

## Syllabus

### Course Overview

The biological basis of behavior is important in a wide range of disciplines, each of which approaches the subject from a slightly different theoretical perspective. The most comprehensive of these disciplines is biological psychology or biopsychology, the study of the underlying biological and chemical processes that shape and guide behavior (Carlson, 2014). Biological psychologists are interested in many of the same things that interest other kinds of psychologists, including mental disorders, language development, perception, drug addiction, memory, and sexuality. However, unlike other kinds of psychologists, biological psychologists are primarily concerned with understanding and explaining behavior in terms of natural sciences like evolutionary biology, genetics, chemistry, and most importantly, the anatomy and physiology of the nervous system. Central to this approach is the idea that all moods, emotions, thought processes, and behaviors are rooted in biology.

This course begins with an introduction to the field of biopsychology, a description of the relationship between genetics, evolution and behavior, and a discussion of functional neuroanatomy. You will then turn your attention to more specialized topics of general psychological interest, addressing them from a biological vantage. As you progress through the course, you will come to appreciate the biopsychological perspective and understand how physical and chemical processes occurring in the nervous system and elsewhere in the body help determine who we are and what we become. In addition to providing essential background for advanced study of the biology-behavior connection, formal exposure to the biopsychological perspective can be of considerable benefit in any context involving human or animal behavior. It can also teach us much about ourselves and about our relationship to the other creatures that inhabit the earth.

#### Reference

Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson.

### Multimedia

- Click [Course Introduction](#) to listen to the audio piece.
  - This audio piece provides a brief introduction to the course.

### NASP Table

This table identifies the National Association of School Psychologists (NASP) domains to which the course competencies align. This alignment is intended for the use of MS in Psychology learners with a specialization in School Psychology as they pursue licensure at the state and national level.

<b>PSY7310 – Biological Basis of Behavior</b>	
<b>NASP domains</b>	<b>PSY7310 course competencies</b>
<b>2.7 Prevention, Crisis Intervention, and Mental Health:</b> School psychologists have knowledge of human development and psychopathology and of associated biological, cultural, and social influences on human behavior. School psychologists provide or contribute to prevention and intervention programs that promote the mental health and physical wellbeing of students.	PSY7310-1. Apply principles of physiological psychology to the psychological issues that can occur within one's area of specialization.
<b>2.3 Effective Instruction and Development of Cognitive/Academic Skills:</b> School psychologists have knowledge of human learning processes, techniques to assess these processes, and direct and indirect services applicable to the development of cognitive and academic skills. School psychologists, in collaboration with others, develop appropriate cognitive and academic goals for students with different abilities, disabilities, strengths, and needs; implement interventions to achieve those goals; and evaluate the effectiveness of interventions. Such interventions include, but are not limited to, instructional interventions and consultation.	PSY7310-2. Analyze peer-reviewed journal articles that include

<p><b>2.7 Prevention, Crisis Intervention, and Mental Health:</b> School psychologists have knowledge of human development and psychopathology and of associated biological, cultural, and social influences on human behavior. School psychologists provide or contribute to prevention and intervention programs that promote the mental health and physical wellbeing of students.</p>	<p>the principles of physiological psychology.</p>
<p><b>2.5 Student Diversity in Development and Learning:</b> School psychologists have knowledge of individual differences, abilities, and disabilities and of the potential influence of biological, social, cultural, ethnic, experiential, socioeconomic, gender-related, and linguistic factors in development and learning. School psychologists demonstrate the sensitivity and skills needed to work with individuals of diverse characteristics and to implement strategies selected and/or adapted based on individual characteristics, strengths, and needs.</p>	<p>PSY7310-3. Analyze the influence of culture and diversity on approaches to physiological psychology.</p>
<p><b>2.10 School Psychology Practice and Development</b> <b>School:</b> Psychologists have knowledge of the history and foundations of their profession; of various service models and methods; of public policy development applicable to services to children and families; and of ethical, professional, and legal standards. School psychologists practice in ways that are consistent with applicable standards, are involved in their profession, and have the knowledge and skills needed to acquire career-long professional development.</p>	<p>PSY7310-4. Analyze the ethical issues relating to physiological psychology.</p>
<p><b>2.9 Research and Program Evaluation:</b> School psychologists have knowledge of research, statistics, and evaluation methods. School psychologists evaluate research, translate research into practice, and understand research design and statistics in sufficient depth to plan and conduct investigations and program evaluations for improvement of services.</p>	<p>PSY7310-5. Communicate in a manner that is scholarly, professional, and consistent with expectations for members of the psychological professions.</p>

