PSY 3360 / CGS 3325  
Historical Perspectives on Psychology  
Minds and Machines since 1600  
Dr. Peter Assmann  
Summer 2018

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Course Text
R.E. Fancher & A. Rutherford  
Pioneers of Psychology. 2016.  
5th edition.  
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In addition, choose one of the following books as the basis for your term paper:


Term paper strategy
• Select one of the four books  
• Find a topic within the book  
• Develop links outside the book  
  – Search for related outside materials

Term paper strategy
• Write an outline (not required)  
  – See guidelines on course web page  
• Write a first draft  
• Rewrite and revise  
• Submit via eLearning (link will be added)
Course requirements

• Quiz/participation (10%)
• Midterm exam (30%)
• Final exam (40%)
• Term paper (20%)

Quiz/participation grade (10%)

• Selected classes will include a brief unannounced quiz. Their purpose is to help prepare for the exams. No makeup quizzes are provided. One quiz may be missed without penalty.

Midterm exam (30%)

• **Thursday June 19**
• Mixture of short-answer, medium-length, multiple choice questions.
• There will be a choice of questions to answer. Study questions are provided.
• Makeup exams only for documented cases of medical and family emergencies.

Final exam (40%)

• **NOW CONFIRMED by the Registrar:**
  – **Thursday August 2 - 8:00 - 10:45 PM**
• Same format and rules as the midterm exam
• Final exam is scheduled for 3 hours in the regular classroom.

Research Credits

*All core courses in Psychology and Cognitive Science include a research participation component.*

• The research credit sign-up system is online: https://utdallas.sona-systems.com.
• Use your UTD NetID to login and sign up for experiments.
• New experiments appear every few days throughout the semester; keep checking the board if you cannot find a suitable time slot.

Key concepts

• **Empiricism vs. rationalism**
  • **Empiricism:** the philosophical belief that all knowledge is derived from experience of the outside world.
  • **Rationalism:** the belief that knowledge can only be attained by mental activity.
### Problem of free will

- **Free will vs. determinism**
  - **Determinism**: the view that everything occurs as a result of known or identifiable causes.
  - **Free will**: the opposite position; a belief in human control of events.

### Mind-body problem

- **Dualism vs. monism**
  - **Dualism**: the philosophical position that the world is made up of two kinds of things, the physical and the mental.
  - **Monism**: the position that there is only one kind of substance (mental or physical).

### René Descartes (1596-1650)

- **French mathematician, philosopher, and physiologist**

### Hydromechanical theory of nerve transmission

- **Animal spirits**
  - Concept originated in ancient Greece (300 BCE)
  - Invisible, weightless substance that flowed through hollow nerves
  - Developed by Galen (129-216 AD)
    - Natural spirits derived from nutrients via the liver
    - Transformed into animal spirits when mixed with inhaled air
    - Animal spirits flowed from the brain to other parts of the body

### Vesalius (1514–1564)

- **Anatomy: De humani corporis fabrica**
- Disagreed with Galen on the structure of the brain and the role of animal spirits; branded as a heretic and forced to flee from Europe
Descartes

- Humans and animals share physical, bodily processes that operate like machines. But only humans have minds (souls)
- The soul is the seat of reason; analogy of the fountaineer (hydraulic engineer) at the base of a reservoir, initiating the flow of water through the pipes
- Nervous system - hydraulic principles

Cogito, ergo sum

“I think, therefore I am”

- Skepticism and the “Cartesian doubt”
  – systematically call into question and challenge all assumptions and ideas, so that what is left is unquestionable and solid.
- Cogito argument
  – something must exist (a conscious agent) in order to do the thinking and doubting.

Discussion Questions

1. Although most of Descartes' specific formulations about the ways the human body and brain work have been discarded, why are his ideas relevant for understanding the history of scientific psychology?
2. Descartes believed that there are some concepts or ideas that can never be directly apprehended in experience, such as perfection or unity. Do you agree? How do we come to an understanding or knowledge of these concepts that we all share?
3. What are some of the implications of Descartes’ mind-body problem for neuroscientists in the 21st century?

Descartes’ Legacy

- What problem for the study of mind and behavior was raised by Descartes’ Cogito argument?
- Why should we care?
The problem for dualism

- If mind and body are fundamentally different entities, how do they interact?
  - How do external objects and events leave their impressions on our awareness?
  - How are thoughts, desires, and intentions translated into actions?

