Term paper grading key

1. **Originality** - uniqueness of the idea; clear separation between original ideas and those of others.
2. **Depth** - scope of the paper; how well ideas are developed.
3. **Theme** - how well the ideas in the book are addressed and extended to outside information sources.
4. **Coherence of arguments** - how well the point of view adopted is supported by evidence and argument.
5. **Clarity and style of writing** - quality of writing, careful proofreading (spelling, grammar).

Charles Darwin (1809-1882)

- The origin of species
- Evolution
- Natural selection

“Nothing in biology makes sense except in the light of evolution.”
Th. Dobzhansky, 1973

Darwin’s later work

Human evolution

*The Descent of Man, and Selection in Relation to Sex* (1871)

- anatomical, morphological, embryological, and behavioral similarities between humans and other primates
- Theory of sexual selection
  - Mating preferences
  - Sexual dimorphism

Figure 6.4 Alfred Russel Wallace (1823–1913)
Richard O. Prum
*The Evolution of Beauty*
- Charles Darwin - *Descent of Man*
- Natural selection
- Sexual selection
- Aesthetic mate choice in evolution
- Sexual dimorphism - displays, ornaments, behavioral specializations
- Co-evolution of traits & aesthetic preferences

Sir Francis Galton (1822-1911)
- Charles Darwin’s cousin
- Explorer, statistician, meteorologist, and psychologist
- Measurement of intelligence
- Individual differences
- Implications of natural selection
- Statistical methods
- Studies of hereditary genius
- Twin studies
- Eugenics

Galton and the Measurement of Intelligence
- **Anthropometry**
- London International Health Exhibition (1884)
- Measurement of intelligence
  - Head size
  - Sensory acuity
  - Reaction time

Galton: Nature Vs. Nurture Debate
- Individual differences
- Normal distributions
- Scatterplots
- Twin studies
- Correlation & regression
- Regression to the mean
- Eugenics

Nature-Nurture Controversy
- **normal distribution** of intellectual abilities
- **Correlation** in patterns of creativity and genius among the family members
- Questionnaire study
- Twin studies: dizygotic (fraternal) vs monzygotic (identical) twins

Origins of American psychology
- Focus on individual differences
  - emphasis on individual experience
    - the adaptive nature of behavior and mind
  - study of adaptation to the environment
- structuralism versus functionalism
  - two opposing approaches to psychology
### Structuralism

- Late 19th century movement in psychology derived from British (and European) empiricism
- Analysis of the structure of mental experience
- **Elementalism**: reduce all mental contents to their most basic elements
- Data from introspection (but also experiments)
- Risk of **stimulus error** (imposition of meaning or interpretation on basic experience)
- Influenced later (anti-elementalist) Gestalt psychologists

### Structuralism

**Wilhelm Wundt (1832-1920)**

Goal: to understand the structure of the mind and the contents of consciousness.

Students and followers of Wundt included:
- **Edward Bradford Titchener (1867-1927)**
  - psychology program at Cornell University
- **G. Stanley Hall**
  - first professor of psychology at Johns Hopkins
  - Founder of American Psychological Association

### Ebbinghaus on memory

**Hermann Ebbinghaus (1850-1909)**

Experimental and mathematical study of memory

Variability in memorization: role of past associations

Solution: use **nonsense syllables** (2,300 possible combinations of CVC syllables (e.g., “bip”, “waf”, etc.)

**Forgetting curves** (exponentially decreasing function)

Wundt questioned the validity of Ebbinghaus’ findings:
- nonsense syllables are unnatural and artificial.
- Participants impose meaning even on nonsense syllables to make them easier to remember.

### Ebbinghaus on memory

**Forgetting curves**

- Exponentially decreasing function

**Learning curves** (rate of learning)

- S-shaped function (sigmoid)

**Serial position curve**

- Primacy
- Recency

### Functionalism

- **Goal**: to understand how the mind and behavior help the organism to adjust to the environment
  - Focus on **function** rather than **structure**
  - **Charles Sanders Peirce (1839-1914)**
  - **William James (1849-1910)**
  - **John Dewey (1859-1952)**

### Functionalism

- Influenced by evolutionary theory
- Biological (e.g. Darwin) rather than physiological (e.g. Helmholtz) tradition
- Research methods
  - reliance on introspection and experiment
  - the study of **animal behavior**
  - mechanisms of **learning** and **development**
  - the study of **mental illness**
Functionalism

- Goal: understanding the function of the mind rather than in describing its contents
- Never formulated as a formal theory
- Emphasis on applications of theory: improving the human condition, educational practice, industry, and personal life

Charles Sanders Peirce (1839-1914)

Mathematician, astronomer, chemist, geodesist, surveyor, cartographer, meteorologist, engineer, inventor, psychologist, philologist, lexicographer, historian of science, economist, book reviewer, dramatist, actor, short story writer; semiotician, logician, rhetorician and metaphysician

Pragmatism: a philosophical theory of truth and meaning

Pragmatism

Pragmatism as a method for clarifying the meaning of complex ideas through verification procedures (using these ideas to generate testable predictions).