**Course Competencies**

(Read Only)

To successfully complete this course, you will be expected to:

- 1 Apply principles of physiological psychology to the psychological issues that can occur within one's area of specialization.
- 2 Analyze peer-reviewed journal articles that include the principles of physiological psychology.
- 3 Analyze the influence of culture and diversity on approaches to physiological psychology.
- 4 Analyze the ethical issues relating to physiological psychology.
- 5 Communicate in a manner that is scholarly, professional, and consistent with expectations for members of the psychological professions.

**Course Prerequisites**

*There are no prerequisites for this course.*

## Syllabus >> Course Materials

### Required

The materials listed below are required to complete the learning activities in this course.

### Integrated Materials

Many of your required books are available via the VitalSource Bookshelf link in the courseroom, located in your Course Tools. Registered learners in a Resource Kit program can access these materials using the courseroom link on the Friday before the course start date. Some materials are available only in hard-copy format or by using an access code. For these materials, you will receive an email with further instructions for access. Visit the [Course Materials](#) page on Campus for more information.

#### Book

Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson. ISBN: 9780205940240.

### Library

The following required readings are provided in the Capella University Library or linked directly in this course. To find specific readings by journal or book title, use [Journal and Book Locator](#). Refer to the [Journal and Book Locator library guide](#) to learn how to use this tool.

- Alway, Y., McKay, A., Ponsford, J., & Schönberger, M. (2012). [Expressed emotion and its relationship to anxiety and depression after traumatic brain injury](#). *Neuropsychological Rehabilitation*, 22(3), 374–390.
- Brambilla, F., Grave, R. D., Amianto, F., & Fassino, S. (2014). [Lack of efficacy of psychological and pharmacological treatments of disorders of eating behavior: Neurobiological background](#). *BMC Psychiatry*, 14(1), 1–14.
- Chiao, J. Y., & Blizinsky, K. D. (2013). [Population disparities in mental health: Insights from cultural neuroscience](#). *American Journal of Public Health*, 103(S1), S122–S132.
- de Sousa, A., McDonald, S., & Rushby, J. (2012). [Changes in emotional empathy, affective responsivity, and behavior following severe traumatic brain injury](#). *Journal of Clinical & Experimental Neuropsychology*, 34(6), 606–623.
- Falling Walls Foundation (Producer). (2010). [Breaking the wall of nature and nurture: How genes and environment combine to affect our life course](#) [Video]. Films on Demand.
- Farb, N. A. S., Anderson, A. K., & Segal, Z. V. (2012). [The mindful brain and emotion regulation in mood disorders](#). *Canadian Journal of Psychiatry*, 57(2), 70–77.
- Grupe, D. W., & Nitschke, J. B. (2013). [Uncertainty and anticipation in anxiety: An integrated neurobiological and psychological perspective](#). *Nature Reviews Neuroscience*, 14(7), 488–501.
- Kagan, A., Özmerdivenli, R., Degirmenci, Y., Çağlar, M., Basbug, A., et al. (2015). [Evaluation of sleep in women with menopause: Results of the Pittsburg Sleep Quality Index and polysomnography](#). *Journal of The Turkish German Gynecological Association; Istanbul*, 16(3) 149-152.
- Kawai, Y., Miura, R., Tsujimoto, M., Sakurai, T., Yamaoka, A., Takeda, A., & . . . Toba, K. (2013). [Neuropsychological differentiation between Alzheimer's disease and dementia with Lewy bodies in a memory clinic](#). *Psychogeriatrics*, 13(3), 157–163.
- Keel, P. K., & Forney, K. J. (2013). [Psychosocial risk factors for eating disorders](#). *International Journal of Eating Disorders*, 46(5), 433–439.

