something** the act of placing something in a public place for people to see; **4.** [countable] **display (of something)** an act of performing a skill or of showing something happening, in order to entertain; **5.** [countable, uncountable] **display (of something)** a special pattern of behavior that a male bird or animal shows in order to attract a female bird or animal.

⁴⁴**radically** [adv] completely; to a very great extent.

⁴⁵**distinctive** [a] having a quality or characteristic that makes something different & easily noticed, SYNONYM: **characteristic**.

⁴⁶**shift** [n] **1.** [countable] a change in position or direction; **2.** [countable] a period of time worked by a group of workers who start work as another group finishes; **3.** [uncountable] the system on a keyboard that allows capital letters or a different set of characters to be typed; the key that operates this system; [v] **1.** [transitive] **shift something (away from/from A) (to/towards B)** to change the attention, direction or focus of something; **2.** [intransitive] (of the emphasis or direction of something) to change from 1 state or position to another; **3.** [intransitive, transitive] to move from 1 position or place to another; to move something in this way; **shift your ground** [idiom] (*usually disapproving*) to change your opinion about a subject, especially during a discussion.

⁴⁷**reciprocity** [n] [uncountable] a situation in which 2 people, countries, etc. provide the same help or advantages to each other.

⁴⁸**style** [n] **1.** [countable, uncountable] the particular way in which something is done; **2.** [countable, uncountable] the features of a book, painting, building, etc. that make it typical of a particular author, artist, historical period, etc.; **3.** [countable] a particular design of something, e.g. clothes; **4.** [uncountable] the quality of being elegant or fashionable & made to a high standard; **5.** [uncountable] the correct use of language; **6.** (in adjectives) having the type of style mentioned; **7.** [countable] (*biology*) the long thin part of a flower that carries the stigma.

⁴⁹**impact** [n] [countable, usually singular, uncountable] **1.** the powerful effect that something has on somebody/something; **2.** the act of 1 object hitting another; the force with which this happens; [v] [transitive, intransitive] to have an effect on something.

⁵⁰**general** [a] **1.** affecting or including all or most people, places or things; **2.** [usually before noun] normal; usual; true in most cases; **3.** including the most important aspects of something; not exact or detailed, SYNONYM: **broad**, OPPOSITE: **specific**; **4.** **the general direction/area** used to describe the approximate, but not exact, direction or area mentioned; **5.** not limited to a particular subject, use or activity; **6.** not limited to 1 part or aspect of a person or thing; **7.** [only before noun] highest in rank. In some titles, **General** comes after the noun.; **as a general rule** [idiom] usually; **of general interest** [idiom] of interest to most people; [n] (abbr., **Gen.**) an officer of very high rank in the army or the US air force; the commander of an army; **in general** [idiom] **1.** usually; mainly; **2.** as a whole.

⁵¹**psychologist** [n] a scientist who studies psychology.

⁵²**top-rated** [a] [only before noun] most popular with the public.

⁵³**divide** [v] **1.** [transitive, usually passive, intransitive] to separate into parts or groups; to make something separate into parts or groups; **2.** [transitive] **divide something (up) between/among somebody** to give a share of something to each of a number of different people or organizations, SYNONYM: **share**; **3.** [transitive] to be the real or imaginary line or barrier that separates 2 areas, things or people, SYNONYM: **separate**; **4.** [transitive] **divide something (between A & B)** to use different parts of your time or energy for different activities; **5.** [transitive] to cause 2 or more people to disagree, SYNONYM: **split**; **6.** [transitive] **divide something by something** to calculate something by finding out how many times 1 number or amount is contained in another; **divide & rule** [idiom] to keep control over people by making them disagree with & fight each other, therefore not giving them the chance to join together & oppose you; [n] [usually singular] **1.** a difference between 2 groups of people that separates them from each other; a difference between 2 sets of ideas or areas of activity; **2.** **divide (between A & B)** (*especially North American English*) a line of high land that separates 2 valleys or systems of rivers, SYNONYM: **watershed**; **bridge the gap/divide (between A & B)** [idiom] to reduce or get rid of the differences that exist between 2 things or groups of people.

⁵⁴**strive** [v] [intransitive] to try very hard to achieve something.

⁵⁵**aim** [n] the purpose of doing something; what somebody is trying to achieve; **take aim at somebody/something** [idiom] to direct your criticism at somebody/something; [v] **1.** [transitive] **be aimed at (doing) something** to have the intention of achieving something; **2.** [intransitive, transitive] to try or plan to achieve something; **3.** [transitive, usually passive] **aim something at somebody** to say or do something that is intended to influence or affect a particular person or group.

trade⁵⁶ evenly⁵⁷, givers are the rare⁵⁸ breed⁵⁹ of people who contribute⁶⁰ to others without expecting anything in return.”

- **Takers.** Takers are self-focused⁶¹ & only help others strategically⁶², when the benefits to themselves outweigh⁶³ the personal costs. In the words of Adam Grant: “Takers have a distinctive⁶⁴ signature⁶⁵: they like to get more than they give. They tilt⁶⁶ reciprocity⁶⁷ in their own favor⁶⁸, putting their own interests ahead of other’s needs.”
- **Givers.** On the other hand, givers will help whenever⁶⁹ the benefits to others exceed⁷⁰ the personal costs. As Adam Grant explains: “In the workplace⁷¹, givers are a relatively⁷² rare breed. They tilt reciprocity in the other direction, preferring to give more than they get. Whereas takers tend to be self-focused, evaluating what other people can offer them, givers are other-focused, paying more attention to what other people need from them.”
- **Matchers.** Finally, matchers strive to preserve⁷³ an equal balance⁷⁴ between giving & getting. “Matchers operate⁷⁵

⁵⁶**trade** [n] **1.** [uncountable] the activity of buying & selling or of exchanging goods or services between people or countries. **Fair trade** is trade between companies in developed countries & producers in developing countries in which fair prices are paid to the producers.; **2.** [countable] a particular type of business; **3. (the trade)** [singular + singular or plural verb] the people or companies that are connected with a particular area of business; **4.** [countable, uncountable] a job, especially one that involves working with your hands & that requires special training & skills; **5.** [uncountable, singular] the amount of goods or services that are sold, SYNONYM: **business**; [v] **1.** [intransitive, transitive] to buy & sell goods & services. In economics, **trade** is usually refer to 1 country or economy exchanging goods or services with another.; **2.** [intransitive] to exist & operate as a business or company; **3.** [intransitive, transitive] to be bought & sold, or to buy & sell something, on a stock exchange or other financial institution; **4.** [transitive] to exchange something that you have for something else.

⁵⁷**evenly** [adv] **1.** in a smooth or regular way; **2.** with equal amounts for each person or in each place.

⁵⁸**rare** [a] (**rarer, rarest**) **1.** not done, seen, happening, etc. very often; **2.** existing only in small numbers & therefore valuable or interesting.

⁵⁹**breed** [v] **1.** [intransitive] (of animals) to have sex & produce young; **2.** [transitive] to keep animals or plants in order to produce young ones in a controlled way; **3.** [transitive] **breed something** to be the cause of something; [n] **1.** a type of animal with a particular appearance that makes it different from others of the same species & that is the result of having been developed in a controlled way; **2.** [usually singular] a type of person.

⁶⁰**contribute** [v] **1.** [intransitive] **contribute (to something)** to be 1 of the causes of something; **2.** [intransitive, transitive] to help to improve or achieve something, especially by adding new ideas; **3.** [transitive, intransitive] to give something, especially money or goods, to help somebody/something; **4.** [transitive, intransitive] to write something for a newspaper, magazine, website, or a radio or television programme; to speak during a meeting or conversation, especially to give your opinion.

