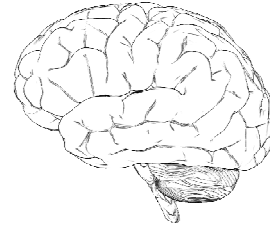


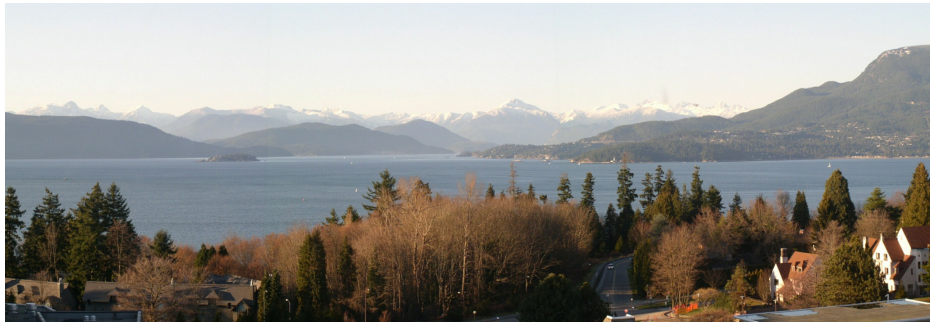
Psychology 101

Intro Bio Cog Psych
University of British Columbia
Dr. Michael Souza



Lecture 01a (07 May 2012)

Overview of the course
Review of the main syllabus policies



Your instructor

Dr. Michael Souza
souza@psych.ubc.ca

My background and interests

Ph.D. U of California - Berkeley
M.A. & B.A. U of California - Davis

*Executive functions, prefrontal cortex,
and cognitive rehabilitation*

Your teaching assistant

Kostadin Kushlev

kostadinpk@psych.ubc.ca

Kosta's background and interests

B.A., Reed College

M.A., UBC

Well-being, happiness and the meaning of life

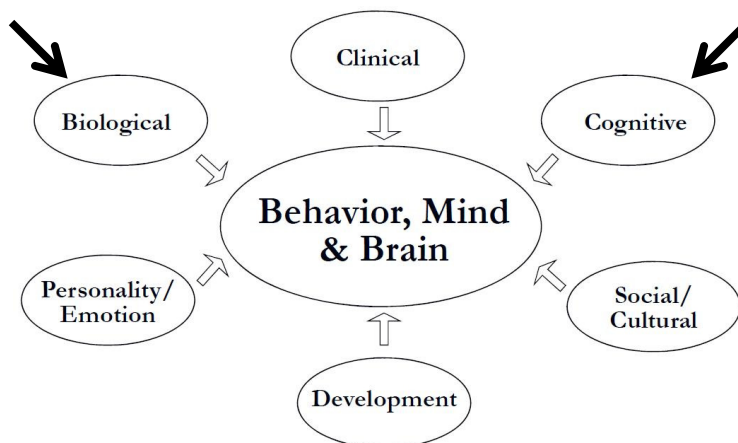


3

Psychology is more than you think...

What is psychology?

The scientific study of behavior, the mind and the brain



4

Topics that we will address

What will you learn?

Basic elements of the scientific method
Structure and function of nervous system
Sensory processing, perception
Learning and memory
Consciousness and sleep
Language and thought

How will we approach these topics?

Behaviour
Cognition
Brain



Picture: <http://theidealmind.com/oldsite.html>

5

Some of the many applied focuses

Learning and memory

Best practices for best function?

Decision-making

How can your decisions and behaviors be manipulated for a certain purpose?

Cognitive training

Improving function
Brain plasticity and recovery of function?