Problem of other minds

- If the only thing we can be absolutely certain of is the existence of our own minds doing the thinking and doubting, how can we ever possibly know whether other people exist, have minds and thoughts like we do?
- Self-awareness is a private state

Monism

“The mind and the body are one and the same thing”
- material monism (Hobbes, Gassendi)
- mental monism (Berkeley)
- neutral monism (Spinoza).

Spinoza’s rejection of dualism

- Dual aspect (neutral) monism: equivalence of mind and matter
- Pantheism: inseparability of nature and God
- Psychic determinism: mental experiences are subject to natural laws and can be studied in the same way as the physical world.

Baruch Spinoza (1632-1677)

Gottfried Wilhelm von Leibniz (1646-1716)
### Psychophysical parallelism
- Dualist solution to the mind-body problem
- There is a close *correlation* between mental events and physical events
- But physical events do not interact with or influence mental events (or vice versa). They are fundamentally different.
- Metaphor of two clocks in perfect synchrony
- Pre-established harmony

### Monadology
- **Anton van Leeuwenhoek** (1632-1723)
- The universe is populated by living things
- **monads** - indivisible units that make up the universe.
  - rational monads
  - sentient monads
  - simple monads

### Leibniz
- **Nativism**: the mind is like a block of veined marble
- **Apperception**
- **Minute perceptions**

### The British Empiricists
- **Francis Bacon** (1561-1626)
- **Thomas Hobbes** (1588-1679)
- **John Locke** (1632-1704)
- **George Berkeley** (1685-1753)
- **David Hume** (1711-1776)

### The British Empiricists
- **Characteristics of the empiricist approach:**
  - respect for the facts; virtues of careful observation
  - focus on **learning** rather than **innate** structure
  - emphasis on the individual
  - idea of human potential
  - focus on practical aspects of the philosophy
  - egalitarian

### Francis Bacon (1561-1626)
- Promotion of science in Great Britain
- Inductive method
- Empirical generalization
- Avoid subjectivity in science by repeated, systematic observations
Thomas Hobbes (1588-1679)

- All knowledge is derived from observation.
  “There is no conception in man’s mind which hath not at first, totally or by parts, been begotten upon the organs of sense.”

- mechanistic principles govern the universe: **matter and motion**
  - material monist
  - determinist

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Thomas Hobbes (1588-1679)

- **Materialism** – cognition and mental processes are based on the same laws that govern physical objects.
  - Perception
  - Memory
  - Attention

- **principle of association**: continuity, cohesion, interconnectedness of ideas

- **Drives**: “appetites” and “aversions”

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Political and social writing

- **Hedonism**: principle of self-interest
- **Free will** is an illusion created by inherent conflicts between appetites and aversions

- **Leviathan** – “great beast”
  - view of mankind in the “natural state”
  - laws and rules are the product of fear of the consequences of everyone acting out of self-interest
  - laws and rules are conventions, not binding in any absolute sense
  - rational self-interest leads to support of a strong monarch
John Locke (1632-1704)

- Empiricist view of the construction of human knowledge
- The mind at birth is a “tabula rasa” (blank slate)
- There are no innate ideas

Locke’s *Essay*

- Where do ideas come from?
- Not innate, because even the most widely held beliefs are not shared by everyone.
- All knowledge comes from experience: *sensation* and *reflection*.

John Locke (1632-1704)

- *Idea* – basic unit of perception and thought (mental image)
- *Operations of the mind* – mental abilities

John Locke (1632-1704)

- *Simple ideas and complex ideas*
  - Simple ideas are the “building blocks” of thought; cannot be broken down or analyzed further

John Locke (1632-1704)

- *Simple ideas and complex ideas*
  - Some simple ideas come from *sensation* (color, taste, smell)
  - Some come from *reflection* (memories, thoughts, intentions)

John Locke (1632-1704)

- *Simple ideas and complex ideas*
  - Complex ideas are composites of simple ideas; the mind can form unlimited combinations of ideas
John Locke (1632-1704)

- Primary qualities – perceived attributes resemble the physical objects that cause them
- Secondary qualities – perceived attributes do not correspond to any physical properties