⁶¹**focused** [a] (also **focused**) with your attention directed to what you want to do; with very clear aims.

⁶²**strategically** [adv] **1.** in a way that is connected with achieving a particular purpose or gaining an advantage; **2.** in a way that is connected with gaining an advantage in a war or other military situation.

⁶³**outweigh** [v] **outweigh something** to be greater or more important than something.

⁶⁴**distinctive** [a] having a quality or characteristic that makes something different & easily noticed, SYNONYM: **characteristic**.

⁶⁵**signature** [n] **1.** [countable] your name as you usually write it, e.g. at the end of a letter; **2.** [uncountable] the act of signing something; **3.** [countable] a particular quality that makes something different from other similar things & makes it easy to recognize.

⁶⁶**tilt** [v] **1.** [intransitive, transitive] to move into a position with 1 side or end higher than the other; to make something move in this way, SYNONYM: **tip**; **2.** [transitive, intransitive] to influence a situation so that 1 particular opinion, person, etc. is preferred or more likely to succeed than another; to change in this way; [n] [singular, uncountable] a position in which 1 end or side of something is higher than the other.

⁶⁷**reciprocity** [n] [uncountable] a situation in which 2 people, countries, etc. provide the same help or advantages to each other.

⁶⁸**favour** [n] (*US favor*) **1.** [countable] a thing that you do to help somebody; **2.** [uncountable] approval or support for somebody/something; **find favor (with somebody/something)** [idiom] to become accepted & popular; **in favor (of somebody/something)** [idiom] **1.** supporting & agreeing with something/somebody; **2.** likely to produce a particular result, often in an unfair way; **3.** in exchange for another thing (because the other thing is better or you want it more); **in somebody’s favor** [idiom] **1.** if something is in somebody’s favor, it gives them an advantage or helps them; **2.** a decision or judgment that is in somebody’s favor benefits that person or says that they were right; [v] **1.** to prefer 1 thing to another, especially a particular system, plan or way of doing something; **2.** to treat somebody/something better than others, especially in an unfair way; **3. favor something** to provide suitable conditions for something; to make it easier for something to happen.

⁶⁹**whenever** [conjunction] **1.** every time that; **2.** at any time that; on any occasion that.

⁷⁰**exceed** [v] **1. exceed something** to be greater than a particular number or amount; **2. exceed something** to go beyond what the law, an order or a rule says you are allowed to do; **3. exceed something** to be better than something, SYNONYM: **surpass**.

⁷¹**workplace** [n] (often **the workplace**) [singular] a place where people work, such as an office or factory.

⁷²**relatively** [adv] to a fairly large degree, especially in comparison with something else; **relatively speaking** [idiom] used when you are comparing something with all similar things.

⁷³**preserve** [v] **1. preserve something** to keep a particular quality or feature; **2.** to keep something safe from harm, in good condition or in its original state; **3.** to prevent something from decaying, by treating it in a particular way; [n] [singular] an activity, job or interest that is thought to be suitable for 1 particular person or group of people.

⁷⁴**balance** [n] **1.** [singular, uncountable] a situation in which all parts exist in equal or appropriate amounts; **2.** [countable, usually singular] the amount of money in a bank account; the amount of a bill that remains after part has been paid; **3.** [uncountable] the ability to keep steady with an equal amount of weight on each side of the body; **strike a balance (between A & B)** [idiom] to manage to find a way of being fair to 2 opposing things; to find an acceptable position which is between 2 things; [v] **1.** [transitive, often passive, intransitive] to be equal in important or amount to something else that has the opposite effect, SYNONYM: **offset**; **2.** [transitive] **balance A with/& B** to give equal importance to 2 different things or parts of something; **3.** [transitive, often passive] **balance a against B** to compare the importance of 2 different things; **4.** [transitive] **balance something (finance)** to show or make sure that in an account the total money spent is equal to the total money received; **5.** [intransitive, transitive] **balance (something) (on something)** to put your body or something else into a position where it is steady & does not fall.

⁷⁵**operate** [v] **1.** [intransitive] to work, happen or exist, especially in a particular way or place at a particular time, SYNONYM: **function**; **2.** [transitive] **operate something** to use or control a system, process or machine; **3.** [intransitive] **operate (on somebody/something)** to cut open somebody’s body in order to remove or repair a damaged part.

on the principle⁷⁶ of fairness⁷⁷: when they help others, they protect⁷⁸ themselves by seeking⁷⁹ reciprocity. If you're a matcher, you believe in tit for tat⁸⁰, & your relationships are governed⁸¹ by even⁸² exchanges⁸³ of favors."

Of course, most people are not locked⁸⁴ in 1 reciprocity style. "Giving, taking, & matching are 3 fundamental⁸⁵ styles of social⁸⁶ interaction⁸⁷, but the lines between them aren't hard & fast. You might find that you shift from 1 reciprocity style to another as you travel across different work roles & relationships." E.g., you may be a giver when mentoring^{88 89} a less-experienced⁹⁰ colleague, act as a taker when negotiating⁹¹ your salary⁹², & be a matcher when exchanging productivity⁹³ tips⁹⁴ with a friend.

⁷⁶**principle** [n] **1.** [countable] a law, rule or theory that something is based on; **2.** [singular] a general or scientific law that explains how something works or why something happens; **3.** [countable] a belief that is accepted as a reason for acting or thinking in a particular way; **4.** [countable, usually plural, uncountable] a moral rule or a strong belief that influences your actions; **in principle** [idiom] **1.** if something can be done in principle, there is no good reason why it should not be done although it has not yet been done & there may be some difficulties; **2.** in general but not in detail.

⁷⁷**fairness** [n] [uncountable] the quality of treating people equally or according to the law or rules.

⁷⁸**protect** [v] **1.** [transitive, intransitive] to keep somebody/something safe from harm or injury; **2.** [transitive, usually passive] to introduce laws that make it illegal to kill, harm or damage a particular animal, area of land, building, etc.; **3.** [transitive] to help an industry in your own country by taxing goods from other countries so that there is less competition; **4.** [transitive, intransitive] to provide somebody/something with insurance against fire, injury, damage, etc.

⁷⁹**seek** [v] **1.** [transitive] to ask for something from somebody, such as help or support; **2.** [transitive, intransitive] to try to obtain or achieve something; **3.** [intransitive] **seek to do something** to try to do something, SYNONYM: **attempt**; **4.** (-seeking) (in adjectives & nouns) looking for or trying to get the thing mentioned; the activity of doing this; **seek your fortune** [idiom] (*literary*) to try to find a way to become rich, especially by going to another place; **seek somebody/something out** [phrasal verb] too look for & find somebody/something, especially when this means using a lot of effort.

⁸⁰**tit for tat** [n] [uncountable] a situation in which you do something bad to somebody because they have done the same to you.

⁸¹**govern** [v] **1.** [transitive, intransitive] **govern (something)** to control a country or its people & be responsible for introducing new laws & for organizing public services & the economy; **2.** [transitive, often passive] **govern something** to control or influence how something happens or functions; to control or influence somebody's actions or behavior.

⁸²**even** [adv] **1.** used to emphasized something unexpected or surprising; **2.** used when you are comparing things, to make the comparison stronger; **3.** used to introduce a more exact description of somebody/something; **even as** [idiom] just at the same time as somebody does something or as something else happens; **even if** [idiom] despite the possibility, fact or belief that; no matter whether; **even now/then** [idiom] **1.** despite what has/had happened; **2.** at this or that exact moment; **even so** [idiom] despite that; [a] **1.** equal in number, amount or value; shared equally, OPPOSITE: **uneven**; **2.** that can be divided exactly by 2, OPPOSITE: **odd**; **break even** [idiom] to complete a piece of business without either losing money or making a profit; **have an even chance (of doing something)** [idiom] to be equally likely to do or not do something.

