

History of Psychology

Session 2: The birth of Psychology

Rui Mata, Center for Cognitive and Decision Sciences
September 29, 2025

Session information

Sessions take place Mondays, 8.15–9.45, Chemie, Organische, Grosser Hörsaal OC.

Slides will be made available shortly before each session.

#	Date	Topic	Instructor	Resources
1	22.09.2025	<u>What kind of science is psychology?</u>	Mata	<u>Spektrum Podcast</u>
2	29.09.2025	The birth of psychology	Mata	<u>Brysbaert & Rastle (2021; 4.1–4.2)</u>
3	13.10.2025	Psychoanalysis	Mata	<u>Brysbaert & Rastle (2021; 4.3–4.4)</u>
4	20.10.2025	Behaviorism	Mata	<u>Brysbaert & Rastle (2021; 5.2)</u>
5	27.10.2025	Gestalt psychology	Mata	<u>Brysbaert & Rastle (2021; 4.2)</u>
6	03.11.2025	Cognitive psychology	Mata	<u>Brysbaert & Rastle (2021; 5.3)</u>
7	10.11.2025	Psychology today	Tisdall	<u>Spear (2007)</u>
8	17.11.2025	Psychotherapy research	Tisdall	<u>Braakmann (2015)</u>
9	24.11.2025	Psychological testing	Tisdall	<u>Wasserman (2012)</u>
10	01.12.2025	Decision science	Tisdall	<u>Newell et al. (2022)</u>
11	08.12.2025	What kind of science is psychology? (revisited)	Tisdall	<u>Ball (2012)</u>
12	15.12.2025	Exam (see below)		

Learning Objectives for Today

- Recognise that main questions in psychological science today have long traditions dating back to classical antiquity
- Identify the origins of the scientific revolution in the Renaissance and Enlightenment, and distinguish rationalist and empiricist views
- Identify key cultural/scientific movements of the 19th century and their influence on psychology, in particular 1) evolutionary theory, 2) neuropsychology, and 3) the social sciences
- Identify the 19th century as the “birth” and institutionalisation of scientific Psychology
- Identify the first “schools” in Psychology - structuralism and functionalism



GREEK

psukhē

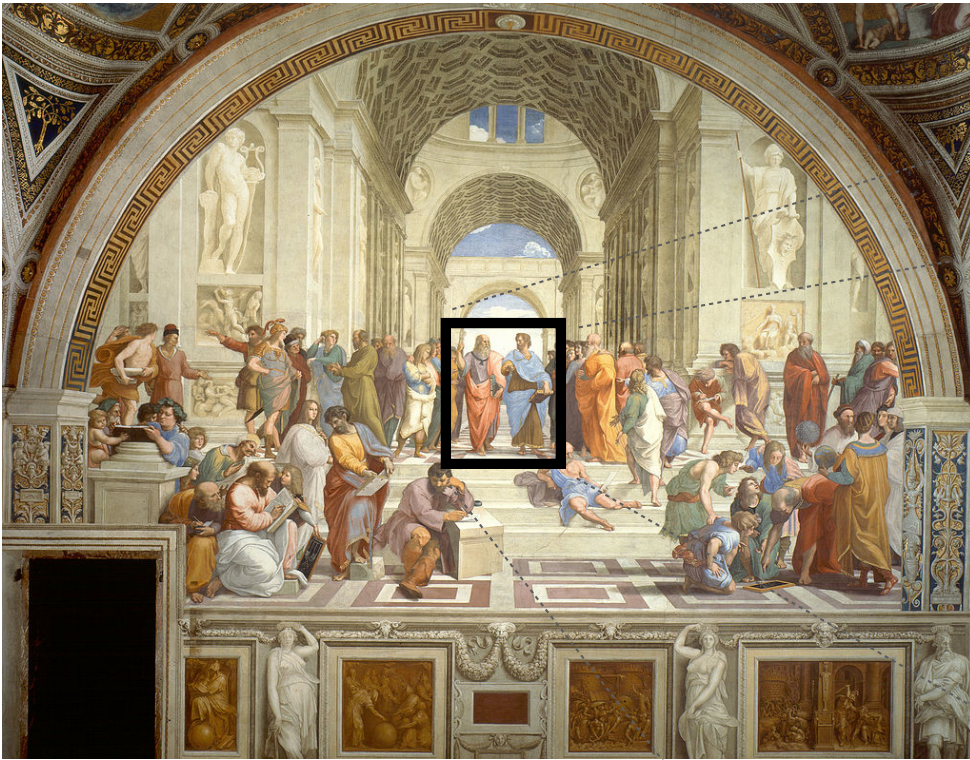
breath, life, soul

LATIN

psyche

mid 17th century





The School of Athens (1509-1511),
Raphael, Apostolic Palace, Vatican.

https://en.wikipedia.org/wiki/The_School_of_Athens



Plato
(holding Timaeus)

Aristotle
(holding Ethics)

Plato

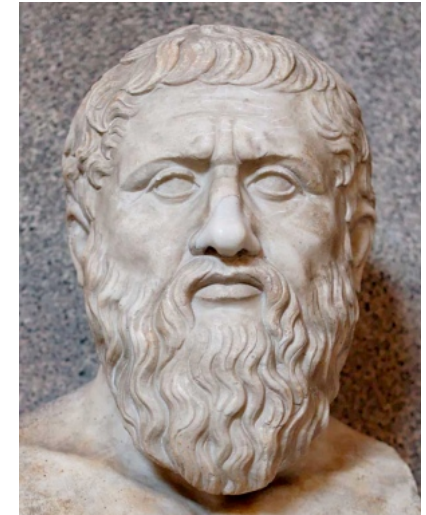
Socrate's disciple, founded the Academy for Philosophy in 385 BC in Athens (at Academus, an olive and plane grove near Athens)