Picture: <http://theidealmind.com/oldsite.html>

8

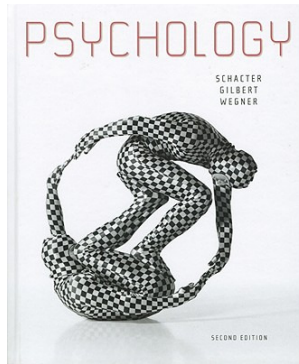
Textbook and course website

Required textbook

Schacter, D.L., Gilbert, D.T. & Wegner, D.M (2011). *Psychology* (2nd ed). New York: Worth.

Course website

<http://vista.ubc.ca> (important announcements, lecture slides, grades...)



9

Course requirements

Two (2) Midterm Examinations

(25% for MT1 and 30% for MT2 = 55% of course grade)

Forty (40) multiple-choice questions per exam

Final Examination (45% of course grade)

50-80 multiple-choice questions



10

Picture: <http://blog.transifex.net/category/indifex/>

Research participation (extra credit opportunity)

You may earn up to 3% extra credit on your final grade by participating in research conducted by the UBC Psychology Human Subject Pool.

You may earn this 3% by participating in three hours of research



THE
UNIVERSITY OF
BRITISH
COLUMBIA



THE DEPARTMENT OF
PSYCHOLOGY



11

Course grade

The Psychology department requires all courses to comply with departmental norms.
Scaling may be employed to comply with these norms (between 63-67%)

A+ 90-100%	B+ 76-79%	C+ 64-67%	D 50-54%
A 85-89%	B 72-75%	C 60-63%	F 0-49%
A- 80-84%	B- 68-71%	C- 55-59%	

12

Other course policies

Attendance is expected

Reading the textbook

E-mail policy and office hours

Missing an exam

Academic misconduct

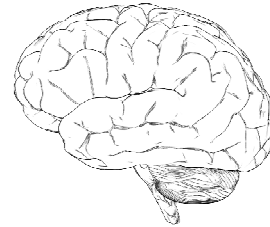


13

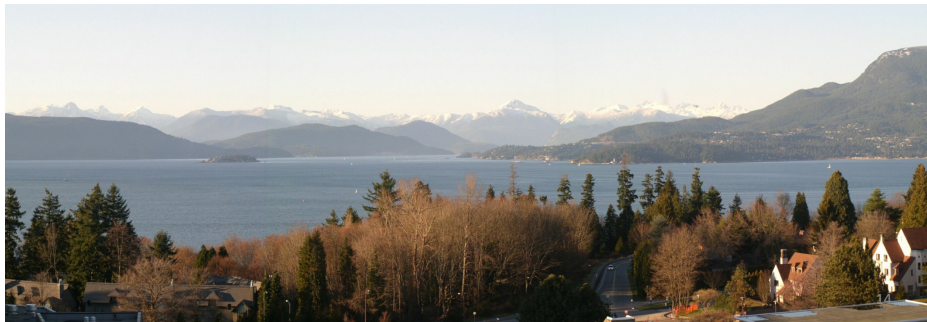
Picture: <http://theidealmind.com/oldsite.html>

Psychology 101

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Lecture 01b (07 May 2012)
A brief history of bio/cog psychology



The [scientific] study of psychology

“Psyche” (soul) + “-ology” (study of)

Psychological science

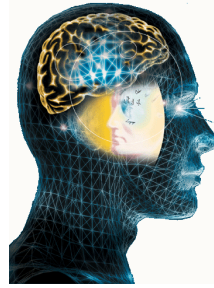
Scientific study of behavior, the mind and brain

Cognitive psychology

Study of cognitive (mental) processes, products

Biological psychology

Study of the biology that gives rise to cognition and behaviour



15

Picture: <http://mindbrain.ucdavis.edu/>

In search of the mind

Empedocles of Acragas (500 B.C.)

Cardiac hypothesis

Alcamaeon of Croton (490-430 B.C.)