⁸³**exchange** [n] **1.** [countable, uncountable] an act of giving something to somebody or doing something for somebody & receiving something in return; **2.** [countable] a conversation or an argument; **3.** [uncountable] the process of changing the money of 1 country into that of another; **4.** [countable] an arrangement when 2 people or groups from different countries visit each other's homes or do each other's jobs for a short time.

⁸⁴**lock** [v] **1.** [transitive, intransitive] **lock (something)** to fasten something with a lock; to be fastened with a lock; **2.** [transitive] **lock something + adv./prep** to put something in a safe place & lock it; **3.** [intransitive, transitive] to become fixed in 1 position & unable to move; to make something become fixed in this way; **4.** [transitive] **(be locked in/into something)** to be involved in a difficult situation, an argument, a disagreement, etc.; **lock somebody/yourself in (...)** [phrasal verb] to prevent somebody from leaving a place by locking the door; **lock somebody up** [phrasal verb] (*rather informal*) to put somebody in prison; **lock something up** [phrasal verb] **1.** to put money into an investment that you cannot easily turn into cash; **2.** **(be locked up in something)** to be in a place where it cannot easily be obtained.

⁸⁵**fundamental** [a] **1.** serious & very important; affecting the most central & important parts of something, SYNONYM: **basic**; **2.** forming the necessary basis of something, SYNONYM: **essential**.

⁸⁶**social** [a] **1.** [only before noun] connected with society & the way it is organized; **2.** [only before noun] connected with activities in which people meet each other for pleasure; **3.** [only before noun] connected with a person's position in society; **4.** [only before noun] (*ecology*) (of animals) living naturally in groups, rather than alone.

⁸⁷**interaction** [n] [uncountable, countable] **1.** the effect that 2 things have on each other; **2.** the way that people communicate with each other, especially while they work or spend time with them.

⁸⁸**mentor** [n] **1.** an experienced person who advises & helps somebody with less experience over a period of time; **2.** an experienced person in a company, university, etc. who trains & advises new employees or students.

⁸⁹**mentoring** [n] [uncountable] the practice of helping & advising a less experienced person over a period of time, especially as part of a formal programme in a company, university, etc.

⁹⁰**experienced** [a] **1.** having knowledge or skill in a particular job or activity; **2.** having knowledge as a result of doing something for a long time, or having had a lot of different experiences.

⁹¹**negotiate** [v] **1.** [intransitive] to try to reach an agreement by formal discussion; **2.** [transitive] to arrange or agree something by formal discussion; **3.** [transitive] **negotiate something (+ adv./prep.)** to successfully get over or past a difficult part on a path or route; **4.** [transitive] **negotiate something (+ adv./prep.)** to successfully solve a problem that is preventing you from achieving something.

⁹²**salary** [n] (plural **salaries**) money that employees receive for doing their job, especially professional employees or people working in an office, usually paid every month.

⁹³**productivity** [n] [uncountable] the rate at which a worker, a company or country produces goods; the amount produced, compared with how much time, work & money is needed to produce them.

⁹⁴**tip** [n] **1.** the thin pointed end of something; **2.** a small piece of advice about something practical, SYNONYM: **hint**; **3.** a small amount of extra money that you give to somebody, e.g. somebody who serves you in a restaurant; **the tip of the iceberg** [idiom] only a small part of a much larger problem; [v] **1.** [intransitive, transitive] to move so that 1 end or side is higher than the other; to move something into this position, SYNONYM: **tilt**; **2.** [transitive] **tip something + adv./prep.** to make something come out of a container by holding the container at the angle; **3.** [intransitive, transitive] to develop in a particular direction; to make something develop in a particular direction; **tip the balance/scales (in favor of, against, etc. somebody/something)** to give somebody/something enough of an advantage or disadvantage, so that the result of something is affected.

Instead of an automatic⁹⁵ behavior⁹⁶, choosing how we engage⁹⁷ with friends & colleagues can be a conscious⁹⁸ choice. Adam Grant explains: “Every time we interact⁹⁹ with another person at work, we have a choice to make: do we try to claim as much value as we can, or contribute value without worrying about what we receive in return?”

2.2.2 The Impact of Giving

Does being a giver pay¹⁰⁰ off? It seems giving does have a positive impact at an organizational¹⁰¹ level. Nathan P. Podsakoff & his team at the University of Arizona conducted¹⁰² a meta-analysis¹⁰³ [Nathan P. Podsakoff, Steven W. Whiting, Philip Podsakoff, Brian D. Blume. *Individual- & Organizational-Level Consequence of Organizational Citizenship Behaviors: A Meta-Analysis*] across 38 studies covering more than 3,500 business units, & found that companies with a culture¹⁰⁴ of generosity¹⁰⁵ & giving – which they call “Organizational Citizenship¹⁰⁶ Behaviors” – are more likely¹⁰⁷ to have higher productivity¹⁰⁸, efficiency¹⁰⁹, customer satisfaction¹¹⁰, as well as reduced costs.

But you may want to ask about the individual¹¹¹ impact of being a giver. The answer is pretty surprising. Givers are most

⁹⁵**automatic** [a] **1.** (of a machine or device) having controls that work without needing a person to operate them; **2.** done or happening without thinking, SYNONYM: **instinctive**; **3.** always happening as a result of a particular action or situation.

⁹⁶**behavior** [n] **1.** [uncountable, countable] the way that somebody/something functions or reacts in a particular situation; **2.** [uncountable] the way that somebody behaves, especially towards other people.

⁹⁷**engage** [v] **1. engage somebody/something** to succeed in attracting & keeping somebody’s attention & interest; **2.** to employ somebody to do a particular job; **engage in something** | **be engaged in something** [phrasal verb] to take part in an activity; **engage with something/somebody** [phrasal verb] to become involved with & try to understand something/somebody.

⁹⁸**conscious** [a] **1.** [not before noun] aware of something; noticing something, OPPOSITE: **unconscious**; **2.** able to use your senses & mental powers to understand what is happening, OPPOSITE: **unconscious**; **3.** (of actions, feelings, etc.) deliberate or controlled, OPPOSITE: **unconscious**; **4.** being particularly interested in something.

⁹⁹**interact** [v] **1.** [intransitive] if 1 thing interacts with another, or if 2 things interact, 1 thing has an effect on the other, or the 2 things have an effect on each other; **2.** [intransitive] **interact (with somebody)** to communicate with somebody, especially while you work or spend time with them.

¹⁰⁰**pay** [v] **1.** [intransitive, transitive] to give somebody money for work, goods, services, etc.; **2.** [intransitive] (of a business, etc.) to produce a profit; **3.** [intransitive, transitive] to result in some advantage for somebody; **4.** [intransitive, transitive] to suffer or accept a disadvantage because of your beliefs or actions; **5.** [transitive] **pay attention/heed/regard/tribute/homage/respect (to somebody/something)** to give attention, etc. to somebody/something; **6.** [transitive] **pay a visit (to somebody/something)** | **pay (somebody/something) a visit** to visit somebody/something; **pay off** [phrasal verb] (of a plan or an action) to bring benefits or good results; **pay something off** [phrasal verb] to finish paying money owed for something.

¹⁰¹**organizational** [a] (*British English also organisational*) **1.** connected with an organization or with organizations in general; **2.** connected with the ability to arrange or organize things well.

¹⁰²**conduct** [v] **1. conduct something** to organize &/or do a particular activity; **2. conduct something** (of a substance) to allow heat or electricity to pass along or through it; **3. conduct yourself + adv./prep. (formal)** to behave in a particular way; [n] [uncountable] (*formal*) **1.** a person’s behavior; **2. conduct of something** the way in which business or an activity is organized & managed.