- Idealism and Theory of Forms

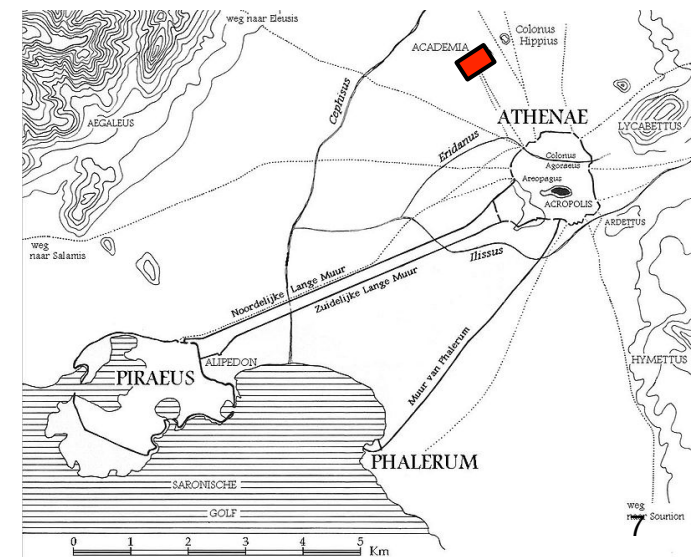
the idea that reality, or reality as we can know it, is fundamentally mental or mentally constructed; senses do not necessarily deliver a true picture of the physical world (cf. analogy of the cave)

- Dualist Views (separation of body and soul)
- Nativist Views (the soul possesses a priori knowledge that can be recalled; cf. Meno's dialogue)

<https://plato.stanford.edu/entries/plato/>



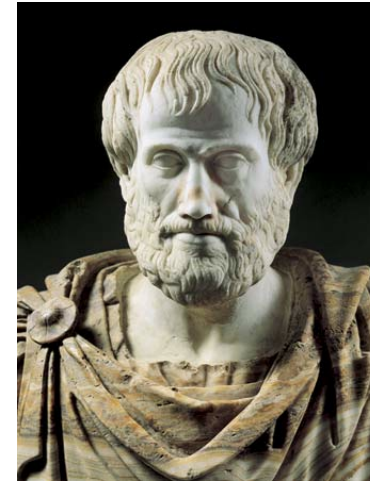
Plato
(427-347 BC)



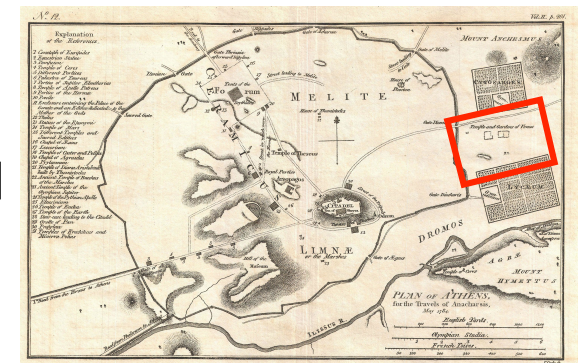
Aristotle

Plato's disciple, founded a philosophy school in 335 BC, the „Lyceum“ at Lykeion, a grove in Athen, behind today's Hellenic Parliament)

- Contributions to many different areas of knowledge (theoretical, practical, productive sciences)
 - biology
 - logic and causality
 - psychology: memory, dreams, health
 - emphasis on practical goals of philosophy (rhetoric, ethics, the good life)
- Monist
body and soul are two interdependent parts that support and rely on each other; the body as a tool of the soul



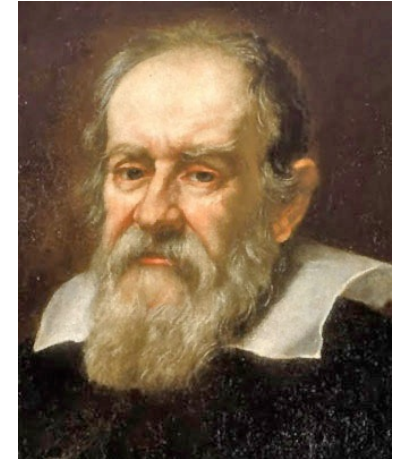
Aristotele
(384-322 BC)



Bocage Map of Athens (1784)

Galileo Galilei

- 1564 Birth in Pisa, Italy
- 1609 Develops a new telescope
- 1610 Discovery of Jupiter's Moons
- 1613 Discovery of Venus' phases
 - evidence that Venus revolves around the sun
 - favours Copernican (heliocentric) over Aristotelian/Ptolemaic (geocentric) system
- 1616 Admonishment by the Pope
- 1623 Publishes "The Assayer", his "scientific manifesto"
- 1632 Publishes "Dialogue Concerning the Two Chief World Systems" and is later arrested
- 1633 Judged for heresy in Rom
 - Consequence: life-long house arrest, publication ban
- 1642 Death
- 1992 (!) rehabilitated by the church



Galileo Galilei
(1564-1642)

Galileo Galilei

Galileo's Telescope



Galileo made his first telescope in 1609, and with it was able to, among other things, verify the phases of Venus, and discover sunspots, that he was later to use as support for a heliocentric view.

**power of and need for
instrumentation in science**

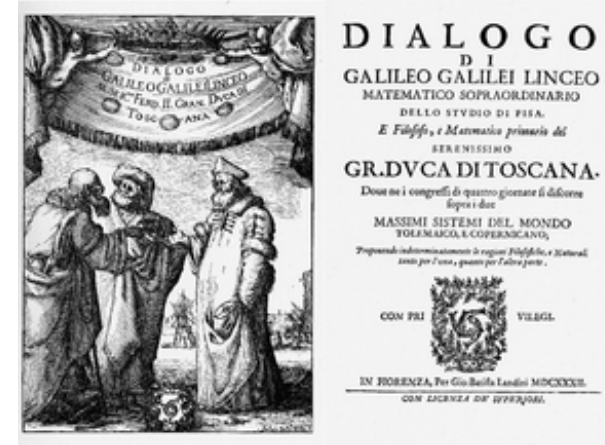
The Assayer



"Philosophy [i.e. natural philosophy] is written in this grand book — I mean the Universe — which stands continually open to our gaze, but it cannot be understood unless one first learns to comprehend the language and interpret the characters in which it is written. It is written in the language of mathematics, and its characters are triangles, circles, and other geometrical figures, without which it is humanly impossible to understand a single word of it; without these, one is wandering around in a dark labyrinth."