Galen (129-199)
Brain hypothesis

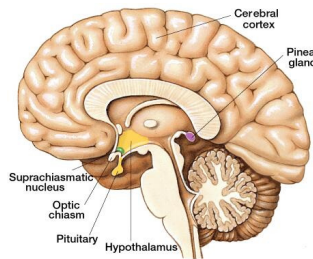
Descartes (1596-1650)

Rationalism

Reflexes

Dualism

Role of the pineal gland



16

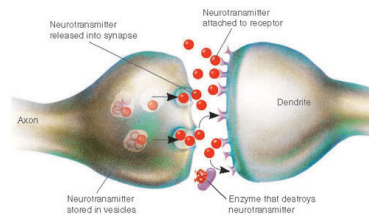
Picture: <http://en.wikipedia.org/wiki/File:Descartes-reflex.JPG>
<http://humanityhealing.net/2010/09/pineal-gland-the-transcendental-gateway/>

The neuron: communicative unit of the brain

Johannes Muller (1801-1858)
 Doctrine of specific nerve energies

Hermann von Helmholtz (1821-1894)
 Speed of neural transmission (27m/s)

Santiago Ramon y Cajal (1852-1934)
 Golgi stain and the Neuron Doctrine
 Nobel Prize in Medicine (1906)



Picture: <http://www.txtwriter.com/backgrounders/Drugaddiction/drugs1.html>

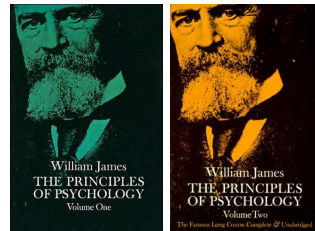
19

The evolution of the field of Psychology

William Wundt (1832-1920)
 First psychology lab (1879) in Leipzig
 Structuralism (reductionist)
 Introspection

William James (1842-1910)
 Functionalism
 First complete volume in Psychology

G. Stanley Hall (1844-1924)
 First U.S. psychology lab (1881) at John Hopkins

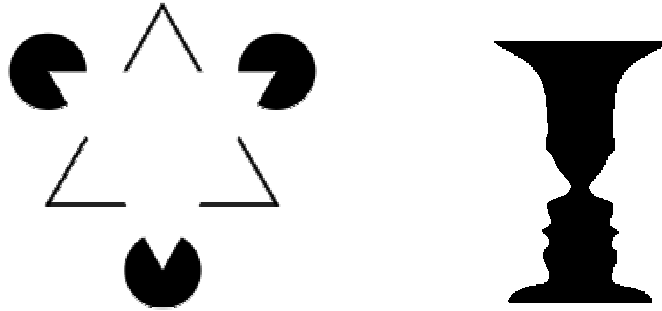


Picture: <http://hot100tips.com/health/open-yourself-with-self-introspection-in-unfoldment-of-the-great-within-2/>

20

Schools of thought: Gestalt

Perception-based theory (early 1900's)
Holistic perception
Revealed by illusions



Picture: http://en.wikipedia.org/wiki/Optical_illusion
<http://webpace.ship.edu/cgboer/gestalt.html>

21

Schools of thought: Freudian

"Hysterical" patients (early 1900's)

The unconscious
Origin of psychological illness
Key features of personality



Picture: http://www.cartoonstock.com/directory/s/self_importance.asp

22

Schools of thought: Behaviorism (Skinner, Watson)

Behaviorism (mid-1900's)
"Black box"
Stimulus-response associations
...even emotions (Little Albert)
Reinforcement learning



Picture: <http://teachinghighschoolpsychology.blogspot.ca/2009/10/little-albert-found.html>

23

Schools of thought: Cognitive

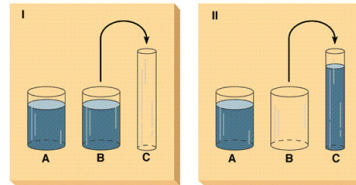
Sir Frederic Bartlett (1886-1969)
False memories

Jean Piaget (1896-1980)
Kid's errors, insight to the mind

Noam Chomsky (1928-present)
Language production

George Miller (1920 - present)
Limited mental resources
Computer analogy
Brain : Mind :: Hardware : Software

