History of Cognitive Psychology

What is Cognitive Psychology?

• Field of Psychology
• Examines the processes that manipulate sensory input
  – transform, reduce, elaborate, store, recover, and use

Influence of Cognitive Psychology

• Young discipline
  – 1950’s
• Other schools of psychology greatly influenced by the cognitive approach
  – Social psychology
  – Clinical
  – Instructional/Organizational psychology
History Lesson

- Aristotle (385-322)
  - First empiricist
- Claimed that careful observation was the key to knowledge
  - Conclusions need to be based on inductions from those observations

Empiricist vs. Rationalist

- **Empiricism**: phenomena investigated by careful, objective observation
- **Rationalism**: phenomena understood by careful thought, and logical proof

Aristotle: Philosophy of Mind

- Mind is a “blank slate” (tabula rasa)
  - Knowledge is not innate
- Experiences form the basis of thought and reasoning
  - The mind is a product of experience
- Interest in memory
  - Memory contains the record of experiences
  - Wrote “De memoria et reminiscencia”
    - (“Concerning Memory and Reminiscence”)
    - First recorded theory of human memory and cognition
Descartes (1596 – 1650)

- French rationalist philosopher
  - Questioned the nature of truth and reality
  - “I think, therefore I am”
- Reasoned from the undeniable fact of thought and awareness to existence
- Early cognitive psychologists needed to reason from the fact of existence to thought and awareness

Scientific Revolution (1550 – 1700)

- Flourishing of empiricism
- Pre-scientific revolution
  - Religious dogma used to answer questions of reality
- Post revolution
  - Scientific method and careful observation became ultimate method of answering substantive questions

British Associationism

- School of thought emphasizing empiricism
  - The driving force molding human behavior and the mind is experience
- Spawned many researchers
  - Wundt (1832 – 1920)
Wundt

• Interested in consciousness
• Set up very first lab for psychological research
  – University of Leipzig
  – 1879

Method of Introspection

• Wundt trained his students in the method of introspection
  – Having trained subjects “look inward” and report their inner sensations and experiences
• Rigorous, controlled procedure for discovering sensations and feelings experienced consciously
• Augmented with other performance measures
  – Reaction times, word associations

Titchner (1867 – 1927)

• Wundt’s student
• Brought psychology to United States
• Felt introspection was the only appropriate procedure for psychology
• Advanced structuralism
  – Intended to determine basic building blocks of human experience
Whoops!

• Insistence on introspective methods by Titchner was problematic
  – Data inherently subjective
    • Titchner decided which introspections were correct and which were erroneous
• Such subjectivity resulted in problems with the reliability of the measure
  – No agreement between labs or observers
  – Results were non-replicable

Behaviorist Revolution

• Wholesale rejection of introspection and the content matter investigated by introspection
  – Mental events and processes
• Watson (1913) wrote the “behaviorist manifesto”
  – Defined psychology as the “science of behavior”
  • Observable, quantifiable
• Called on others in his effort of devising a science

• Behaviorism dominated academic, research-based psychology in the United States
• 1913 – 1950’s
• World War 2 inspired dissatisfaction with behaviorist approach
• There was a need to solve practical problems during wartime that were being encountered by the military
• Many of these problems were cognitive in nature
  – Fatigue, demands of constant vigilance under less than ideal conditions

Technological Developments

• During war and post-war years, technological developments had a large impact on psychology
  – Communications Engineering
    • Telephone communication seen as analogous to human information processing
    • Resurgence in research and theories focusing on human attention

Computers

• Contributed greatly to the development of cognitive psychology
  – Mind conceptualized as an information processing device
Computers: Complex Tasks

- Computers assigned more and more complex tasks to perform
  - Development of Artificial Intelligence
  - Chess, proving logical theorems
- Seminar at RAND corporation
  - Summer 1958
  - Demonstrated to social psychologists how computer-simulation techniques could be applied to model human behavior

RAND Seminar Graduates

- RAND seminar profoundly influenced several of its participants
  - George Miller, Eugene Galanter, Karl Pribram
- Adopted methods and philosophy espoused in the seminar
- Wrote “Plans and the Structure of Behavior”
  - Written out of dissatisfaction with behaviorist approach
  - Emphasized the role of planning in behavior

Cognitive Psychology is Born

- “Plans and the Structure of Behavior” inspired a new generation of psychologists
- In 1967 Neisser wrote the book “Cognitive Psychology”
  - First cognitive psychology text
Summary

- Cognitive revolution
  - Dissatisfaction with behaviorism
  - World War 2
  - Technological advances
    - COMPUTERS!!
- Mental processes once again the focus of psychology
  - Investigated with objective, quantifiable measures

Current Directions: Cognitive Science

- Collaboration between many disciplines
  - Psychology, artificial intelligence, linguistics, philosophy, anthropology, neuroscience
- Area of investigation
  - Study of intelligence in humans, computer programs and abstract theories
  - Emphasis on intelligent behavior as computation
- Issues such as knowledge representation are important in all the fields

Current Directions: Cognitive Neuroscience

- Examines where cognitive operations occur in the brain
- Formation of this field made possible by technological advances in brain imagery techniques
  - PET
  - fMRI
PET: Positron-emission topography

- Diagnostic technique that uses radioactive tracers to study brain activity
- Measures blood flow in different parts of the brain

fMRI: Functional magnetic resonance imaging

- Diagnostic technique that uses magnetic fields and computerized images
- Used to locate mental functions in the brain