**mathematics as the
language of science**

Dialogue [Concerning the Two Chief World Systems]



The book presents a series of discussions between three men, Salviati (a stand-in for Galileo), Sagredo (an initial neutral layman), and Simplicio (a follower of geocentric views). The book discusses a number of phenomena, including Venus' phases and sunspots (that are largely correct by today's standards), but also a theory of tides (that we now know to be false). The dialogue did not discuss the geocentric theory of Tycho Brahe that some astronomers preferred at the time (a hybrid system of the Copernican and Ptolemaic models; Mercury and Venus orbit the Sun, but the Sun orbits a stationary Earth; Mars, Jupiter, and Saturn orbit the Sun in much larger circles, which means they also orbit the Earth). At the time, the two systems were not distinguishable from the existing data.

**using data to distinguish theories
(and science communication)**

Francis Bacon

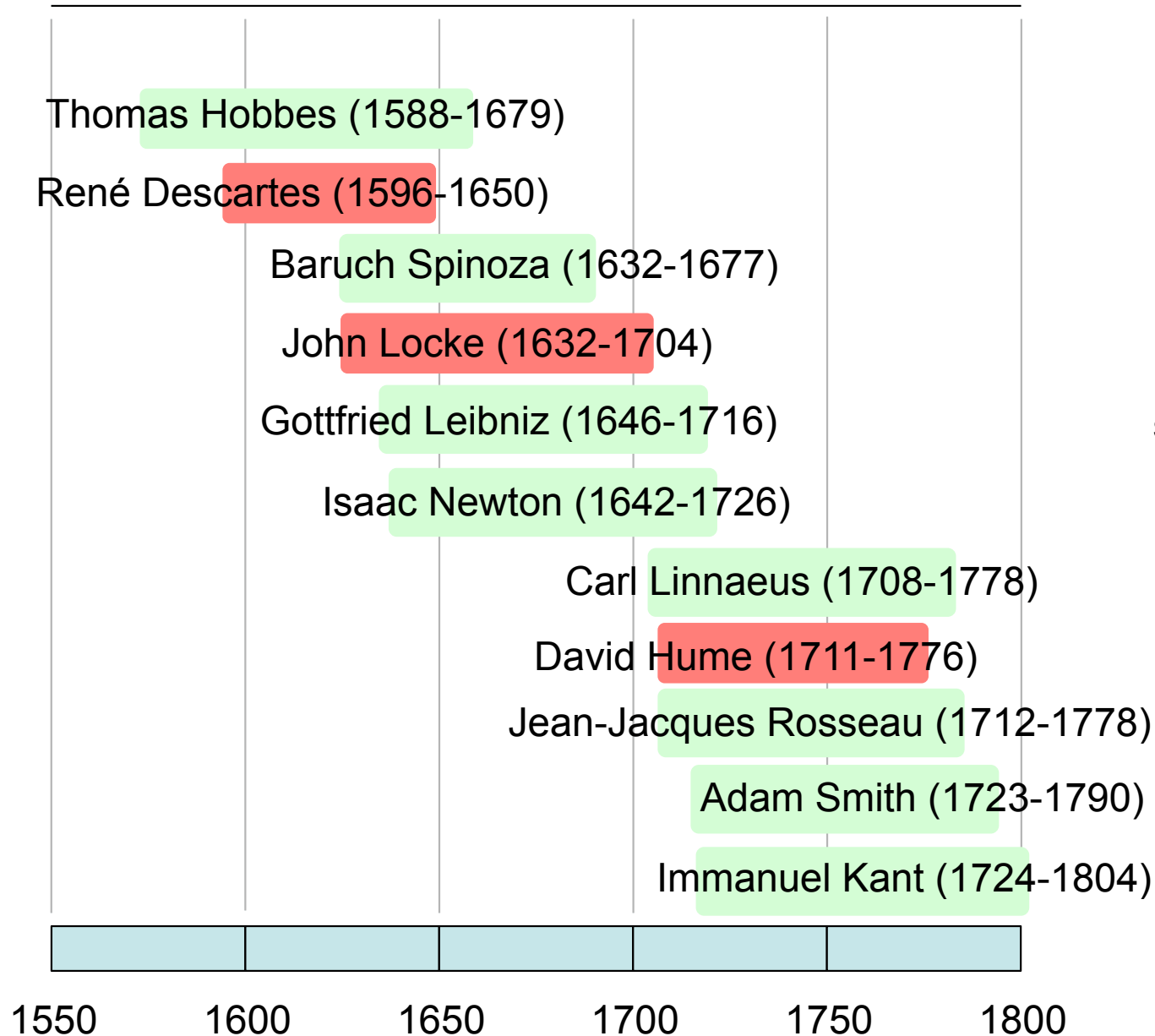
- In 1645, his “Novum Organum Scientiarum” helped establish and popularise the scientific method (i.e., inductive method). By reasoning using "induction", Bacon meant the ability to generalize a finding stepwise, based on accumulating data. He advised proceeding by this method, or in other words, by building a case from the ground up.
- For example, Bacon suggests that one draws up a list of all things in which the phenomenon to explain occurs, as well as a list of things in which it does not occur. Then one can rank the lists according to the degree in which the phenomenon occurs in each one. Then one should be able to deduce what factors match the occurrence of the phenomenon in one list and don't occur in the other list, and also what factors change in accordance with the way the data had been ranked.
- Broadly, this approach could be seen as a synthesis of experience and reason...



Francis Bacon
(1561-1626)

<https://plato.stanford.edu/entries/francis-bacon/>

Rationalism and Empiricism



Rationalism

The epistemological view that reason is the main source of knowledge, and, consequently, that there are significant ways in which concepts and knowledge can be gained independently of sensory experience — deduction.

