

TOPICS FOR THE ADMISSION KNOWLEDGE TEST

BASICS OF NEUROSCIENCE AND COGNITION

General overview

Suggested bibliography:

Cognitive Neuroscience (wiki) (capítulos 1,4,5,6,13)

[http://en.wikibooks.org/wiki/Cognitive Psychology and Cognitive Neuroscience](http://en.wikibooks.org/wiki/Cognitive_Psychology_and_Cognitive_Neuroscience)

Society For Neuroscience. *Brain Facts* (capítulos 1,2,3,4,8,9,16)

Available at:

<http://www.brainfacts.org/about-neuroscience/brain-facts-book/>

Optional:

Fiori, N. (2008). *As Neurociências Cognitivas*. Petropolis, RJ: Ed. Vozes.

http://books.google.com.br/books?id=CnEkVuPiSMsC&lpg=PR1&ots=t_4BBTaPPf&dq=nicole%20fiori%20the%20cognitive%20neurosciences&hl=pt-BR&pg=PR9#v=onepage&q=nicole%20fiori%20the%20cognitive%20neurosciences&f=false .

Cellular and molecular bases

- Cells of the nervous system: structure and function of neurons and glia
- Characteristics of the neuronal membrane; ion channels and membrane potential
- Electrical conductance in neurons: action potential
- Neuronal communication: synapse (chemical and electrical), stages of chemical neurotransmission and main neurotransmitters and neuromodulators
- Neuroanatomy: development of the nervous system; functional and anatomical division of the nervous system; autonomous nervous system

Suggested bibliography:

Gazzaniga, M., Mangun, G. R., & Ivry, R. B. (2002/2009). Chapter 2: Cellular Mechanisms and Cognition and Chapter 3: Neuroanatomy and Development. In: *Cognitive Neuroscience: The Biology of the Mind 2nd/3rd ed.* New York: Norton.

or
Bear, M. F., Connors, B. W., & Paradiso, M. A. (2007). Part 1: Foundations. In: *Neuroscience: Exploring the Brain*. 3A Ed. Baltimore, MD: Lippincott Williams & Wilkins.

FOUNDATIONS OF EMPIRICAL RESEARCH

Basis of empirical science:

- Inductive and deductive reasoning, theory, hypothesis, criteria for scientific theories:
 - parsimony, precision, testability
- Non-experimental empirical methods:
 - Naturalistic observation: reactivity, case study, survey research, naturalistic observation, ethogram, participative observation
 - Relational method: contingency research, chi-square test of independence, correlational research, correlation coefficient, correlation and causality
- Experimental methods:
 - Variables: independent variables, dependent variables, intervening variables, control variables, floor/ceiling effect, interaction between variables
 - Experimental designs: group design, base line, matching, randomization, single subject design, practice effect, order effect, counterbalancing, mixed design, control group, control

condition, demand characteristics, double-blind experiment, experiment and quasiexperiment, sampling

Suggested bibliography:

Kantowitz, B. A., Roediger III, H. L., & Elmes, D. G. (2005/2009). Chapters 1-3. In *Experimental Psychology 2nd/3rd ed.* Belmont, CA: Wadsworth – Cengage Learning.

ETHICS IN RESEARCH

· Ethics in research with human participants: Ética em pesquisa com participantes humanos: APA ethical guidelines for human research diretrizes and guidelines of CONEP, informed consent, vulnerable groups, human research ethics committee, Brazilian legislation

· Ethics in research with animals: APA ethical guidelines for researchers experimenting with animals, animal ethics committee (Comitê de Ética no Uso de Animais), Brazilian legislation

Suggested bibliography:

Kantowitz, B. A., Roediger III, H. L., & Elmes, D. G. (2005/2009). Chapter 4: Ethics in Psychological Research. In *Experimental Psychology 2nd/3rd ed.* Belmont, CA: Wadsworth – Cengage Learning.

and Resolução CNS n.º 196/96 do Conselho Nacional de Saúde, sobre Diretrizes e Normas Regulamentadoras de Pesquisas Envolvendo Seres Humanos. and Lei 11794/08 sobre Procedimentos para Uso Científico de Animais.

RESEARCH PROJECTS AND REPORTS

Research reports: sections of a project proposal, sections of a scientific paper

Suggested bibliography:

Kantowitz, B. A., Roediger III, H. L., & Elmes, D. G. (2005/2009). Chapter 5: How to Read and Write Research Reports. In *Experimental Psychology 2nd/3rd ed.* Belmont, CA: Wadsworth – Cengage Learning.

<http://www.fapesp.br/253> - Projeto de Pesquisa / FAPESP

STATISTICAL REASONING

Descriptive statistics:

Types of variables, measures of central tendency, measures of dispersion, graphs, the normal distribution

Inductive/inferencial statistics:

Distribution of sample means and standard error of mean, experimental and null hypothesis, significance level, p-value, type I error, type II error, statistical power, effect size, directional/nondirectional hypothesis and one- vs two-tailed test, t-test for independent groups and for paired measurements, use of tables of normal distribution, t-distribution and chi-squared distribution

Suggested bibliography:

Kantowitz, B. A., Roediger III, H. L., & Elmes, D. G. (2005/2009). Appendix B: Statistical Reasoning: an Introduction. In *Experimental Psychology 2nd/3rd ed.* Belmont, CA: Wadsworth – Cengage Learning.

BASIC MATHEMATICS

Basic algebra:

Number bases, exponents, fractional exponents, roots, arithmetic rules of exponents and logarithms

Functions: Polynomial, exponential and logarithmic functions, roots of a second-order polynomial, sine,

cosine, tangent, inverse functions, domain of a function, asymptote

Graphical analysis:

Cartesian plane, intercept, inclination, parabole, hyperbole

Suggested bibliography:

Fischer, I. (s/ ano). *Basic Calculus Refresher*. pp.1-6. Available at:

<http://www.stat.wisc.edu/~ifischer/calculus.pdf>