- Kelly, G., & Simpson, G. (2011). Remediating serious inappropriate sexual behavior in a male with severe acquired brain injury. *Sexuality & Disability*, 29(4), 313–327.
- Lahart, I. M., Lane, A. M., Hulton, A., Williams, K., Godfrey, R., Pedlar, C., & . . . Whyte, G. P. (2013). Challenges in maintaining emotion regulation in a sleep and energy deprived state induced by the 4800km ultra-endurance bicycle race: The Race Across AMerica (RAAM). *Journal of Sports Science & Medicine*, 12(3), 481–488.
- Lammel, S., Tye, K. M., & Warden, M. R. (2014). Progress in understanding mood disorders: Optogenetic dissection of neural circuits. *Genes, Brain & Behavior*, 13(1), 38–51.
- Lastella, M., Roach, G. D., Halson, S. L., Gore, C. J., Garvican-Lewis, L. A., & Sargent, C. (2014). The effects of transmeridian travel and altitude on sleep: Preparation for football competition. *Journal of Sports Science & Medicine*, 13(3), 718–720.
- Lequerica, A., & Krch, D. (2014). Issues of cultural diversity in acquired brain injury (ABI) rehabilitation. *Neurorehabilitation*, 34(4), 645–653.
- Manckoundia, P., Taroux, M., Kubicki, A., & Mourey, F. (2014). Impact of ambulatory physiotherapy on motor abilities of elderly subjects with Alzheimer's disease. *Geriatrics & Gerontology International*, 14(1), 167–175.
- Mavroudis, P. D., Scheff, J. D., Calvano, S. E., & Androulakis, I. P. (2013). Systems biology of circadian-immune interactions. *Journal of Innate Immunity*, 5(2), 153–162.
- Meyer-Lindenberg, A., & Tost, H. (2012). Neural mechanisms of social risk for psychiatric disorders. *Nature Neuroscience*, 15(5), 663–668.
- Moreno, J. A., Arango Lasprilla, J. C., Gan, C., & McKerral, M. (2013). Sexuality after traumatic brain injury: A critical review. *NeuroRehabilitation*, 32(1), 69–85.
- Morris, S. E., Rumsey, J. M., & Cuthbert, B. N. (2014). Rethinking mental disorders: The role of learning and brain plasticity. *Restorative Neurology & Neuroscience*, 32(1), 5–23.
- Rhea, D. J., & Thatcher, W. G. (2013). Ethnicity, ethnic identity, self-esteem, and at-risk eating disordered behavior differences of urban adolescent females. *Eating Disorders*, 21(3), 223–237.
- Ronan, J. L., Wu, W., & Crabtree, G. R. (2013). From neural development to cognition: Unexpected roles for chromatin. *Nature Reviews Genetics*, 14(5), 347–359.
- Russo, S. J., & Nestler, E. J. (2013). The brain reward circuitry in mood disorders. *Nature Reviews Neuroscience*, 14(9), 609–625.
- Sinclair, D., Purves-Tyson, T. D., Allen, K. M., & Weickert, C. S. (2014). Impacts of stress and sex hormones on dopamine neurotransmission in the adolescent brain. *Psychopharmacology*, 231(8), 1581–1599.
- Szajer, J., & Murphy, C. (2013). Education level predicts retrospective metamemory accuracy in healthy aging and Alzheimer's disease. *Journal of Clinical & Experimental Neuropsychology*, 35(9), 971–982.
- Ty, M., & Francis, A. J. P. (2013). Insecure attachment and disordered eating in women: The mediating processes of social comparison and emotion dysregulation. *Eating Disorders*, 21(2), 154–174.
- Weltens, N., Zhao, D., & Oudenhove, L. V. (2014). Where is the comfort in comfort foods? Mechanisms linking fat signaling, reward, and emotion. *Neurogastroenterology & Motility*, 26(3), 303–315.
- Wolf, C., & Linden, D. E. J. (2012). Biological pathways to adaptability – Interactions between genome, epigenome, nervous system and environment for adaptive behavior. *Genes, Brain & Behavior*, 11(1), 3–28.
- Wollburg, E., Meyer, B., Osen, B., & Löwe, B. (2013). Psychological change mechanisms in anorexia nervosa treatments: How much do we know? *Journal of Clinical Psychology*, 69(7), 762–773.
- Yu, Y., Shen, H., Zeng, L., Ma, Q., & Hu, D. (2013). Convergent and divergent functional connectivity patterns in schizophrenia and depression. *PLOS ONE*, 8(7), 1–11.