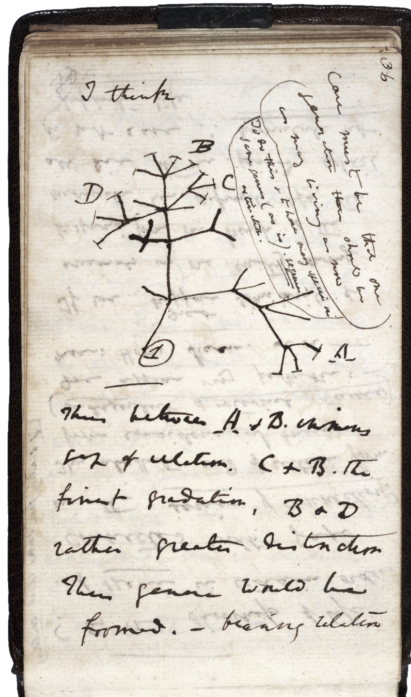
Empiricism

The epistemological view that experience is the main source of knowledge, and that emphasizes the role of evidence in the formation of ideas and beliefs — induction—over the notion of innate knowledge or deduction.

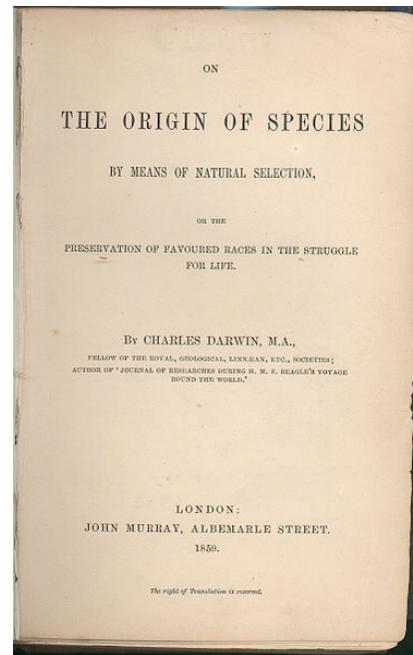
Summary (interim)

- **Classical antiquity:** no well-defined field of psychology, but psychology topics were central parts of the intellectual debate in philosophy (e.g., discussion on the nature of knowledge, the structure and functions of the soul, ethics and morality, as well as implications for education and politics);
- **Renaissance and enlightenment:** pronounced cultural change from scholasticism (system of knowledge centred on religious doctrine) to humanism (focusing on human values and secular reason), emergence of science (instrumentation, formalisation) and its institutionalisation (e.g., books, universities); continued discussion on the nature of knowledge and associated philosophical positions (rationalism vs empiricism)

Evolutionary Theory

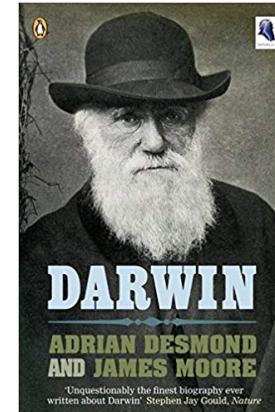


(1837)



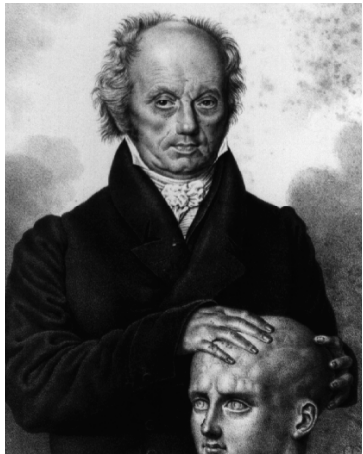
(1859)

“In the distant future I see open fields for far more important researches. Psychology will be based on a new foundation, that of the necessary acquirement of each mental power and capacity by gradation. Light will be thrown on the origin of man and his history.”



Darwin started his work on natural selection shortly after his Beagle voyage but it took him 20 years to actually publish his ideas. Desmond and Moore aim to explain this by portraying Darwin as a “closet evolutionist” that is torn between science and religion. According to Desmond and Moore, Darwin is conflicted and anxious, fearful of losing his standing in his Anglican conservative society, and hurting his deeply religious wife. The book also makes clear how Darwin's “discovery” of natural selection is not the product of the work of an isolated genius– Darwin himself points out how **a**) Malthusian ideas about scarcity and competition (that pervaded the political discourse of the time), **b**) the concept of long periods of time having shaped the geological record (advocated by Charles Lyell), and **c**) the accumulation of facts concerning variation and similarities between species, combined to create “natural selection”.

From Phrenology to Neuropsychology



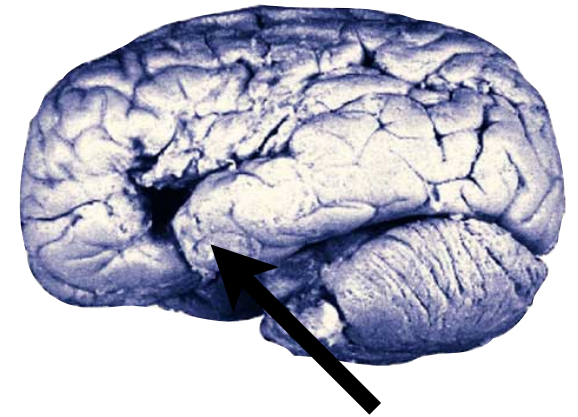
Franz Josef Gall (1758-1828). German neuroanatomist, physiologist, and pioneer in the study of the localization of mental functions in the brain. Claimed as the founder of phrenology. Gall's contributions to the field of neuropsychology were controversial at the time and now widely referred to as pseudoscience. However, Gall's study of phrenology contributed to the emergence of the naturalistic approach to the study of man, and fostered scientific inquiry into brain functions.



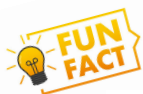
Pierre Paul Broca (1824-1880). French physician, anatomist and anthropologist. In 1861, Broca heard of a patient, named Louis Victor Leborgne, who had a progressive loss of speech but no other cognitive impairment. When Leborgne died just a few days later, Broca performed an autopsy. Broca went on to find autopsy evidence from additional cases in support of the localization of language articulation.