John Locke (1632-1704)

- Paradox of the basins
  - Does warmth reside in the water basin or in the mind?
  - Warmth is a secondary quality

John Locke (1632-1704)

- Physical realism
  - physical objects stimulate the sense organs and cause the mind to form an accurate representation of external reality
- Copy theory of perception (Democritos, 460-370 BC)

Molyneux’s problem

“Suppose a man born blind, and now adult, and taught by his touch to distinguish between a cube and a sphere of the same metal, and nighly of the same bigness, so as to tell, when he felt one and the other, which is the cube, which the sphere. Suppose then the cube and sphere placed on a table, and the blind man be made to see: quaere, whether by his sight, before he touched them, he could now distinguish and tell which is the globe, which the cube?”

Molyneux’s problem

- Based on their philosophical positions, how would each of the following respond to the question?
  - Descartes
  - Leibniz
  - Locke

Molyneux’s problem

- English surgeon and anatomist William Cheselden (1688-1752) published an account of a congenitally blind boy’s experiences after cataract removal.
- At first the boy found it difficult to distinguish shapes and recognize objects.
- Critics suggested that the boy did not have enough time to recover from the operation.
**Molyneux’s problem**
- Infant studies
- Visual deprivation experiments
- Experiments with sensory substitution systems show that participants need some time to learn to distinguish and identify objects

**John Locke (1632–1704)**
- Blind people cannot comprehend color terms
- Private language of sensory experience
- Problem of other minds

**Locke’s contributions**
- Animals have memory, form simple ideas through sensation and perception; but do not form abstract concepts or thoughts
- Early development in children – learning and personality development in children determined entirely by their experiences

**Locke’s contributions**
- Problem of personal identity – “personal identity is the consciousness of being the same thinking being at different times and places.”

**Locke’s political writings**
- *Two Treatises on Government*
  - government as a social contract
  - all people are born equal
  - universal education as a right

**George Berkeley (1685–1753)**
- Born in Kilkeny, Ireland
- Lecturer at the University of Dublin
- Traveled to America, hoping to set up a new college in Bermuda
- Bishop of Cloyne for last 18 years of his life
George Berkeley (1685-1753)
- Dissatisfied with the prevailing metaphor of a clockwork universe
- Materialism responsible for decline in morals and religion
- Denied existence of matter

George Berkeley (1685-1753)
- Mental monism (idealism) denies the existence of a physical world distinct from our perceptions of it.
  - *esse is percipi* “to be is to be perceived”

George Berkeley (1685-1753)
- All we can ever know about the world comes from sensory perception.
  - No “external reality” beyond our perceptions of the world.

George Berkeley (1685-1753)
- Problem: if perception determines existence, then do things cease to exist when we no longer perceive them?
- Do perceptions vary from one individual to another?

There was a young man who said, “God
Must think it exceedingly odd
If he finds that this tree
Continues to be
When there’s no one about in the quad”

Dear Sir:
  Your astonishment’s odd
  I am always about in the quad.
  And that’s why the tree
  Will continue to be
  Since observed by
  Yours faithfully,
  God

George Berkeley (1685-1753)
- Human knowledge is based on ideas: sensory experience plus reflections of the mind
George Berkeley (1685-1753)

- Our psychological experiences reflect the world as it actually is
- distinction between primary and secondary qualities makes no sense

Principle of Association

- An object is nothing more than a combination of its perceived qualities
- Apple = color + smell + taste + shape + size

George Berkeley (1685-1753)

There are no abstract ideas.

- Attributes are grouped together on the basis of contiguity and similarity

George Berkeley (1685-1753)

(1) the active mind or spirit, perceiving, thinking, willing
(2) passive objects of mind, ideas derived from sensation, memory or imagination

Theory of vision

- An Essay Towards a New Theory of Vision (1709)
- Molyneux’s problem
- Distance perception is learned, not innate

Theory of vision

- Distance perception is not based on abstract geometrical relationships, but on learned associations between cues derived from different senses (visual & kinesthetic)
- eye movements (convergence and divergence)
David Hume (1711-1776)

- Scottish philosopher, economist, historian
- Radical skepticism
- Foundations of human knowledge
- Theory of meaning
- Causality

Hume’s reply to Descartes:

“The Cartesian doubt, therefore, were it ever possible to be attained by any human creature (as it plainly is not), would be entirely incurable, and no reasoning could ever bring us to a state of assurance and conviction on any subject.” [Inquiry XII(i)]

Impressions and ideas

- **Impressions** – raw sensory data
- **Ideas** – derived from impressions by combining, transposing, augmenting, and diminishing other impressions and ideas.