### Suggested

The following materials are recommended to provide you with a better understanding of the topics in this course. These materials are not required to complete the course, but they are aligned to course activities and assessments and are highly recommended for your use.

### Optional

The following optional materials are offered to provide you with a better understanding of the topics in this course. These materials are not required to complete the course.

### External Resource

Please note that URLs change frequently. While the URLs were current when this course was designed, some may no longer be valid. If you cannot access a specific link, contact your instructor for an alternative URL. Permissions for the following links have been either granted or deemed appropriate for educational use at the time of course publication.

- [APA: Guidelines for ethical conduct in the care and use of animals](#). null
- [BioAnim.com: Glutamate ion channel](#). null
- [Journal of Neuroscience: Three cases of enduring memory impairment after bilateral damage limited to the hippocampal formation](#). null
- SmarterEveryDay (Producer). [The backwards brain bicycle \[Video\]](#). Retrieved from <https://www.youtube.com/watch?v=MFzDaBzBIL0>

- U.S. Department of Education. (n.d.). [Family Educational Rights and Privacy Act \(FERPA\)](https://www.ed.gov/policy/gen/guid/fpco/ferpa/index.html) <https://www.ed.gov/policy/gen/guid/fpco/ferpa/index.html>
- U.S. Department of Health & Human Services. (n.d.). [Summary of the HIPAA privacy rule](https://www.hhs.gov/hipaa/for-professionals/privacy/laws-regulations/index.html) <https://www.hhs.gov/hipaa/for-professionals/privacy/laws-regulations/index.html>

## Unit 1 >> Origins of Behavioral Neuroscience

### Introduction

Scientific examination of the biological basis of behavior spans a wide range of disciplines and methodologies. In this unit, you will explore some of the relevant areas and their contributions to our understanding of behavior. Two such areas, self-awareness and the ethical issues surrounding the use of animals in scientific research, will be addressed in detail as they relate to biological psychology. To prepare for the more advanced topics presented later in the course, you will become familiar with the biological roots of behavior, evolution, and natural selection, along with psychobiological research methods.

The mind-body problem has puzzled philosophers since ancient times. With respect to the relationship between mental and material existence, modern science has implicitly adopted a materialistic position referred to in the text as monism (Carlson, 2014). This position, that the world consists of matter and energy and that immaterial entities such as minds can be reduced to purely material processes, lies at the heart of a heated controversy involving consciousness, self-awareness, and the nature of the human mind. Fascinating research in biological psychology sheds considerable light on these issues. For example, people with a parietal lesion to the mammalian visual system report that they can see nothing in the part of their visual field corresponding to the lesion. Yet, such people can reach toward or guess correctly at the orientation of objects presented there.