From Phrenology to Neuropsychology

The patient “Tan” (Louis Leborgne) was unable to clearly speak any words other than “tan” - and is often used as a classical example of Broca’s aphasia (expressive or non-fluent aphasia). Broca’s autopsy of Leborgne revealed an extensive lesion that involved the frontal lobe, specifically, inferior frontal gyrus.



IFG: inferior frontal gyrus



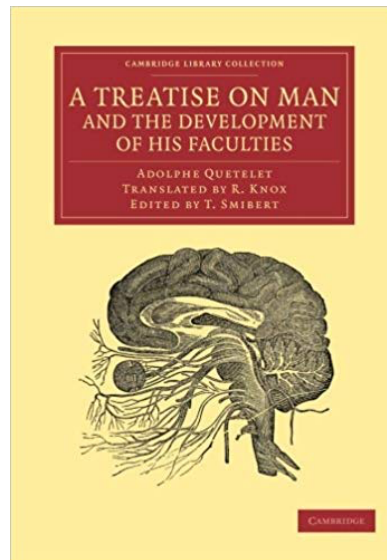
Was Broca a maverick who single-handedly changed the scientific methods of the day? Hardly. Broca’s contribution is more likely a good example of the zeitgeist that prevailed in the field at that time. The association between speech disorders and frontal lobe lesions had been already advanced by Jean-Baptiste Bouillaud in 1825. In turn, the hypothesis of left hemisphere dominance for language was first proposed by Marc Dax in 1836, also based on the observation of brain lesion patients. Broca’s methods and claims had been anticipated by over 30 years! Two conclusions can be drawn from Broca’s example. First, this episode reminds us that historical accounts often forget the contribution of separate individuals and, instead, focus on a single prominent person who can be used as a placeholder for a particular advancement or event in a field. Indeed, the naming of a brain area and aphasic type after Broca can be seen as an example of Stigler’s law of eponymy, which states that no scientific discovery is named after its original discoverer, and which emphasizes the perils of attributing any discovery to a single individual.

Cubelli, R., & De Bastiani, P. (2011). 150 Years after Leborgne: Why is Paul Broca so important in the history of neuropsychology? *Cortex*, 47 (2), 146–147. <http://doi.org/10.1016/j.cortex.2010.11.004>

“Social physics”: Adolphe Quetelet

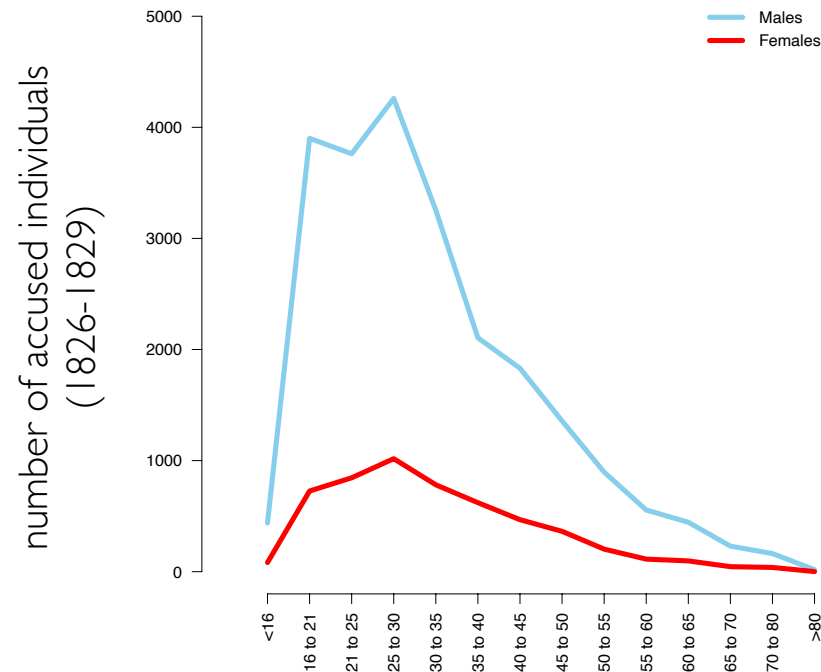


Adolphe Quetelet
(1796-1874)



1842

The Age-crime Curve



“Among all the causes which have an influence for developing or halting the propensity for crime, the most vigorous is, without contradiction, age. It is, in fact, with age that man’s **physical strength** and **passions** develop and that their energy afterwards diminishes ... This propensity must be practically nil at both extremes of life since, on the one hand, strength and passions, those two powerful instruments of crime, have scarcely been born, and when, on the other hand, their energy (pretty nearly extinguished) is found weakened by **reason** ... It is about the age of 25 years when the propensity for crime attains its maximum.”

1879



Convict Building University of Leipzig, initial location of the Institute for Experimental Psychology, established by Wilhelm Wundt

<http://www.uni-leipzig.de/~psycho/wundt/viewer.htm>

Wilhelm Wundt



Wilhelm Wundt (1832-1920)

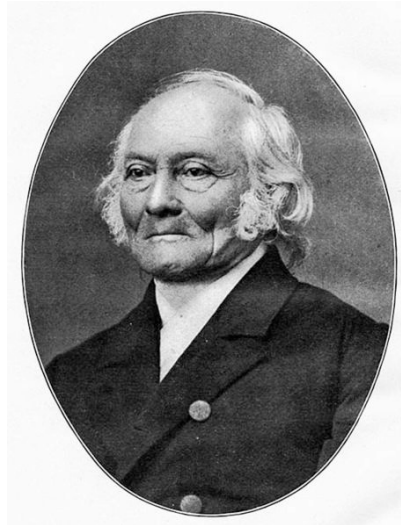
- 1832 Birth in Neckarau/Mannheim
- 1851-5 Study Medicine in Tübingen, Heidelberg, Karlsruhe
- 1856 Doctoral Degree in Heidelberg (Dr. med.)
 - Research Semester in Berlin (with Du Bois-Reymond)
- 1857 Habilitation and Privatdozentur in Heidelberg [25 years-old]
- 1858-65 Assistant to Hermann von Helmholtz in Heidelberg
- 1868(?) Prof. for Anthropology and Medical Psychology in Heidelberg
 - Member of the Badischen Fortschrittspartei (liberal)
 - Parliamentarian of the Badischen Landtags
- 1874 Professor of (Inductive) Philosophy in Zürich
- 1875 Professor of Philosophy in Leipzig
 - 1879 Founding of the 1st. experimental Psychology Lab
- 1917 Retirement [85 years-old!]
- 1920 Death in Großbothen, near Leipzig