Epistemology

- How do we arrive at conclusions about **statements of fact**?
  - Principle of association
  - Impressions and ideas

Theories of perception

- **Causal theory of perception**: The philosophical position that our perceptual experiences are caused by external objects in the real world.
- **Representative theory of perception**: The idea that our percepts resemble these external objects, or represent them to us.
- **Naive realism**: The belief that our perceptions are the external objects, that they are one and the same.
### Disagreement with Locke

- Hume sees a problem in Locke’s realism.
- If our ideas are representations and our thoughts are simply copies of those representations, then we can never know how accurate our sensory representations are, nor can we ever form any ideas of the real world, outside of our impressions of it.

### Does perception provide us with representations of objects?

"It is a question of fact whether the perceptions of the senses be produced by external objects resembling them. How shall this question be determined? By experience, surely, as all other questions of a like nature. But here experience is and must be entirely silent. The mind has never anything present to it but the perceptions, and cannot possibly reach any experience of their connections with objects. The supposition of such a connection is, therefore, without any foundation in reason."

David Hume, *An Inquiry Concerning Human Understanding*

### Hume’s reply to Berkeley

“To have recourse to the veracity of the Supreme Being in order to prove the veracity of our senses is surely making a very unexpected circuit. If his veracity were at all concerned in this matter, our senses would be entirely infallible, because it is not possible that he can ever deceive. Not to mention that, if the external world be once called into question, we shall be at a loss to find arguments by which we may prove the existence of that Being or any of his attributes."

[Inquiry XII(i)]

### Epistemology

- For Hume, there are no innate ideas.
- All ideas are derived from sensory experience, or from inner feelings.
- We cannot conceive of anything that is fundamentally different from the things we have experienced.

### Hume’s microscope

- To understand a complex idea, first reduce it to its simple constituent ideas. If any of these remains obscure, produce the impression from which it is derived.

### Epistemology

- No statement of fact can ever be proved by reasoning *a priori*. The only way to establish the truth of a factual statement is through experience.
Hume’s razor

• If a term cannot be shown to evoke an idea that can be analyzed into simple constituent parts, then it has no meaning.

Theory of meaning

• How can words stand for ideas?
  1. they can be derived from empirical facts (matters of fact)
  2. they can be derived analytically, based on the relationships among the ideas they contain (relations of ideas)

Theory of causality

• What creates the link between cause and effect?
  1. no necessary link between cause and effect
  2. habitual association
  3. feeling of necessity (natural belief)

Abstract concepts

• For Locke, general concepts like triangle, motion, and redness are constructed by a process of abstraction.
• particular ideas derived from sensory experience are combined to arrive at general ideas, which represent all of the things held in common by all the examples, and omit the features they do not share.

Abstract concepts

• For Hume, all abstract concepts are derived from experience (from impressions). These include:
  - Space
  - Time
  - Mathematical truths
  - Causality (cause and effect)
  - Matter, force, energy
  - Necessity

• Berkeley: if you eliminate all the features that are unique to a triangle, chair, or a person, you have nothing left behind. There are no abstract ideas.
• Hume agrees with Berkeley and proposes that a general idea is used to stand for a set of particular ideas as a result of a process of habitual association.
Free will vs. determinism

- Hume’s view of free will is linked to his theory of causality
  - there is no logical necessity in events
  - the feeling of necessity is an *illusion*, a psychological projection based on the association of ideas
  - This illusion has great utility for everyday life.

What is this Necessity, save an empty shadow of my mind’s own throwing?

Thomas Huxley, *The Physical Basis of Life*, p. 161

Immanuel Kant (1724-1804)

- born in Königsberg (now Kaliningrad, in Russia)
- never left his home town, never married; taught at the University of Königsberg
- attracted students and researchers from all over Europe and Britain

Key concepts

- *a priori*: a way of gaining knowledge without appealing to any particular experience(s). This method is used to establish transcendental and logical truths.
- *a posteriori*: a method of acquiring knowledge by appealing to some particular experience(s). This method is used to establish empirical facts and hypothetical truths.