Commissurotomy (split-brain surgery) involves the surgical sectioning (cutting) of the corpus callosum, which is the neuronal connection between the right and left hemispheres of the brain. When sensory information regarding an object is presented to the right hemisphere of a split-brain patient, he or she is unaware of the object but can indicate with movement of the left hand that the object has been detected. By studying cases of unilateral neglect (failure to perceive objects in the left visual field or the left halves of objects throughout the visual field), we learn more about the brain mechanisms that control attention and awareness. Such phenomena imply that consciousness depends heavily on verbal processes (Carlson, 2014).

Although human subjects are frequently used in psychological experimentation, animals continue to be of crucial importance. This is particularly true in the field of biopsychology. Most of the animal research described in the text is conducted on live laboratory animals. Criminal laws and professional codes of ethics insure that these animals are treated humanely and receive proper housing, nutrition, and exercise. Nevertheless, some animal lovers find it hard to be totally objective about the ontological status and proper treatment of research animals, even though many more pets than research animals are abused or destroyed by animal shelters. The use of animals in research thus remains a controversial subject, making it all the more necessary to take a thorough and balanced approach to the issue.

The topics of evolution and natural selection bear strongly on our knowledge of the physiology of human behavior. We have made substantial headway in learning how natural selection influences the development of behavioral traits.

### Reference

Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson.

### Learning Activities

#### u01s1 - Studies

### Readings

Read the following:

- [Learner Expectations](#).
  - This reading offers important information about your success in this course.
- [Professional Communications and Writing Guide](#).
  - Adhere to these guidelines when writing a discussion post, peer response, or paper, as well as when using citations and references.
- Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson. ISBN: 9780205940240.
  - Chapter 1, "Introduction," pages 1–18, in your course text.
- Meyer-Lindenberg, A., & Tost, H. (2012). [Neural mechanisms of social risk for psychiatric disorders](#). *Nature Neuroscience*, *15*(5), 663–668.
- Ronan, J. L., Wu, W., & Crabtree, G. R. (2013). [From neural development to cognition: Unexpected roles for chromatin](#). *Nature Reviews Genetics*, *14*(5), 347–359.
- Wolf, C., & Linden, D. E. J. (2012). [Biological pathways to adaptability – Interactions between genome, epigenome, nervous system and environment for adaptive behavior](#). *Genes, Brain & Behavior*, *11*(1), 3–28.

## Multimedia

- Click [Know Your Genetic Terminology](#) to launch the interactive.

## Films on Demand Video

- Click [Breaking the Wall of Nature and Nurture: How Genes and Environment Combine to Affect Our Life Course](#) to view the video.

## Optional Internet Resources

If you choose, you may explore this Internet resource:

- [APA: Guidelines for Ethical Conduct in the Care and Use of Animals](#).

### u01s2 - Your Online ePortfolio

Online ePortfolios serve two key purposes: 1) to support learning and reflection, and 2) to be used as a showcase tool. Your learning journey can be documented, and ePortfolios contribute to lifelong learning and growth through reflection and sharing. Online ePortfolios can also be shared with employers and peers to present artifacts that demonstrate your accomplishments at Capella.

## Using ePortfolio to Prepare for Your Capstone

Your program may culminate in a capstone course. At that time you may be required to show evidence of your learning throughout the program by referring to multiple assessments that you have created. You will be telling a story about your learning throughout the program using artifacts you have collected during many of these courses.

## Using ePortfolio to Build Your Career

As you are preparing to tell your story in the professional world, leverage your ePortfolio artifacts to demonstrate the knowledge and competencies you have gained through your program in professional conversations, performance reviews, and interviews.

To do that, reflect on the knowledge and skills you have gained from your courses and the elements you have put in your portfolio, along with how you have already applied these things to your professional life or how you might apply them in the future.

Next, create your story or talking points to tell your professional story.

## Saving Your Documents to ePortfolio

You will need a place to store your documents in an organized fashion so that you can access them at a later date. Do not rely on the courseroom to store your assignments for you as you will lose access to the courseroom after you have completed the course. Capella uses a cloud-based portfolio platform to facilitate your organization of the artifacts you create throughout your program.