Wilhelm Wundt

„If one considers psychology as a natural science, it should be quite clear that the great revolutions that completely reshaped the physical sciences since the time of *Bacon* and *Galileo* did not have any effect upon it. For one can say with still more reason of psychology what *Kant* once remarked of logic: that it has not progressed a single step forward since *Aristotle*. (...) Those issues [e.g., nature, origin, and mortality of the soul], however, mostly do not belong to scientific psychology, but to metaphysics, because the latter, not being a natural science, has been just as unable to take any advantage of the methodological improvements of the natural sciences.”

Wilhelm Wundt, *Beiträge zur Theorie der Sinneswahrnehmung*, 1862

Weber and Fechner



Ernst-Heinrich Weber (1795-1878)

German physician who is considered one of the founders of experimental psychology. An influential figure in the areas of physiology and psychology during his lifetime and beyond. His studies on sensation and touch, along with his emphasis on good experimental techniques gave way to new directions and areas of study for future psychologists, physiologists, and anatomists.

https://en.wikipedia.org/wiki/Ernst_Heinrich_Weber

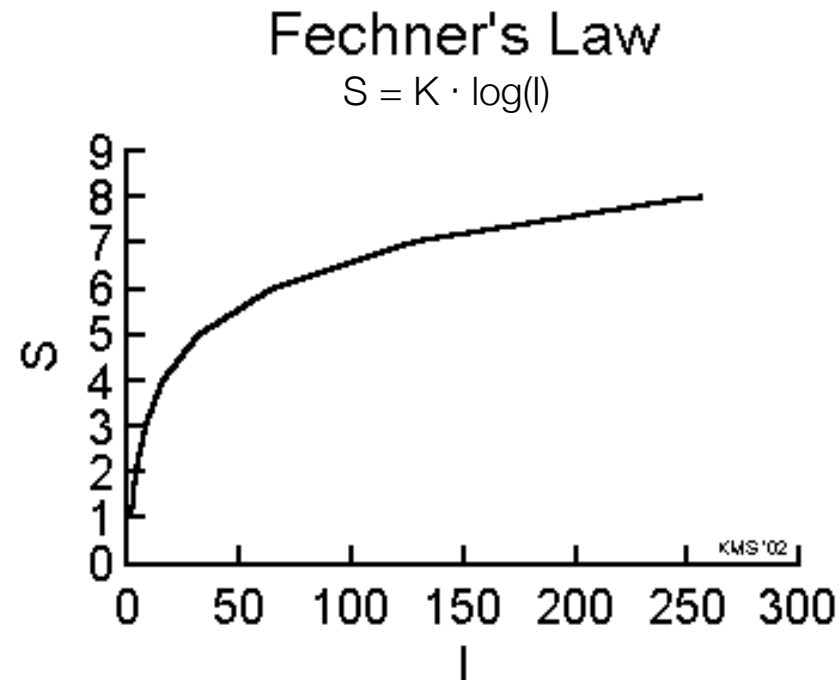
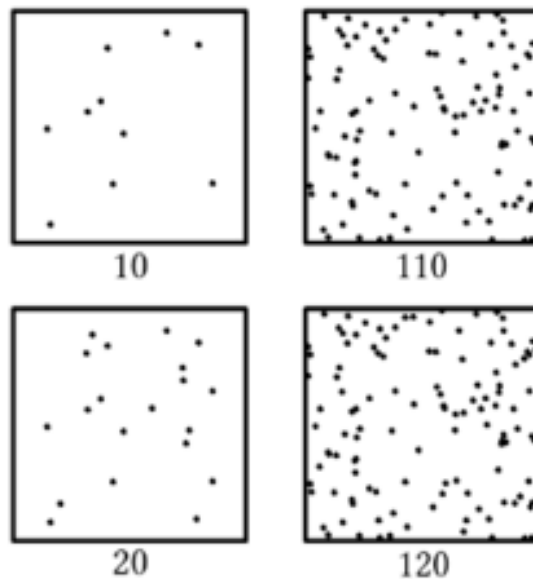


Gustav Theodor Fechner (1801-1887)

A German philosopher, physicist and experimental psychologist. An early pioneer in experimental psychology and founder of psychophysics. He is also credited with demonstrating the non-linear relationship between psychological sensation and the physical intensity of a stimulus that can be described by the formula known as the Weber–Fechner law: $\text{Sensation} = K \cdot \log(\text{Intensity})$.

https://en.wikipedia.org/wiki/Gustav_Fechner

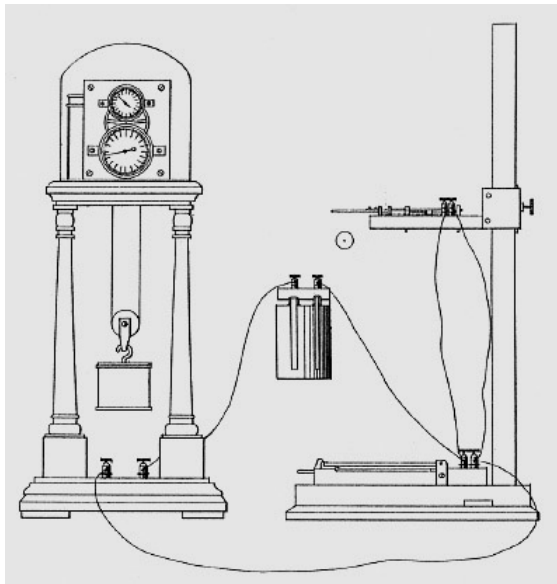
Psychophysics



The figure on the left provides an illustration of the Weber–Fechner law. On each side, the lower square contains 10 more dots than the upper one. However the perception is different: On the left side, the difference between upper and lower square is clearly visible. On the right side, the two squares look almost the same. The figure on the right depicts the relation between intensity (I) of a stimulus and the subjective experience or sensation (S).