Piaget, Human Development, 7e. Copyright © 1998, McGraw-Hill Companies, Inc. All Rights Reserved.
Piaget's Conservation Task



Picture: <http://educatingpreschool.blogspot.ca/2011/03/piagets-four-stages.html>

24

Schools of thought: Cognitive Neuropsychology

Paul Broca and “Tan”

Damage to the left frontal lobe
Non-fluent aphasia

Phineas Gage (1823-1860)

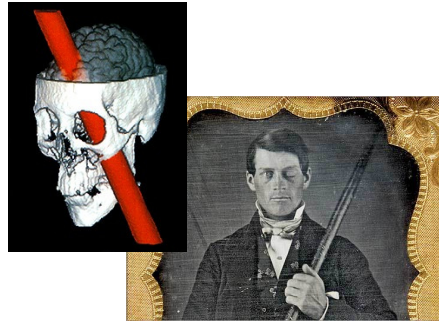
Damage to orbitofrontal cortex (OFC)
“Frontal lobe personality”

Alexander Luria (1902-1977)

Credited as founder of neuropsychology
Patients with brain injury on the battlefield

Patient H.M. (1926-2008)

Surgical removal of the hippocampus
Anterograde amnesia



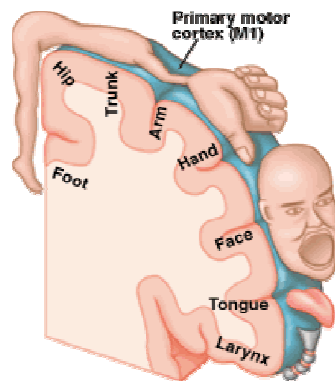
Picture: <http://www.mesacc.edu/dept/d10/asb/origins/phineas.html>

http://www.boston.com/news/local/massachusetts/articles/2009/07/22/newly_discovered_image_offers_fresh_insights_about_1848_medical_miracle/

Schools of thought: Brain plasticity and recovery of function

Phantom limb syndrome

V.S. Ramachandran (UCSD)



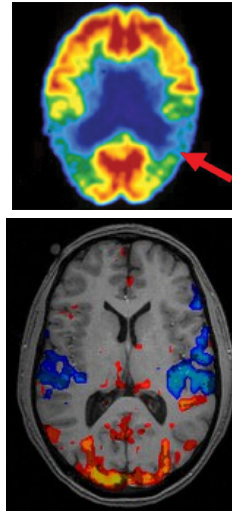
Picture: <http://brainconnection.positscience.com/topics/?main=anat/motor-anat>

Schools of thought: Cognitive Neuroscience

Michael Gazzaniga (1939-present)
Founder of cognitive neuroscience

PET scanner (1970's)
Neurochemicals
Blood flow and neural activity

MRI scanner (1970's-80's)
Structure and [later] function



Picture: <http://cerncourier.com/cws/article/cern/28507/1/cernimag2-10-01>
<http://psychcentral.com/lib/2007/what-is-functional-magnetic-resonance-imaging-fmri/>

27

Psychology today

Highly interdisciplinary

Linguistics
Computer science
Philosophy
Biology
Mathematics
Medicine
Economics
Political science
Anthropology
Sociology
Cultural studies
...and so on!

“Cognitive science”



Picture: <http://www.care2.com/news/member/971826095/2728285>

28

Interim lecture summary

Psychological science is the study of behaviour, the mind and the brain

Work in neuroanatomy and the schools of thought have greatly enriched our knowledge about human biology and information processing

The future of psychology is bright!