Semiotics: Peirce’s theory of signs

Icon – resembles its referent; e.g. “falling rocks” road sign
Index – linked by association; e.g. lightning and thunder
Symbol – arbitrary link; e.g. most words

Peirce and logic

- Peirce (1886): “logical operations could be carried out by electrical switching circuits”
- Existential graphs

Charles Sanders Peirce (1839-1914)

Modes of reasoning in science

Induction
inductive reasoning combines facts to arrive at theoretical conclusions (empirical generalizations)

Deduction
deductive reasoning uses theory to generate testable predictions

Abduction
Abduction is the process of hypothesis generation; creative aspect of science
William James (1842-1910)

**Life and times**
- Early education
- Wm. James the artist
- Medical school
- Agassiz’s expedition to Brazil
- Harvard professor

*Principles of Psychology* (1890)

James’s Early Life

- **Louis Agassiz** (1807–1873) — An eminent Harvard biologist and America’s most outspoken critic of Charles Darwin’s *Origin of Species*.
- **Charles Renouvier** (1815–1903) — A French philosopher whose writings about free will influenced William James.
- **Alexander Bain** (1818–1903) — A Scottish philosopher/psychologist who was among the first to write psychology textbooks that integrated neural physiology and psychology in the mid-1800s. He influenced James with his writings on habit.

William James (1842-1910)

- Pragmatism and the pragmatic method
  - Truth
  - Belief
  - Concept of fitness applied to ideas

William James (1842-1910)

- Free will and determinism
  - Charles Renouvier
  - “The will to believe”
- Philosophy of religion
  - Varieties of religious experience

James-Lange theory of emotion

**Emotion** is the psychological response to physiological events. We see a bear; this triggers a physiological response, which leads us to experience *fear*. Emotion is caused by bodily events, not the other way around.

Principles of Psychology (1890)

**The stream of consciousness**

1. Consciousness is personal.
2. Consciousness is *continuous and indivisible*.
3. Consciousness is *constantly changing*.
4. Consciousness is *selective*.
5. Consciousness is *functional*.

- The purpose of consciousness is to help people adapt to their environment.
The stream of consciousness

Consciousness, then, does not appear to itself chopped up in bits. Such words as “chain” or “train” do not describe it fitly as it presents itself in the first instance. It is nothing jointed; it flows. A “river” or a “stream” are the metaphors by which it is most naturally described. In talking of it hereafter, let us call it the stream of thought, of consciousness, or of subjective life.

Wm James, Principles of Psychology, 1890, vol. I, p. 239

William James (1842-1910)

- Instinct and habit
- Neural mechanisms of habit formation
- Ido-motor theory of behavior

William James (1842-1910)

- Concept of self
  - The physical self
  - The thinking self
  - The social self
  - The spiritual self
  - Personal identity and the self
    - "I am the same self that I was yesterday"

William James (1842-1910)

- Philosophy of pragmatism
- James-Lange theory of emotion
- Stream of consciousness
- Instinct and habit
- Personal identity and the self
- Ido-motor theory of behavior
- Varieties of religious experience

Vienna Circle (1920s)

Logical positivism

- All knowledge is derived from experience.
- Science applies strict criteria of verifiability by empirical means to test the meaningfulness of any statement.
- All theoretical terms must be directly linked to empirical observations.
- Combined formal logic with radical empiricism.

Percy Bridgman (1892-1961)

Bridgman (1927) every abstract concept in physics must be defined in terms of the procedures used to measure it. Operational definitions provide a basis for attaching every theoretical construct to observable empirical phenomena (or data).
Operationism

**Operationism**: insistence that all abstract scientific terms must be operationally defined. Behaviorists attempted to provide operational definitions of concepts like *drive, anxiety, and intelligence*.

---

Psychology in Russia: The Reflex School

Emphasis on the physiological basis of behavior and learning
External (physical) causes of behavior
Psychology as the science of behavior: Origins of behaviorism