¹⁰³**meta-analysis** [n] [countable, uncountable] (plurals **meta-analyses**) research that combines the results of a number of related studies.

¹⁰⁴**culture** [n] **1.** [uncountable] the customs, beliefs, art, way of life or social organization of a particular country or group; **2.** [countable] a country or group with its own customs & beliefs, art, way of life & social organization; **3.** [countable, uncountable] the typical beliefs, attitudes & behavior that people in a particular group or organization share; **4.** [uncountable] **culture (of something)** activities such as literature, music, art & film, thought of as a group; **5.** [uncountable] the process of growing cells or bacteria in an artificial substance or medical or scientific study; the substance in which they are grown; **6.** [countable] a group of cells or bacteria grown for medical or scientific study; [v] **culture something** to keep cells or bacteria in conditions that are suitable for growth, for medical or scientific study.

¹⁰⁵**generosity** [n] [uncountable] the quality of being kind & generous.

¹⁰⁶**citizenship** [n] [uncountable] **1.** the legal right to belong to a particular country; **2.** the state of being a citizen & accepting the responsibilities of it.

¹⁰⁷**likely** [a] (**likelier, likeliest**) (**more likely & most likely** are the usual forms.) **1.** that can be expected, SYNONYM: **probable**; **2.** if somebody is likely to do something, or something is likely to happen, they will probably do it or it will probably happen, OPPOSITE: **unlikely**; **3.** seeming suitable for a purpose; [adv] probably.

¹⁰⁸**productivity** [n] [uncountable] the rate at which a worker, a company or country produces goods; the amount produced, compared with how much time, work & money is needed to produce them.

¹⁰⁹**efficiency** [n] **1.** [uncountable] the quality of doing something well with no waste of time or money; **2.** [uncountable, countable] (*specialist*) the relationship between the amount of energy that goes into a machine or an engine, & the amount that it produces; **3.** (**efficiencies**) [plural] ways of wasting less time & money or of saving time or money.

¹¹⁰**satisfaction** [n] **1.** [uncountable, countable] the good feeling that you have when you have achieved something or when something that you wanted to happen does happen; something that gives you this feeling, OPPOSITE: **dissatisfaction**; **2.** [uncountable, singular] **satisfaction (of something)** the act of satisfying a need or desire; **3.** [uncountable] **satisfaction (of something)** (*formal*) an acceptable way of dealing with a complaint, a debt, an injury, etc.; **to somebody’s satisfaction** [idiom] **1.** if you do something to somebody’s satisfaction, they are pleased with it; **2.** if you prove something to somebody’s satisfaction, they believe or accept it.

¹¹¹**individual** [n] **1.** a person considered separately rather than as part of a group; **2.** a single member of a group or class; **3.** a person who is very different from others & has lots of new & interesting ideas; [a] **1.** [only before noun] considered separately rather than as part of a group; **2.** [only before noun] of or for a particular person; **3.** [only before noun] designed for use by 1 person; **4.** characteristic of a particular person or thing; **5.** (*usually approving*) having an unusual character, SYNONYM: **distinctive, original**.

likely to occupy¹¹² *both the lowest & highest levels* of an organization¹¹³. “The worst performers¹¹⁴ & the best performers are givers; takers & matchers are more likely to land¹¹⁵ in the middle. (...) Givers dominate¹¹⁶ the bottom & the top of the success ladder¹¹⁷. Across¹¹⁸ occupations¹¹⁹, if you examine¹²⁰ the link¹²¹ between reciprocity styles & success, the givers are more likely to become champs¹²² – not only chumps¹²³.”

As you can see, givers are more rare than takers & matchers, & have dramatically¹²⁴ different performance¹²⁵ results. While low-performing givers say yes to everything at the expense of their own work, which has a negative impact on their time management, project delivery, communication, & execution in general, smart givers take into account what is best for the organization, not only what is best for the person asking for help. As a result, they are highly valued & manage to both be helpful to their colleagues while positively impacting their organization.

In addition, givers may **get more support** from fellow colleagues on their way up to success. “There’s something distinctive that happens when givers succeed: it spreads & cascades. When takers win, there’s usually someone else who loses. Research shows that people tend to envy successful takers & look for ways to knock them down a notch. In contrast, when givers (...) win, people are rooting for them & supporting them, rather than gunning for them. Givers succeed in a way that creates a ripple effect, enhancing the success of people around them.”

In essence, successful givers generate win-win-win situations, where they succeed, their colleagues are elevated, & the company performs better. Since givers can end up either at the lowest or the highest levels of performance, how can you make sure you are 1 of the most successful givers?

2.2.3 How to Be A Smart Giver

If your goal is moderate success, you can decide to act like a taker or a matcher. But if you want to be part of the top performing members of your organization, or to have a positive impact on the world & foster win-win-win relationships with people around you, you may want to try to become a smart giver.

¹¹²**occupy** [v] **1. occupy something** to fill or use a space, area or amount of time, SYNONYM: **take up something**; **2. occupy something** to live or work in a room, house or building; **3. occupy something** to enter a place in a large group & take control of it, especially by military force; **4. occupy something** to have an official job or position, SYNONYM: **hold**; **5. occupy something** to be in or at a particular position in a system, SYNONYM: **hold**; **6.** to fill your time or keep you busy doing something.

¹¹³**organization** [n] (*British English also organisation*) **1.** [countable] an organized group of people with a particular purpose, such as a business or government department; **2.** [uncountable] the way in which the different parts of something are arranged, SYNONYM: **structure**; **3.** [uncountable] the act of making arrangements or preparations for something, SYNONYM: **planning**; **4.** [uncountable] the quality of being arranged in a neat, careful & logical way; the ability to plan your work or life well & in an efficient way.

¹¹⁴**performer** [n] **1.** a person or thing that behaves or works in the way mentioned; **2.** a person who performs for an audience in a show or concert.

¹¹⁵**land** [n] **1.** [uncountable] the part of the earth’s surface that is not covered by water; **2.** [uncountable] (**lands** [plural]) the area of ground that somebody owns, especially when you think of it as property that can be bought or sold; **3.** [uncountable] (**lands** [plural]) an area of ground, especially of a particular type or used for a particular purpose, SYNONYM: **terrain**; **4.** [countable] a country or state; **5.** (**the land**) [uncountable] used to refer to country areas & the way of life in the countryside, or to ground or soil used for farming; [v] [intransitive, transitive] to arrive on land or another surface; to put somebody/something on land or another surface.

¹¹⁶**dominate** [v] **1.** [transitive, intransitive] **dominate (something/somebody)** to control or have a lot of influence over something/somebody, especially in a negative way; **2.** [transitive] **dominate something** to be the most important or obvious feature of something; **3.** [transitive, intransitive] **dominate (something)** to be the largest, highest or most common thing in a place.

¹¹⁷**ladder** [n] **1.** [usually singular] a series of stages by which you can make progress in your life or career; **2.** a piece of equipment for climbing up & down something such as the side of a building, consisting of 2 lengths of wood or metal that are joined together by steps.

¹¹⁸**across** [prep] **1.** from 1 side to the other side of something; **2.** on the other side of something; **3.** on or over a part of the body; **4.** in every part of a place, group of people, etc., SYNONYM: **throughout**; [adv] from 1 side to the other side; **across from somebody/something** [idiom] opposite somebody/something.

¹¹⁹**occupation** [n] **1.** [countable] a job or profession; **2.** [uncountable] the act of moving into a country, town, etc. & taking control of it using military force; the period of time during which a country, town, etc. is controlled in this way; **3.** [uncountable] the act of living in or using a building, room or piece of land; **4.** [countable] a way of spending time, especially when you are not working.

