

William James and the Beginnings of Academic Psychology

Psychophysics: First Empirical Investigations of the Mind

- Challenge for psychology as an empirical science:
 - How to study mental phenomena empirically
 - How to bring them into the laboratory
- Psychophysics: Focus on the relationship between sensory stimuli and perceptual experience
 - Quantify the relationship between the intensity of the stimulus and its perceived intensity

Ernst Heinrich Weber (1795-1878) anatomist, then physiologist at Leipzig

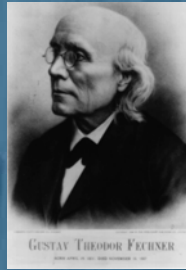


- How sensitive are we to differences in weights
 - Whether we are lifting them or have them placed on our skin?
 - How to quantify the relationship?
- Introduced *just noticeable differences* (jnd) as the unit of measure
 - Discovered that jnd's were a constant ratio of the weight
 - $\Delta R/R = K$
 - K differed with the activity: could distinguish differences of 1/40 in lifting, but only 1/30 when passive
 - Could differentiate closer distances on front of fingers (approx. 1 mm) than on back (40-60 mm.)



Gustav Fechner (1801-1887) physicist, then philosopher at Leipzig

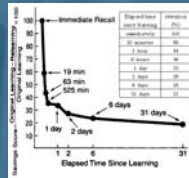
- Rediscovered, then formalized and developed Weber's law
- Showed that it implied a relationship between stimulus intensity and the intensity of a sensation:
 - S (intensity of a sensation) = $k \log R$ (intensity of the stimulus)
- Also discovered a very intriguing visual illusion in which we see colors where there are none:
 - <http://dogfeathers.com/java/fechner2.html>





Hermann Ebbinghaus (1850-1909)— quantifying remembering and forgetting

- Inspired by Fechner to discover quantitative order in higher mental processes
 - Learning and memory
- Investigated number of repetitions of reading lists of items in sync with a metronome before perfect recall
- Problem: some words are easier to learn than others: prior associations
 - Used nonsense words: zok, vam, etc.
- Longer lists required more trials to learn
- Measured forgetting by the number of trials required to relearn a list after performance dropped
 - Logarithmic forgetting curve



Frans Cornelius Donders (1818-1889), measuring the time of mental activity



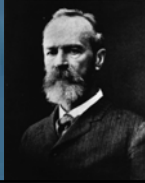
- Assume that a mental activity takes a certain amount of time to perform
- Use this to gain evidence about the particular mental activities required to perform a task
- Take two activities, one of which requires an additional mental operation
 - Subtract the time to perform the simpler task from the time required to perform the longer task
 - *Subtractive method*

Discipline Building

- Disciplines require more than investigators coming up with new findings
- They require methods of investigation, social structures in which to communicate results, ways to train new practitioners
- Two discipline builders in psychology



Wilhelm Wundt



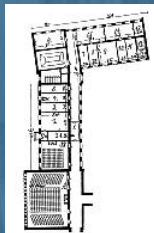
William James

Wilhelm Wundt (1832-1920) Professor of Philosophy, Leipzig

- Had been a research assistant for Hermann Helmholtz
 - Unconscious inference in perception
- *Beiträge zur Theorie der Sinneswahrnehmung* (1862)
 - Book on perception, but offered a plan for psychology
 - Based on experiment, observation of behavior, and self observation
 - Included Völkerpsychologie—the study of linguistic, moral, and religious differences between ethnic groups

Psychology in the Laboratory

- Wundt established his laboratory in 1879 and expanded over 20 years to occupy whole floor
- Published its own journal, *Philosophische Studien* (mostly of students and affiliates)
- Trained 186 Ph.D.s, many of them international
 - James McKeen Cattell—word associations
 - G. Stanley Hall
 - Edward Titchner—introspection of mental elements
- On example, a project in psycholinguistics: proposed that mental representation constructed prior to speech and that the grammatical structure of an utterance served to emphasize on or another part of the representation



Reliance on introspection

- Wundt is often mischaracterized as relying on introspection
 - This is due largely to his American student Edward Titchner who developed a program at Cornell
 - Involves reporting on the contents of your own mental states
 - Develop a table of mental elements
 - Account for other mental states as molecules built of these elements by association
 - Requires training in introspection
 - A major target of criticism of early behaviorists



William James (1842-1910)

- Trained as an MD, taught physiology and later philosophy at Harvard
- In 1875 establish a *teaching* laboratory (not a research laboratory)
 - James was not an experimentalist
 - Method was to reflect on mental life, drawing upon the experimental findings of others
- *Principles of Psychology*, finally published in 1890 after 12 years, was a large, two volume synthesis:
 - “the empirical correlation of the various sorts of thought or feeling [as known in consciousness] with definite conditions of the brain



Two major influences: Peirce and Darwin

- Charles Sanders Peirce: pragmatism
 - Truth often characterized as correspondence, but we can never establish correspondence
 - “The true is the name of whatever proves itself to be good in the way of belief, and good, too, for definite and assignable reasons.”
- Charles Darwin: evolution
 - Not the first evolutionist, but convinced many of the occurrence of evolution (transmutation)
 - Offered an account of transmutation—natural selection—to explain the adaptedness of traits
 - Far less successful in establishing natural selection
- Pragmatism and evolution combined to yield functionalism



James' Functionalism

- Approached the mind in much the way that Darwin approached biological organisms
 - Darwin collected biological organisms (or their fossils) and tried to account for them in terms of natural selection
 - James collected mental phenomena and then tried to account for them in terms of how they served us
 - Less interested in giving a structural description of mental life and tying it to the brain
 - Assumption: mental life is something we can access directly—it is conscious