Instrumentation: The brass-and-glass era

Brass “instrumentation came to symbolize this stage of development, for the new psychologists were self-consciously concerned with translating perennial problems of sensation and perception into terms amenable to experimentation and measurement”

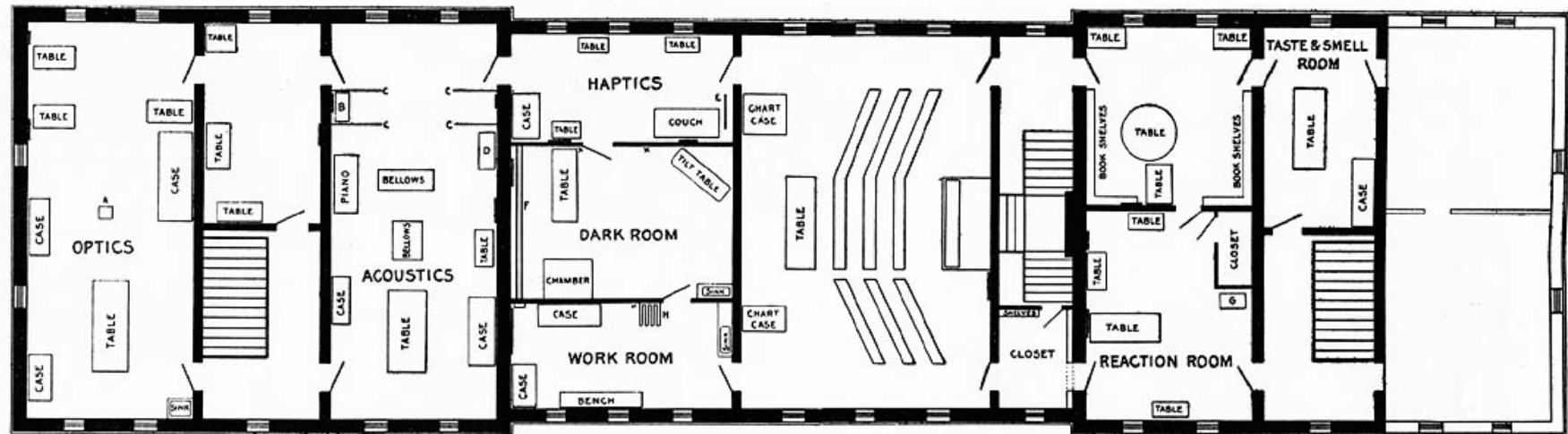


Hipp Chronoscope

A stopwatch instrument, driven by clock-work regulated by a vibrating tongue, started and stopped by a clutch activated by electro-magnets; two dials recorded duration in units down to 1,000th of a second; commonly used in reaction-time experiments. Following similar devices constructed by the English physicist Charles Wheatstone (1802 - 1875), the German clockmaker and mechanic Matthäus Hipp (1813 - 1893) developed his version in 1848. Hipp lived and worked most of his life in Bern and Neuchâtel, Switzerland. After Wilhelm Wundt (1832 - 1920) recommended the application of Hipp's chronoscope in the first edition of *Grundzüge der physiologischen Psychologie* in 1874, the "time viewer" was widely used in the emerging community of experimental psychologists.

Instrumentation: The brass-and-glass era

Psychological Laboratory, Cornell University, 1900



Titchener, Edward B. (1898). A psychological laboratory. *Mind*, 7, 311-331

<http://vlp.mpiwg-berlin.mpg.de/sites/data?id=sit415>

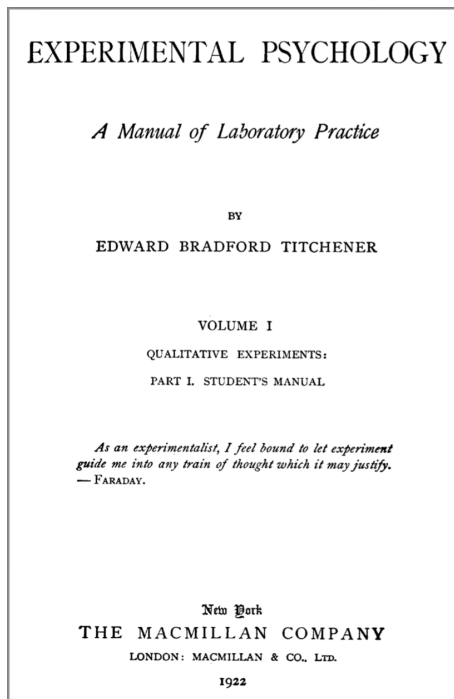
Wilhelm Wundt: Methodological eclecticism

Pluralistic Use of Methods

- **Experimental Studies:** psychophysical methods to study the connection between physical stimuli and subjective experience, reaction time measurements, accuracy of reproduction in memory tasks.
- **Introspection:** self reports of sensations, feelings, and thoughts by trained individuals under controlled experimental situations.
- **Historical and Comparative Analysis:** analysis of the products of human thought and culture through examination of different societies and their development.

In the United States of America...

Titchener and Structuralism



Titchener held that psychology is the science of consciousness and that the only method which could adequately deal with the contents of consciousness is introspection. Extensive training was required to become an investigator and subjective data had to be obtained in response to controlled stimuli. Titchener emphasized rigour in experimentation and became “the paragon of laboratory meticulousness in American psychology”.

§ 12. Auditory Sensation

33

of tones: all musical instruments furnish compound tones, or clangs, not simple tones. And ordinary noises—hiss, crash, buzz, clatter, etc.—are made up of a number of simple noises given together and in succession.

PRELIMINARY EXERCISES. — The following exercises will serve to make clear the relation of the tone-stimulus to the noise-stimulus, and the introspective difference between the two sensation classes. They should be performed by both *O* and *E*.