Key concepts

- *analytic statement*: a statement or item of knowledge that is known to be true solely because of its conformity to rules of logic.
- *synthetic statement*: a statement or item of knowledge that is known to be true because of its connection with some intuition.
Key concepts

- Kant regarded mathematics as *synthetic a priori* because it depends on the pure intuitions of the elements of time and space.

- In an *analytic* judgment, the *predicate* is contained in the *subject*: For example, "Triangles have three sides."
- The truth of this statement is determined by an analysis of the subject.

In a *synthetic* judgment, the *predicate* adds to or expands the *subject*: For example, "Triangles were the earliest figures to be discovered in geometry."
- The truth of such a statement cannot be known by an analysis of the subject.

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<th><em>a priori</em></th>
<th><em>a posteriori</em></th>
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<tr>
<td><em>analytic</em></td>
<td>“Triangles have three sides”</td>
<td>(none)</td>
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<tr>
<td><em>synthetic</em></td>
<td>Kant’s categories; mathematics</td>
<td>“Some birds fly south in winter”</td>
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Critique of Pure Reason

- **Transcendentalism**: philosophical view that there is a form of knowledge derived from *synthetic a priori* judgments.
- Objects in the real world are fundamentally unknowable. They provide the raw material from which sensations are derived.

Noumena and phenomena

- **Noumena**: “things-in-themselves”– objects in a pure state independent of human experience; cannot be known directly.
- **Phenomena**: anything experienced is transformed by the mind into a subjective phenomenon (i.e., conditioned by space, time and the categories).
Critique of Pure Reason

• **Space** and **time** exist only as part of the mind, as "**intuitions**" by which perceptions are measured and judged.
• In addition to these intuitions, Kant proposed that a number of **a priori** concepts, called **categories**, also exist.

Kant's categories

• Kant’s categories include the most general concepts of human experience.
• These provide a **conceptual framework** in terms of which all objects are analyzed.
• The objects of empirical knowledge (everything we experience) is “filtered” through the categories.

Kant's categories

• There are four main categories with 3 subcategories each, for a total of 12:

<table>
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<th>Quantity</th>
<th>Unity, plurality, totality</th>
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<tr>
<td>Quality</td>
<td>Reality, negation, limitation</td>
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<tr>
<td>Relation</td>
<td>Substance &amp; accident, cause &amp; effect, reciprocity</td>
</tr>
<tr>
<td>Modality</td>
<td>Possibility, existence, necessity</td>
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Ethical and moral philosophy

• Kant's ethical system is based on the belief that **reason** is the final authority for morality.
• Actions of any sort, he believed, must be undertaken *from a sense of duty dictated by reason*.
• *No action performed for expediency or solely in obedience to law or custom can be regarded as moral.*

Ethical and moral philosophy

• Kant described two types of commands given by reason: the **hypothetical imperative**, which dictates a given course of action to reach a specific end; and the **categorical imperative**, which dictates a course of action that must be followed because of its rightness and necessity.

Ethical and moral philosophy

• The **categorical imperative** is the basis of morality and was stated by Kant in these words:
"Act as if the maxim of your action were to become through your will a general natural law."
Kant’s theory of causality

- Hume's rejection of causality
  - Co-occurrence of events
  - Habitual association
  - (Illusory) feeling of necessity
- Kant’s answer: Causality is
  - Fundamental to science and human knowledge
  - A relationship not based on observation or logic
  - Imposed by the structure of the human mind

Kant’s psychological theory

- Noumena and phenomena
- Space, time and the 12 categories of experience
- Perception is an active process
- The mind actively participates in the construction of reality

Kant’s contributions to psychology

- Synthesis of empiricism and rationalism
- Perception is an active process
- The mind makes an active contribution to our experience of reality
- The mind can be studied, but only by introspection, not direct observation.

Kant’s contributions to psychology

- Kant believed that mental phenomena could not be studied empirically because they
  1. lacked spatial dimensions
  2. were too transient
  3. could not be experimentally manipulated
  4. could not be described mathematically.