To make an online portfolio useful, it is essential that it is organized clearly and that important files of any format are accessible. Read the [Online ePortfolio Guidelines \[PDF\]](#) to ensure you set up your online portfolio correctly. For more information on ePortfolio visit the Campus [ePortfolio](#) page.

## Privacy Statement

Capella complies with privacy laws designed to protect the privacy of personal information. While you may voluntarily share your own information publicly, you are obligated to protect the personal information of others that may be associated with your academic or professional development. Before sharing information and material in any ePortfolio that is set up to be shared externally to your program at Capella, please consider privacy obligations in relation to protected populations who may be included or referenced in your academic or clinical work. Refer to the [Family Educational Rights and Privacy Act \(FERPA\)](#) and/or the [Health Insurance Portability and Accountability Act \(HIPAA\)](#) if you have specific questions or concerns about your choices.

### u01d1 - Animal Research

The APA Guidelines for Ethical Conduct in the Care and Use of Animals state:

Research should be undertaken with a clear scientific purpose. There should be a reasonable expectation that the research will:

- a) increase knowledge of the processes underlying the evolution, development, maintenance, alteration, control, or biological significance of behavior,
- c) increase understanding of the species under study; or
- d) provide results that benefit the health or welfare of humans or other animals (2005, section I. A).

For this discussion:

- Locate and read an article from the Capella Library about ethical issues in research with animals.
- Answer these questions:
  - What are some of the benefits of animal research?
  - What are some of its drawbacks?
  - Do you anticipate a time when we will no longer use animals in scientific research?
- Include enough information to support your position.
- Cite your source using standard APA guidelines.

Reference

American Psychological Association Committee on Animal Research and Ethics (CARE). (2005). APA guidelines for ethical conduct in the care and use of animals. Retrieved from <http://www.apa.org/science/anguide.html>

## Response Guidelines

Respond to at least one other learner. Your response is expected to be substantive in nature and to reference the assigned readings as well as other theoretical, empirical, or professional literature to support your views and writings. Reference your sources using standard APA guidelines.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

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[Finding Articles for Your Discussion Post](#)

### u01d2 - Mental Disorders

For this discussion:

- Find a recent, full-text article in which the author or authors used biological research to study a particular disorder or behavior. Select an article that addresses a disorder or behavior you likely will encounter in your particular area of specialization. The study should utilize one or more of the research techniques of behavioral genetics (such as twin studies, adoption studies, targeted mutations, or psychophysiological techniques not related to genetics).
- Summarize the article and outline the problem and the hypotheses of the study. Which research techniques did the study use?
- Analyze and explain how these techniques were helpful in answering the research questions.
- Cite and reference your article using APA formatting.

## Response Guidelines

Respond to at least two other learners. Your responses are expected to be substantive in nature and to reference the assigned readings, as well as other theoretical, empirical, or professional literature to support your views and writings. Reference your sources using standard APA guidelines.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

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## Unit 2 >> Structure and Functions of Cells of the Nervous System

### Introduction

There are many different cell types in the nervous system, each with a specialized function. The mechanisms by which neurons function are central to the regulation and control of behavior. In this unit, you will explore gross neuroanatomy while examining the essential structure of the neuron, the principles of neurotransmission, and the basics of psychopharmacology.

One of the key premises of biological psychology is that human behavior and perception are functions of the firing patterns of the billions of neurons constituting the human brain. These neurons communicate with each other through electrochemical impulses called action potentials (Carlson, 2014), which occur in organized patterns largely regulated by the concentrations of chemical neurotransmitters within discrete brain regions. While biopsychology holds that all mental and behavioral functions of humans and higher animals can be reduced to neuron-level biological processes and relationships, some aspects of these processes are still poorly understood. Nevertheless, this kind of reductionism is at the heart of contemporary biological psychology and psychopharmacology, providing us with a conceptual framework in which to characterize the mental and behavioral effects of certain useful drugs in terms of their effects on the nervous system. One implication of this reductionist framework is that psychoactive drugs, rather than producing effects on their own, function by modulating ongoing processes within the brain. Specifically, they work by modulating chemical neurotransmission, thus altering neuronal firing patterns and thereby influencing mental and behavioral states and processes. As you go through this unit, pay careful attention to the different ways in which drugs can affect chemical neurotransmission and thereby alter behavior.