¹²⁰**examine** [v] **1.** to consider or study an idea or subject very carefully; **2.** to look at somebody/something closely, to see if there is anything wrong or to find the cause of a problem; **3. examine somebody** to give somebody a test to see how much they know about a subject or what they can do.

¹²¹**link** [v] [often passive] **1.** to make a physical or electronic connection between 1 object, machine or place & another, SYNONYM: **connect**; **2.** to make or have a connection with somebody/something, especially where 1 thing affects the other; **3.** to state that there is a connection or relationship between 2 things or people, SYNONYM: **associate**; **link up (with somebody/something)** [phrasal verb] to join or become joined with somebody/something; [n] **1.** a connection between 2 or more people or things, especially where one affects the other; **2.** a relationship between 2 or more people, countries or organizations; **3.** a means of traveling or communicating between 2 places; **4.** (*computing*) a place in an electronic document that is connected to another electronic document or to another part of the same document; **a link in the chain** [idiom] 1 of the stages in a process or a line of argument; **the weak link (in the chain)** [idiom] the point at which a system or an organization is most likely to fail.

¹²²**champ** [v] [intransitive, transitive] **champ (something)** (especially of horses) to bite or eat something noisily; **champing at the bit** [idiom] (*informal*) impatient to do or start doing something; [n] an informal way of referring to a champion, often used in newspapers.

¹²³**chump** [n] (*old-fashioned, informal*) a stupid person.

¹²⁴**dramatically** [adv] **1.** in a very sudden or extreme way; to a very great degree; **2.** in a way that is exciting or impressive; **3.** using the style of a play in telling a story or giving an account of an event.

¹²⁵**performance** [n] **1.** [uncountable, countable] how well or badly you do something; how well or badly something works; **2.** [uncountable, singular] **performance of something** the action or process of performing a task or function; **3.** [countable] **performance (of something)** an act of presenting a play, concert or some other form of entertainment; **4.** [countable] an act of performing a song, a piece of music, or a role in a play or film.

- **Change your mindset.** Consider the lens through which you are viewing your job & your relationships with friends & family. For your professional context, ask yourself who exactly is affected by your work? How do your choices impact the experience of colleagues & customers? How can you align your decisions so when you win, everyone wins? Instead of being self-focused like a taker or transactional like a matcher, think of an expanding pie where everyone can benefit from your success.
- **Help wisely.** A problem low-performance givers face is the **lack of focus** on the way they give. Tracking your impact does not mean you need to become a taker & only help when it benefits you, nor that you need to become a matcher & only help when you receive equal value in return. Rather, it means that you need to make sure you are helping achieve goals that are beneficial in general, not only to the person you are helping. Ask yourself: is this good for the company, for the customers, for the team? In a personal context, ask: is this good for our group of friends, our family, or our relationship in general? If the answer is no, try to brainstorm a better solution.
- **Track your impact.** From time to time, **block some time for self-reflection** to look back at past times you have helped, & what the outcome was. In the end, who benefitted from your help? Was it just 1 person, who may have been a taker? Or did your help have a wider positive impact, which justifies the time & energy you spent to provide your support? If you feel like your impact wasn't as positive as you expected, try to think of the factors at play, & how you can be wiser next time you are asked for help so your involvement can be as beneficial as possible.

These strategies can be helpful for anyone, but especially for low-performing givers who are spending too much time & energy on providing scattered support which negatively impact their own work & relationships. Wherever you are on the spectrum of reciprocity styles, remember that it is a choice: you can practice wise generosity to become a smart giver & create a positive ripple effect around yourself.” – **Anne-Laure Le Cunff**

Quick notes. Dr. Who – a disagreeable giver?
Peterson take & giver.

Chapter 3

The Foundation for Critical Thinking

“The Foundation is a non-profit organization that seeks to promote essential change in education & society through the cultivation of fairminded critical thinking – thinking which embodies intellectual empathy, intellectual humility, intellectual perseverance, intellectual integrity & intellectual responsibility.”

“I found that I was fitted for nothing so well as for the study of Truth ... with desire to seek, patience to doubt, fondness to meditate, slowness to assert, readiness to consider, carefulness to dispose & set in order ... being a man that neither affects what is new nor admires what is old, & that hates every kind of imposture.” – Francis Bacon (1605)

3.1 The Foundation for Critical Thinking/Critical Thinking: Where to Begin

“Many of our resources, publications, & materials are applicable to all professions & across all domains of thought. We do, however, recognize that the depth & breadth of content we offer may be daunting. We have therefore created the following pages as starting points by your studies.

- [For College & University Faculty](#)
- [For College & University Students](#)
- [For High School Teachers](#)
- [For Jr. High School Teachers](#)
- [For Elementary Teachers \(Grades 4–6\)](#)
- [For Elementary Teachers \(Kindergarten – 3rd Grade\)](#)
- [For Science & Engineering Instruction](#)
- [For Business & Professional Development](#)
- [For Nursing & Health Care](#)
- [For Home Schooling & Home Study](#)

If you are new to critical thinking or wish to deepen your concept of it, we recommend you review the content below & bookmark this page for future reference.”

3.1.1 Our Conception of Critical Thinking ...

“There are many ways to articulate the concept of critical thinking, yet every substantive conception must contain certain core elements. Consider these brief conceptualizations of critical thinking ...

“Critical thinking is the intellectually disciplined process of actively & skillfully conceptualizing, applying, analyzing, synthesizing, &/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief & action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency,

relevance, sound evidence, good reasons, depth, breadth, & fairness ...” – A statement by Michael Scriven & Richard Paul, presented at the 8th Annual International Conference on Critical Thinking & Education Reform, 1987, [a more complete version](#)

“Critical thinking is self-guided, self-disciplined thinking which attempts to reason at the highest level of quality in a fairminded way. People who think critically attempt, with consistent & conscious effort, to live rationally, reasonably, & empathically. They are keenly aware of the inherently flawed nature of human thinking when left unchecked. They strive to diminish the power of their egocentric & sociocentric tendencies. They use the intellectual tools that critical thinking offers – concepts & principles that enable them to analyze, assess, & improve thinking. They work diligently to develop the intellectual virtues of intellectual integrity, intellectual humility, intellectual civility, intellectual empathy, intellectual sense of justice & confidence in reason. They realize that no matter how skilled they are as thinkers, they can always improve their reasoning abilities & they will at times fall prey to mistakes in reasoning, human irrationality, prejudices, biases, distortions, uncritically accepted social rules & taboos, self-interest, & vested interest.

They strive to improve the world in whatever ways they can & contribute to a more rational, civilized society. At the same time, they recognize the complexities often inherent in doing so. They strive never to think simplistically about complicated issues & always to consider the rights & needs of relevant others. They recognize the complexities in developing as thinkers, & commit themselves to life-long practice toward self-improvement. They embody the Socratic principle: *The unexamined life is not worth living*, because they realize that many unexamined lives together result in an uncritical, unjust, dangerous world.” – Linda Elder, Sep 2007”

3.1.2 Why Critical Thinking?

The Problem. “Everyone thinks; it is our nature to do so. But much of our thinking, left to itself, is biased, distorted, partial, uninformed, or down-right prejudiced. Yet the quality of our lives & that of what we produce, make, or build depends precisely on the quality of our thought. Shoddy thinking is costly, both in money & in quality of life. Excellence in thought, however, must be systematically cultivated.”

A Brief Definition. “Critical thinking is the art of analyzing & evaluating thinking with a view to improving it.”