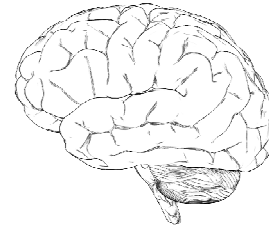


29

Picture: <http://www.care2.com/news/member/971826095/2728285>

Psychology 101

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Lecture 01c (07 May 2012)

Research methods



The ways of psychology

The scientific method

Identify a problem, form a hypothesis
Design the study
Gather data
Use the data to evaluate your hypothesis
Report your findings

Conducting ethical research

Guidelines and ethics – why we have them

Answering research questions

Using statistics to figure it all out



31

Picture: <http://www.withdissonance.net/the-milgram-experiment/>

Identifying a problem

Careers are built around a set of interests that can be nurtured early on

Most research builds

Was this study flawed?
Confirming/replicating a finding?
Addressing limitations in previous work

Some work is completely novel



32

Picture: http://www.123rf.com/photo_11310661_builder-working-working-mason-makes-laying-bricks-in-the-background-cranes-construction-cartoon-char.html

Faculty and their interests at UBC Psychology



Graf, Peter

Email: pgraf@psych.ubc.ca

Core Area(s): Cognitive Science

Research Interests

Human memory; prospective vs retrospective memory; encoding/retrieval interactions; lifespan memory development; memory breakdown in organic amnesia and in patients with Alzheimer's disease.



Christoff, Kalina

Email: kchristoff@psych.ubc.ca

Core Area(s): Cognitive Science

Research Interests

The cognitive and neural basis of human thought, reasoning and problem solving, including spontaneous thought processes such as mind wandering; real-time fMRI training and its application for the treatment of clinical disorders; prefrontal cortex function and organization; role of the temporal lobes and long-term memory processes for the generation of thought; neural principles of complex cognition, as revealed by functional neuroimaging (fMRI).



Enns, James T.

Email: jenns@psych.ubc.ca

Core Area(s): Cognitive Science, Developmental

Research Interests

Vision, attention, cognitive science, cognitive neuroscience, computational vision, development of perception and attention.

33

Scouring the literature

Literature review

- Review articles, empirical studies
- Comments on future directions
- Thinking "outside the box"

Search engines

- UBC Library
- PsycINFO (APA)
- Pubmed.org
- Google Scholar
- ...and more!



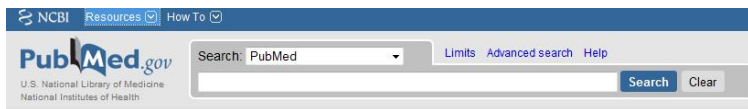
awesome psych research [Advanced Scholar Search](#)

Articles include patents Legal opinions and journals

Stand on the shoulders of giants

[Go to Google Home](#) - [About Google](#) - [About Google Scholar](#) - [Go to Google Scholar](#)

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34

Theories and hypotheses

Developing a theory:

"The brain is a plastic organ. Accordingly, it should benefit from cognitive exercises that target areas of weakness after injury or impairment"

Forming a hypothesis:

"A cognitive training program consisting of two hours a day for six weeks of memory exercises will boost older adult's scores on standard tests of memory"



35

Picture: <http://www.bitterwallet.com/104-year-old-twitter-woman-just-a-pawn-in-a-pr-game/11881>

Designing the study

Naturalistic observation

Case study

Survey

Correlational study

Experiment



The unfortunate case of Genie

36

Picture: [http://en.wikipedia.org/wiki/Genie_\(feral_child\)](http://en.wikipedia.org/wiki/Genie_(feral_child))

Key elements of an experiment

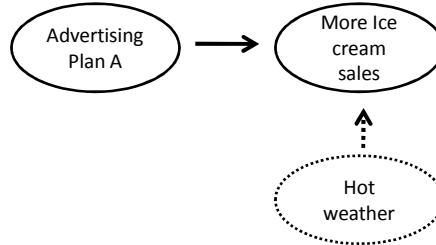
Manipulation and control

Variables

- Subject, independent and dependent
- Control group
- Confounds

Operational definitions

- Validity and reliability
- Ecological validity



37

Picture: <http://www.controlyourcash.com/2010/12/27/dartboard-investing-only-works-when-you-stand-inches-away/dartboard/>

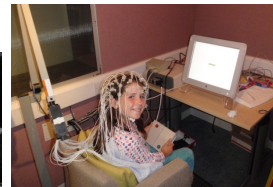
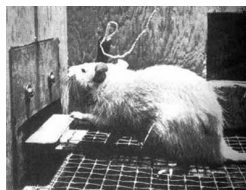
Just a few of the tools at our disposal...