(1) Take a book with a ribbed-cloth binding. Tap the cover with the finger-nail; or pass the nail slowly across two or three ridges. You hear a tapping or plucking or snapping noise. Draw the nail more quickly over a number of ridges. The noise is replaced by a harsh scroop which is distinctly tonal. The pitch (quality) of the tonal element rises as the movement becomes quicker. Notice that the pluck and the scroop are entirely different sense-experiences, although from the physical standpoint the latter is only a series of plucks.

(2) The ‘imperfection’ of the system of wave-motions which characterises the noise-stimulus may be produced by the *interference* of a number of complete wave-motions (tonal stimuli).

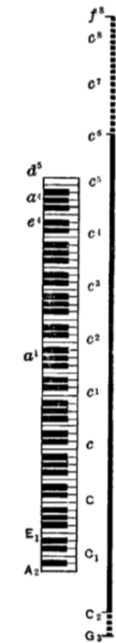
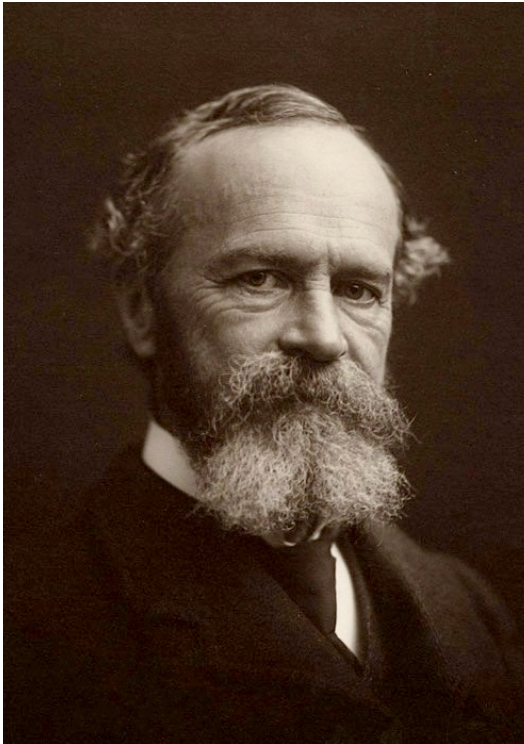


FIG. 6. — The series of auditory qualities. The keyboard of a grand piano extends from the A_2 of $27\frac{1}{2}$ vs. to the c^8 of 4224 vs. The smaller piano keyboard ranges between the C_1 of 33 vs. and the a^4 of 3520 vs. Helmholtz' lower limit of orchestral music is the E_1 of $41\frac{1}{2}$ vs. (German 4-stringed double bass); his higher limit, the d^6 of 4752 vs. (piccolo flute). The organ has a range of 9 octaves: C_2 ($16\frac{1}{2}$ vs.) to c^6 (8448 vs.). The highest note of the violin is the a^4 (2640 vs.). The range of audition is, approximately, from the G_3 of $12\frac{3}{8}$ vs. to the f^8 of 45056 vs. — See Ellis, in Helmholtz' "Sensations of Tone," 1895, 17 f.

William James and Functionalism



William James (1842-1910)

American philosopher and psychologist who was trained as a physician. Growing up, William James attended schools in the United States, England, France, Switzerland, and Germany. He also spent time abroad in France and Germany (Dresden) before getting his doctorate. James was the first educator to offer a psychology course in the United States at Harvard in 1875. Considered to be one of the founders of functional psychology. James gained widespread recognition with his *The Principles of Psychology* (1890), totaling twelve hundred pages in two volumes, which took twelve years to complete.

"I originally studied medicine in order to be a physiologist, but I drifted into psychology and philosophy from a sort of fatality. I never had any philosophic instruction, the first lecture on psychology I ever heard being the first I ever gave".

The First Schools: Structuralism vs. Functionalism

“We have to consider (1) functionalism conceived as the psychology of mental operations in contrast to the psychology of mental elements; or, expressed otherwise, the psychology of the how and why of consciousness as distinguished from the psychology of the what of consciousness. We have (2) the functionalism which deals with the problem of mind conceived as primarily engaged in mediating between the environment and the needs of the organism. This is the psychology of the fundamental utilities of consciousness; (3) and lastly we have functionalism described as psychophysical psychology, that is the psychology which constantly recognizes and insists upon the essential significance of the mind-body relationship for any just and comprehensive appreciation of mental life itself.”

Angell, J. R. (1907). The province of functional psychology. *Psychological Review*, 14 (2). 61-91.

[https://en.wikipedia.org/wiki/Structuralism_\(psychology\)](https://en.wikipedia.org/wiki/Structuralism_(psychology))

https://en.wikipedia.org/wiki/Functional_psychology

Summary

- The 19th century saw a number of developments with important implications for psychology: 1) **evolutionary theory**: principle of natural selection explains origin of species that can provide a functional explanation of human psychology and behavior; 2) **neuropsychology**: subtraction logic of ablation/lesion studies helps link brain localisation/function to psychological phenomena (e.g., language); **social sciences**: systematic collection/analysis of demographic data (e.g., weight/height, crime, marriage, cultural productions) with the goal of describing social “laws” that may result from psychological mechanisms (e.g., passion, reason)
- **Wundt and his laboratory**: Wundt as a symbolic figure in the birth of psychology, professor of philosophy, but background in physiology, influenced by the psychophysics of Weber and Fechner, and social physics of Quetelet; methodological pluralism (instrumentation/measurement, introspection, cultural/historical analysis); Wundt’s Leipzig laboratory of experimental psychology as a “scientific factory” that produces publications and scholars
- The formation of **schools**: **Structuralism**: advanced by Edward Titchener (inspired partly by Wilhelm Wundt) as an approach to understanding the elements of consciousness; emphasised instrumentation and experimental rigour when eliciting structured introspective reports; **Functionalism**: advanced by James Angell (inspired by William James and evolutionary views) as an approach to understanding the functions of conscious experience; in practice, some methods and experimental approach was similar between schools (e.g., reaction time measurement)
- **Institutionalization**: the first several laboratories (but also societies, journals, textbooks, and other institutions) of academic/scientific psychology emerged at the end of 19th century