The Result. “A well-cultivated critical thinker:

- raises vital questions & problems, formulating them clearly & precisely;
- gathers & assesses relevant information, using abstract ideas to interpret it effectively;
- comes to well-reasoned conclusions & solutions, testing them against relevant criteria & standards;
- thinks openmindedly within alternative systems of thought, recognizing & assessing, as need be, their assumptions, implications, & practical consequences; &
- communicates effectively with others in figuring out solutions to complex problems.

Critical thinking is, in short, self-directed, self-disciplined, self-monitored, & self-corrective thinking. It requires rigorous standards of excellence & mindful command of their use. It entails effective communication & problem-solving abilities, & a commitment to overcoming our native egocentrism & sociocentrism.” Read [The Foundation for Critical Thinking’s concept of critical thinking](#).

3.1.3 The Essential Dimensions of Critical Thinking

“Our conception of critical thinking is based on the [substantive approach](#) developed by Dr. Richard Paul & his colleagues at the Center & Foundation for Critical Thinking over multiple decades. It is relevant to every subject, discipline, & profession, & to reasoning through the problems of everyday life. It entails 5 essential dimensions of critical thinking:

1. The analysis of thought.
2. The assessment of thought.
3. The dispositions of thought.
4. The skills & abilities of thought.
5. The obstacles or barriers to critical thought.

At the left is an overview of the 1st 3 dimensions. In sum, the elements or structures of thought enable us to “take our thinking apart” & analyze it. The intellectual standards are used to assess & evaluate the elements. The intellectual traits are dispositions of mind embodied by the fairminded critical thinker. To cultivate the mind, we need command of these essential dimensions, & we need to consistently apply them as we think through the many problems & issues in our lives.”

Fig. Critical Thinkers Routinely Apply Intellectual Standards to The Elements of Reasoning In Order to Develop Intellectual Traits: **The Standards** [Clarity, Accuracy, Relevance, Logicalness, Breadth, Precision, Significance, Completeness, Fairness, Depth] → (Must be applied to) → **The Elements** [Purposes, Questions, Points of view, Information, Inferences, Concepts, Implications, Assumptions] → (As we learn to develop) → **Intellectual Traits** [Intellectual Humility, Intellectual Autonomy, Intellectual Integrity, Intellectual Courage, Intellectual Perseverance, Confidence in Reason, Intellectual Empathy, Fairmindedness].

3.1.4 The Elements of Reasoning & Intellectual Standards

“To learn more about the elements of thought & how to apply the intellectual standards, check out our interactive model. simply click on the link [Open the “Elements & Standards” Online Learning Model](#) & use your mouse to explore each concept.”

Why the Analysis of Thinking Is Important

“If you want to think well, you must understand at least the rudiments of thought, the most basic structures out of which all thinking is made. You must learn how to take thinking apart.”

Analyzing the Logic of a Subject

“When we understand the elements of reasoning, we realize that all subjects, all disciplines, have a fundamental logic defined by the structures of thought embedded within them. Therefore, to lay bare a subject’s most fundamental logic, we should begin with these questions:

- What is the main purpose or goal of studying this subject? What are people in this field trying to accomplish?
- What kinds of questions do they ask? What kinds of problems do they try to solve?
- What sorts of information or data do they gather?
- What types of inferences do they usually draw? What types of judgments do they typically make? (Judgments about ...)
- How do they go about gathering information in ways that are distinctive to this field?
- What are the most basic ideas, concepts, or theories in this field?
- What do professionals in this field take for granted or assume?
- How should studying this field affect my view of the world?
- What viewpoint is fostered in this field?
- What implications follow from studying this discipline? How are the products of this field used in everyday life? How might they be used in ways they are not currently?”

3.1.5 Going Deeper ...

“While most critical thinking concepts are intuitive, to integrate & apply these concepts consistently & rationally takes concerted effort, study, & reflection. Just as professional athletes or musicians must practice to master their sport or art, so too must thinkers practice to master their minds. We invite you to return to our website often & explore the resources available to assist you in developing & cultivating your thinking.”

The Critical Thinking Bookstore

“Our [online bookstore](#) houses numerous [books & teacher’s manuals](#), [Thinker’s Guides](#), [videos](#), & other [educational materials](#).”

Learn from our Fellows & Scholars

“Watch our [Event Calendar](#), which provides an overview of all upcoming conferences & academies hosted by the Foundation for Critical Thinking. Clicking an entry on the Event Calendar will bring up that event’s details, & the option to register.

For those interested in online learning, the Foundation offers [accredited online courses in critical thinking](#) for both educators & the general public, as well as an [online test for evaluating basic comprehension of critical thinking concepts](#). We are in the process of developing more online learning tools & tests to offer the community.”

Utilizing this Website

“This website contain large amounts [research](#) & an [online library of articles](#), both of which are freely available to the public. We also invite you to become a member of the [Critical Thinking Community](#), where you will gain access to more tools & materials.”

3.2 The Foundation for Critical Thinking/Science & Engineering

“While there are numerous resources on our website applicable to Science & Engineering instruction, the following resources are among the most relevant to incorporating critical thinking concepts into the Science or Engineering classroom.”

3.2.1 Engineering Instruction

“Engineering increasingly attends to systems of systems, where the product of the engineer’s intellect exhibits complex interactions with other systems, markets, technologies, the environment, & society. Additionally, the workplace demands that the individual engineer continually develop, mastering new learning & deal with increasing complexities. The thinking skills of our students & young engineers provide the foundation for that growth, while in school & in the workplace. When we explicitly target their thinking skills, we provide them leverage for learning both in class & on the job.

“Critical Thinking” can be an educational buzz-phrase which we presume implicit in rigorous programs. Or, substantively expressed, critical thinking becomes a “system opening system,” a lever for both cracking open both new domains & intensifying insight into the web of connections that characterize engineering work. Generalizable critical thinking *skills* & *dispositions* should guide professional reasoning through complex engineering questions & issues, whether technological, commercial, environmental, ethical, or social.

Yet our students do not naturally think using the tools of critical thinking; they do not intuit the important questions they should be asking of themselves, teachers, colleagues, customers, or vendors, to either guide their understanding or refine their thinking. It is therefore essential that we foster, through engineering instruction, the skills, abilities & traits of the disciplined mind.”

3.2.2 Science Instruction

Complimentary Articles on Critical Thinking

“The following pages on our website contain articles which, though not exclusively on the topic of science instruction, are none the less valuable & applicable to any educational environment & are therefore recommended reading for any science educator.

- [Critical Thinking in Every Domain of Knowledge & Belief](#)
- [Becoming a Critic of Your Thinking](#)
- [Critical Thinking: A Stage Theory](#)
- [Critical Thinking: Identifying the Targets](#)
- [Glossary of Critical Thinking Terms](#)
- [The Analysis & Assessment of Thinking](#)
- [The Role of Questions in Teaching, Thinking & Learning](#)
- [Universal Intellectual Standards](#)
- [Using Intellectual Standards to Assess Student Reasoning](#)
- [Distinguishing Between Inert Information, Activated Ignorance, Activated Knowledge](#)

- Distinguished Between Interfaces & Assumptions
- Thinking with Concepts
- Valuable Intellectual Traits

Chapter 4

Miscellaneous

- **psychiatrist** [n] a doctor who studies & treats mental illnesses.
- **psychoanalyst** [n] (also **analyst**) a person who treats patients using psychoanalysis.