Characterizing Mental Life

1. **Is purposeful and willful.** *"The pursuance of future ends and the choice of means of their attainment are thus the mark and criterion of the presence of mentality in a phenomenon."*
2. **Exhibits intentionality.** *"The psychologist's attitude towards cognition . . . is a thoroughgoing dualism. It supposes two elements, mind knowing and thing known, and treats them as irreducible."*
3. **Is something of which we are aware.** Not something hidden

Characterizing Mental Life - 2

4. **Is private, personal, and uniquely one's own.** "In this room--this lecture room, say--there are a multitude of thoughts, yours and mine, some of which cohere mutually, and some not. . . . My thought belongs with *my* other thoughts, and your thought with *your* other thoughts, whether anywhere in this room there be a *mere* thought, which is nobody's thought, we have no means of ascertaining, for we have no experience of its like. The only states of consciousness that we naturally deal with are found in particular consciousnesses, minds, selves, concrete particular I's and you's."
5. **Is always changing, in flux.** There is no single constant feature of our mental states.



Characterizing Mental Life - 3

6. **Is sensibly continuous, if flows like a stream.**
Perception of continuity without anything being constant.
7. **Is selective, attentive, and interested; it is excited by some features of the world, not by others.** The ability to select is learned. As a result of being a selective, CML is active, not passive.

Functionalism applied to consciousness

- Rejects the view that consciousness is a thing—a separate mind, a parallel entity, or a brain state
- Rather, it is a *function*: conscious activities are the result of a brain working in an environment. "I mean . . . to deny that the word stands for an entity, but to insist most emphatically that it stands for a function."
- Focus on functions consciousness plays for us, not on what it is
 - How does being conscious help us?
 - Could we do the same things without consciousness?

Emotions

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- "Our natural way of thinking about these standard emotions is that the mental perception of some fact excites the mental affection called the emotion, and that this latter state of mind gives rise to the bodily expression. My thesis on the contrary is that the bodily changes follow directly the PERCEPTION of the exciting fact, and that our feeling of the same changes as they occur IS the emotion. Common sense says, we lose our fortune, are sorry and weep; we meet a bear, are frightened and run; we are insulted by a rival, are angry and strike. The hypothesis here to be defended says that this order of sequence is incorrect, that the one mental state is not immediately induced by the other, that the bodily manifestations must first be interposed between, and that the more rational statement is that we feel sorry because we cry, angry because we strike, afraid because we tremble, and not that we cry, strike, or tremble, because we are sorry, angry, or fearful, as the case may be. Without the bodily states following on the perception, the latter would be purely cognitive in form, pale, colourless, destitute of emotional warmth. We might then see the bear, and judge it best to run, receive the insult and deem it right to strike, but we could not actually feel afraid or angry."

Practical advice on emotions



- “Whistling to keep up courage is no mere figure of speech. On the other hand, sit all day in a moping posture, sigh, and reply to everything with a dismal voice, and your melancholy lingers. There is no more valuable precept in moral education than this, as all who have experience know: if we wish to conquer undesirable emotional tendencies in ourselves, we must assiduously, and in the first instance cold-bloodedly, go through the outward motions of those contrary dispositions we prefer to cultivate. The reward of persistency will infallibly come, in the fading out of the sullenness or depression, and the advent of real cheerfulness and kindness in their stead. Smooth the brow, brighten the eye, contract the dorsal rather than the ventral aspect of the frame, and speak in a major key, pass the genial compliment, and your heart must be frigid indeed if it do not gradually thaw!”

Habits

- “Habit is thus the enormous fly-wheel of society, its most precious conservative agent. It alone is what keeps us all within the bounds of ordinance, and saves the children of fortune from the envious uprisings of the poor. It alone prevents the hardest and most repulsive walks of life from being deserted by those brought up to tread therein. It keeps the fisherman and the deck-hand at sea through the winter; it holds the miner in his darkness, and nails the countryman to his log-cabin and his lonely farm through all the months of snow; it protects us from invasion by the natives of the desert and the frozen zone. It dooms us all to fight out the battle of life upon the lines of our nurture or our early choice, and to make the best of a pursuit that disagrees, because there is no other for which we are fitted, and it is too late to begin again. It keeps different social strata from mixing.”

Habit (continued)



“Habit is not one of the seven habits of highly effective people.”

- “Already at the age of twenty-five you see the professional mannerism settling down on the young commercial traveller, on the young doctor, on the young minister, on the young counsellor-at-law. You see the little lines of cleavage running through the character, the tricks of thought, the prejudices, the ways of the ‘shop,’ in a word, from which the man can by-and-by no more escape than his coat-sleeve can suddenly fall into a new set of folds. On the whole, it is best he should not escape. It is well for the world that in most of us, by the age of thirty, the character has set like plaster, and will never soften again.”

Free Will

- "Let psychology frankly admit that *for her scientific purposes* determinism can be *claimed*, and no one can find fault. If, then, it turn out later that the claim has only a relative purpose, and may be crossed by counter-claims, the readjustment can be made. Now ethics makes a counter-claim; and the present writer, for one, has no hesitation in regarding her claim as the stronger, and in assuming that our wills are "free." For him, then, the deterministic assumption of psychology is merely provisional and methodological."

More on Free Will

- "the most that any argument can do for determinism is to make it a clear and seductive conception, which a man is foolish not to espouse, so long as he stands by the great scientific postulate that the world must be an unbroken fact, and that prediction of all things without exception must be ideally, even if not actually, possible. It is a *moral* postulate about the Universe, the postulate that *what ought to be can be, and that bad acts cannot be fated, but that good ones must be possible in their place*, which would lead to the contrary view."