Computers

- Precise calculations
- Constructing and testing models

Biomedical technology

- Single cell recording
- Electroencephalography (EEG)
- Magnetic resonance imaging (MRI)



Picture: <http://www.clker.com/clipart-desktop-computer.html>
<http://www.frontlip.eu/2011/03/the-neu-romantics/>
<http://www.neuroscience.cam.ac.uk/directory/profile.php?v250>

38

...and their associated measurements

Behavior

Accuracy, reaction time (RT)

Single cell recordings

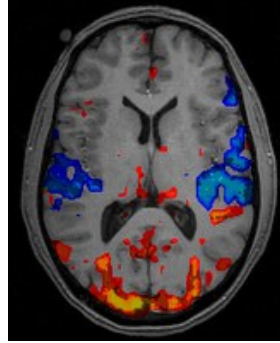
Action potentials

Event-related potentials (ERP)

Voltage changes

Functional magnetic resonance imaging (fMRI)

BOLD signal



Picture: <http://psychcentral.com/lib/2007/what-is-functional-magnetic-resonance-imaging-fmri/>

39

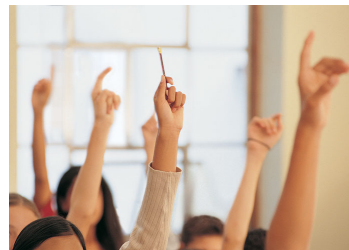
Choosing participants and gathering data

Sampling from a population

Participant selection and assignment
Control for important subject variables
Convenience samples
Attrition

Expectation and bias

Hawthorne effect
Demand characteristics
Blind experiments



Picture: <http://www.betterhighschools.org/>

40

Analyzing the data and reporting your findings

Statistical analyses

Revisiting and evaluating your hypothesis

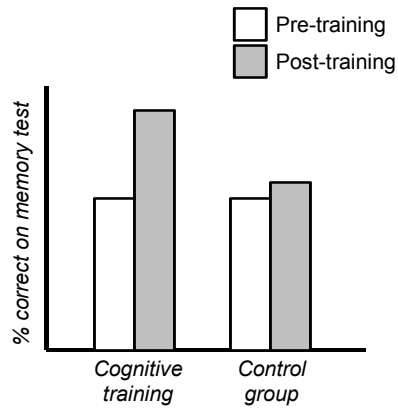
Things to consider

Replicable? Does it generalize?
Limitations and future directions?

Sharing your findings

Scientific journals
Annual conferences
Colleagues

...what's next?



Other experiments

False memories

Adults are more likely to generate false memories from long, detailed stories than are children

IVs and DV?

Attention

The left posterior parietal lobe is the first region to respond to demands in attentional control

IVs and DV?

Working memory and neurons

Neurons in the left anterior inferior frontal gyrus will be more engaged by memory retrieval than memory maintenance

IVs and DV?

Sleep

Lecture material is remembered better when 1:1 study/sleep versus 2:0 study/sleep

IVs and DV?

Lecture summary

The scientific method guides our approach and acquisition of knowledge in psychology

In cognitive and biological psychology, we have a number of important tools that we use to address our questions (e.g., computers, biomedical technology)

Carefully controlled experiments can shed light on different phenomena of interest. This is how we move forward in a meaningful way



awesome psych research [Advanced Scholar Search](#)

Articles (include patents) Legal opinions and journals

Stand on the shoulders of giants

[Go to Google Home](#) - [About Google](#) - [About Google Scholar](#) - [Go to Google Scholar](#)

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Next lecture: Research ethics and statistics

43