4.1 An Untrained &/Thus (?) Failed Eidetiker: The Way I Remember

Remark 4.1. *At the beginning, I am not so sure that this concept should be mentioned here, in the subject of psychology. But when I recalled back some pieces of my memory, I realize how serious & devastated¹ this ability has affected the development of my personality & psychology in various aspects.*

Definition 4.1 ([Wikipedia/eidetic memory](#)). “Eidetic memory (*more commonly called* photographic memory *or* total recall) is the ability to recall an image from *memory* with high precision for a brief period after seeing it only once, & without using a *mnemonic device*.”

Remark 4.2 ([Wikipedia/eidetic memory](#)). “Although the terms eidetic memory & photographic memory are popularly used interchangeably, they are also distinguished, with eidetic memory referring to the ability to see an object for a few minutes after it is no longer present & photographic memory referring to the ability to recall pages of text or numbers, or similar, in great detail. When the concepts are distinguished, eidetic memory is reported to occur in a small number of children & generally not found in adults, while true photographic memory has never been demonstrated to exist.”²

Question 4.1. *Eidetic memory: A gift or a curse?*

4.1.1 Eidetic vs. Photographic

From [Wikipedia/eidetic memory/eidetic vs. photographic](#):

“The terms *eidetic memory* & *photographic memory* are commonly used interchangeably, but they are also distinguished. Scholar Annette Kujawski Taylor stated,

“In eidetic memory, a person has an almost faithful mental image snapshot or photograph of an event in their memory. However, eidetic memory is not limited to visual aspects of memory & includes auditory memories as well as various sensory aspects across a range of stimuli associated with a visual image.”

Author Andrew Hudmon commented:

“Examples of people with a photographic-like memory are rare. Eidetic imagery is the ability to remember an image in so much detail, clarity, & accuracy that it is as though the image were still being perceived. It is not perfect, as it is subject to distortions & additions (like episodic memory) & vocalization interferes with the memory.”

“Eidetikers”, as those who possess this ability are called, report a vivid *after image* that lingers in the visual field with their eyes appearing to scan across the image as it is described. Contrary to ordinary mental imagery, eidetic images are externally projected, experienced as “out there” rather than in the mind. Vividness & stability of the image begin to fade within minutes after the removal of the visual stimulus.

[Lilienfeld](#) et al. stated,

¹Vì: Hồi ức của 1 kẻ có trí nhớ điện tử. Cần phân biệt với bộ phim [IMDb/Memories of Murder](#) (2003), original title: Salinui chueok, i.e., Hồi ức kẻ sát nhân.

²The word eidetic comes from the Greek word *eidos* meaning “visible form”.

“People with eidetic memory can supposedly hold a visual image in their mind with such clarity that they can describe it perfectly or almost perfectly . . . , just as we can describe the details of a painting immediately in front of us with near perfect accuracy.”

By contrast, photographic memory may be defined as the ability to recall pages of text, numbers, or similar, in great detail, without the visualization that comes with eidetic memory. It may be described as the ability to briefly look at a page of information & then recite it perfectly from memory. This type of ability—absolute recall of all events in a lifetime—has never been proven to exist.”³

4.1.2 Prevalence

From [Wikipedia/eidetic memory/prevalence](#):

“Eidetic memory is typically found only in young children, as it is virtually nonexistent in adults.” Hudmon stated, “*Children possess far more capacity for eidetic imagery than adults, suggesting that a developmental change (e.g., acquiring language skills) may disrupt the potential for eidetic imagery.*”

“It has been hypothesized that language acquisition & verbal skills allow older children to think more abstractly & thus rely less on **visual memory** systems. Extensive research has failed to demonstrate consistent correlations between the presence of eidetic imagery & any cognitive, intellectual, neurological, or emotional measure.”

“A few adults have had phenomenal memories (not necessarily of images), but their abilities are also unconnected with their intelligence levels & tend to be highly specialized. In extreme cases, like those of **Solomon Shereshevsky** & **Kim Peek**, memory skills can reportedly hinder social skills. Shereshevsky was a trained mnemonist, not an eidetic memorizer”, & there are no studies that confirm whether Kim Peek had true eidetic memory.”

4.1.3 Skepticism

From [Wikipedia/eidetic memory/skepticism](#): [...]

“Lilienfeld et al. stated:

“Some psychologists believe that eidetic memory reflects an unusually long persistence of the iconic image in some lucky people”. [...] “More recent evidence raises questions about whether any memories are truly photographic (Rothen, Meier & Ward, 2012). Eidetikers’ memories are clearly remarkable, but they are rarely perfect. Their memories often contain minor errors, including information that was not present in the original visual stimulus. So even eidetic memory often appears to be reconstructive”.

Scientific skeptic author **Brian Dunning** reviewed the literature on the subject of both eidetic & photographic memory in 2016 & concluded that there is “a lack of compelling evidence that eidetic memory exists at all among healthy adults, & no evidence that photographic memory exists. But there’s a common theme running through many of these research papers, & that’s that the difference between ordinary memory & **exceptional memory** appears to be one of degree.”

4.1.4 Trained Mnemonists

From [Wikipedia/eidetic memory/trained mnemonists](#):

“To constitute photographic or eidetic memory, the visual recall must persist without the use of mnemonics, expert talent, or other cognitive strategies. Various cases have been reported that rely on such skills & are erroneously attributed to photographic memory.”

Example 4.1. “An example of extraordinary memory abilities being ascribed to eidetic memory comes from the popular interpretations of **Adriaan de Groot**’s classic experiments into the ability of **chess grandmaster** to memorize complex positions of chess pieces on a chessboard. Initially, Initially, it was found that these experts could recall surprising amounts of information, far more than nonexperts, suggesting eidetic skills. However, when the experts were presented with arrangements of chess pieces that could never occur in a game, their recall was no better than that of the nonexperts, suggesting that they had developed an ability to organize certain types of information, rather than possessing innate eidetic ability”.

Individuals identified as having a condition known as **hyperthymesia** are able to remember very intricate details of their own personal lives, but the ability seems not to extend to other, non-autobiographical information. They may have vivid recollections such as who they were with, what they were wearing, & how they were feeling on a specific date many years in the past. Patients under study, e.g., **Jill Price**, show brain scans that resemble those with **obsessive-compulsive disorder**. In fact, Price’s unusual autobiographical memory has been attributed as a byproduct of compulsively making journal &

³This appeared in the movie **Good Will Hunting** (1997) mentioned in the quotes section.

diary entries. Hyperthymestic patients may additionally have depression⁴ stemming from the inability to forget unpleasant memories & experiences from the past.⁵ It is a misconception that hyperthymesia suggests any eidetic ability.⁶

Each year at the **World Memory Championships**, the world's best memorizers compete for prizes. None of the world's best competitive memorizers has a photographic memory, & no one with claimed eidetic or photographic memory has ever won the championship."

4.1.5 Notable Claims

From **Wikipedia/eidetic memory/notable claims**:

"Main article: **Wikipedia/List of people claimed to possess an eidetic memory**.

There are a number of individuals whose extraordinary memory has been labeled "eidetic", but it is not established conclusively whether they use **mnemonics** & other, non-eidetic memory-enhancement.

Example 4.2. *'Nadia', who began drawing realistically at the age of 3, is autistic & has been closely studied. During her childhood she produced highly precocious, repetitive drawings from memory, remarkable for being in perspective (which children tend not to achieve until at least adolescence) at the age of 3, which showed different perspectives on an image she was looking at. E.g., when at the age of three she was obsessed with horses after seeing a horse in a story book she generated numbers of images of what a horse should look like in any posture. She could draw other animals, objects, & parts of human bodies accurately, but represented human faces as jumbled forms."*⁷

Example 4.3. *Others have not been thoroughly tested, though savant **Stephen Wiltshire** can look at a subject once & then produce, often before an audience, an accurate & detailed drawing of it, & has drawn entire cities from memory, based on single, brief helicopter rides; his 6-meter drawing of 305 square miles of New York City is based on a single 20-minute helicopter ride.*

Example 4.4. *Another less thoroughly investigated instance is the art of **Winnie Bamara**, an Australian indigenous artist of the 1950s.*

Question 4.2. *Connection/Correlation between eidetic memory & gifted drawing ability?*

4.1.6 Quotes on Eidetic Memory

- In the movie **Red Dragon** (2002), I like the following conversation:

Dr. Hannibal Lecter: *"That's fascinating. You know I'd always suspected as much, you are an eidetiker."*

Will Graham: *"I'm not psychic."*

Dr. Hannibal Lecter: *"No, no, no, this is different; more akin to artistic imagination. You're able to assume the emotional point-of-view of other people, even those that scare or sicken you. It's a troubling gift, I should think."*

- In the movie **Good Will Hunting** (1997):

"Do you have a photographic memory?" [...]

4.2 Psychology & Scientists/Mathematicians

"According to **Herman Goldstine**, the mathematician **John von Neumann** was able to recall from memory every book he had ever read." – **Wikipedia/eidetic memory/prevalence**

4.3 Psychology & Music

Han Zimmer's masterpieces: ...

⁴NQBH: a connection between eidetic memory & depression.

⁵Exactly my case.

⁶It seems to me that I possess both of these curses, although the latter is less obvious when I grow up: My memory is less sharp & more messy (somehow the capacity of my memory seems to expand).

⁷Cf. my untrained drawing ability compared to a trained adult when I was a boy.

4.4 Introversion &/vs. Extroversion

4.5 Depression: The Unphysical Cancer

Well, it will take me a really really long long time to beat this shit.

4.6 Monomaniac: A Social Loser or A Lonely Wolf?

Monomaniac - Kẻ độc hành.

4.7 Rich Dad, Poor Dad

I just realize: If I cannot teach my son to become a man, a real man, then I should not have him. “Like father, like son”. If I cannot help my son get out of the life circle⁸ of poor & stupidity, then why should I have one?

4.8 Undisputed Truth

Mike Tyson’s autobiography Tyson and Sloman, 2013:

“This book is dedicated to all the outcasts – Everyone who has ever been mesmerized, marginalized, tranquilized, beaten down, & falsely accused. & incapable of receiving love.” – Tyson and Sloman, 2013, Dedication

4.9 Miscellaneous

Ask myself before doing anything literally:

Question 4.3 (Decision question). *Should I do it or not? If yes, why? If no, why?*

Question 4.4 (Self-study questions). *What? Why? & How?*

Question 4.5. *What is the best status or feeling in life?*

This question lies in the borderline between the fields of psychology & philosophy. Should I move it to **NQBH/philosophy**?

NQBH’s personal answer. Concentration & contributions. □

“He [G. H. Hardy] was, as I [C. P. Snow] later discovered, shy & self-conscious⁹ in all formal actions, & had a dread of introductions. He just put his head down as it were in a butt of acknowledgment, & without any preamble whatever began: ...” [...] “I [C. P. Snow] half-guessed that he [G. H. Hardy] had a horror of persons, then prevalent in academic society, who devotedly studied the literature but had never played the game.” [...] “He appeared to find the reply partially reassuring¹⁰, & went on to more tactical questions.” [...] “As I had plenty of opportunities to realize in the future, Hardy had no faith in intuitions¹¹ or impressions, his own or anyone else’s. The only way to assess someone’s knowledge, in Hardy’s view, was to examine him. That went for mathematics, literature, philosophy, politics, anything you like. If the man had bluffed & then wilted under the questions, that was his lookout. 1st things came 1st, in that brilliant & concentrated mind.” [...] “Nothing else mattered. In the end he [G. H. Hardy] smiled with immense charm, with child-like openness, & said that Fenner’s (the university cricket ground) next season might be bearable after all, with the prospect of some reasonable conversation.” – Hardy, 1992, Foreword, pp. 10–11

“I [C. P. Snow] don’t know what the moral is. But it was a major piece of luck for me. This was intellectually the most valuable friendship of my life. His mind, as I have just mentioned, was brilliant & concentrated: so much so that by his side anyone else’s seemed a little muddy, a little pedestrian & confused. He wasn’t a great genius, as Einstein & Rutherford were. He said, with his usual clarity¹², that if the word meant anything he

⁸vi: vòng lặp lẫn quẩn của cuộc đời.

⁹**self-conscious** [a] **1. self-conscious (about sth)** nervous/embarrassed about your appearance or what other people think of you; **2.** (*often disapproving*) done in a way that shows you are aware of the effect that is being produced, *opposite*: **unselfconscious**.

¹⁰**reassuring** [a] making you feel less worried or uncertain about something.

¹¹**intuition** [n] **1.** [uncountable] the ability to know something by using your feelings rather than considering the facts; **2.** [countable] **intuition** (*that ...*) an idea or a strong feeling that something is true although you cannot explain why. VI: trực giác.

¹²**clarity** [n] [uncountable] **1.** the quality of being expressed clearly; **2.** the ability to think about or understand something clearly; **3.** if a picture, substance or sound has clarity, you can see or hear it very clearly, or see through it easily.

was not a genius at all. At his best, he said, he was for a short time the 5th best pure mathematician in the world. Since this character was as beautiful & candid¹³ as his mind, he always made the point that his friend & collaborator Littlewood was an appreciably more powerful mathematician than he was, & that his protégé¹⁴ Ramanujan really had natural genius in the sense (though not to the extent, & nothing like so effectively) that the greatest mathematicians had it.

People sometimes thought he was under-rating himself, when he spoke of these friends. It is true that he was magnanimous¹⁵, as far from envy as a man can be: but I think one mistakes his quality if one doesn't accept his judgment. I prefer to believe in his own statement in *A Mathematician's Apology*, at the same time so proud & so humble:

‘I still say to myself when I am depressed & find myself forced to listen to pompous & tiresome people, “Well, I have done 1 thing you could never have done, & that is to have collaborated with Littlewood & Ramanujan on something like equal terms.”’

In any case, his precise ranking must be left to the historians of mathematics (though it will be an almost impossible job, since so much of his best work was done in collaboration). There is something else, thought, at which he was clearly superior to Einstein or Rutherford or any other great genius: & that is at turning any work of the intellect¹⁶, major or minor or sheer play, into a work of art. It was that gift above all, I think, which made him, almost without realizing it, purvey¹⁷ such intellectual delight¹⁸. When *A Mathematician's Apology* was 1st published, Graham Greene in a review wrote that along with Henry James's notebooks, this was the best account of what it was like to be a creative artist¹⁹. Thinking about the effect Hardy had on all those round him, I believe that is the clue.” – Hardy, 1992, Foreword, pp. 12–13

¹³**candid** [a] **1.** saying what you think openly & honestly; not hiding your thoughts; **2.** a **candid** photograph is one that is taken without the person in it knowing that they are being photographed.

¹⁴**protégé** [n] (feminine **protégée**) (*from French*) a young person who is helped in their career & personal development by a more experienced person.

¹⁵**magnanimous** [a] (*formal*) kind, generous & forgiving, especially towards an enemy or competitor.

¹⁶**intellect** [n] **1.** [uncountable, countable] the ability to think in a logical way & understand things, especially at an advanced level; your mind; **2.** [countable] a very intelligent person.

¹⁷**purvey** [v] (*formal*) **purvey something** to supply food, services or information to people.

¹⁸**delight** [n] **1.** [uncountable, singular] a feeling of great pleasure, **SYNONYM:** joy; **2.** [countable] something that gives you great pleasure, **SYNONYM:** joy.

¹⁹NQBH: a creative artist wannabe.

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