Because it will provide the foundation for the remainder of the course, the next two weeks' material will probably be the most challenging of the term. We will be returning to it throughout the quarter.

### Reference

Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson.

### Learning Activities

#### u02s1 - Studies

### Readings

Read the following:

- Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson. ISBN: 9780205940240.
  - Chapter 2, "Structure and Functions of Cells of the Nervous System," pages 19–47, in your course text.

### Multimedia

- Click [Neural Anatomy](#) to launch the multimedia presentation.
- Click [Neurotransmitters](#) to launch the multimedia presentation.

#### u02d1 - Neurotransmitters

Pick a neurotransmitter. Then, describe the effects on a person who has too much or too little of this neurotransmitter, for two of the categories below. For example, a person who has too much adrenaline might be aggressive and have an elevated heartbeat (behavioral and physiological).

- Behavioral.
- Cognitive.
- Emotional.
- Physiological.

Support your ideas using the course text and at least one other scholarly source. Reference your sources using standard APA guidelines.

## Response Guidelines

Respond to at least one other learner. Your response is expected to be substantive in nature and to reference the assigned readings as well as other theoretical, empirical, or professional literature to support your views and writings. Reference your sources using standard APA guidelines.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

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[Finding Articles for Your Discussion Post](#)

### u02d2 - Synaptic Transmission

For this discussion:

- Describe the synapse of a terminal button onto a dendritic membrane.
- Indicate at least six ways that a drug can affect synaptic transmission.
- Compare the changes in drug reactivity that are noted in tolerance and sensitization.
- Explain why each of the six effects occurs. Specifically, what are the chemical behaviors of the drug that cause the effect on the synaptic transmission?
- Reference any sources using standard APA guidelines.

## Response Guidelines

Respond to at least one other learner. Your response is expected to be substantive in nature and to reference the assigned readings, as well as other theoretical, empirical, or professional literature to support your views and writings. Reference any sources using standard APA guidelines.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

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[Finding Articles for Your Discussion Post](#)

### Unit 3 >> Structure of the Nervous System

#### Introduction

The goal of research in behavioral neuroscience, an important dimension of biopsychology, is to identify the brain functions underlying particular behaviors and locate the neural circuits that perform these functions. The division of the nervous system into distinct anatomical regions is not arbitrary but based on the apparent structural and functional properties of each region (Carlson, 2014). A thorough knowledge of neuroanatomy will be helpful when we begin to examine such topics as mental illness and neuropsychological disorders in later units. We will explore the two major divisions of the vertebrate nervous system: the central nervous system (CNS) and the peripheral nervous system (PNS). The CNS consists of the brain and spinal cord, while the PNS consists of the somatic and autonomic nervous systems (Carlson, 2014). We will examine the various anatomical distinctions of the vertebrate nervous system and how they relate to behavior. We will also look at the many technologies that have been developed to aid scientists in the study of human and animal nervous systems.

Although current ideas regarding the localization of neural function are still somewhat tenuous, they incorporate significant refinements of previous conceptualizations and are grounded in the latest experimental and clinical research. While these ideas may not be perfect, they are among the best insights that we currently have on human and animal behavior.

Because it will provide the foundation for the remainder of the course, the material covered this week and last week will probably be the most challenging of the term. We will be returning to it throughout the quarter.

Reference

Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed). Boston, MA: Pearson.

## Learning Activities

### u03s1 - Studies

## Readings

Read the following:

- Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson. ISBN: 9780205940240.
  - Chapter 3, "Structure of the Nervous System," pages 48–75, in your course text.
- Lequerica, A., & Krch, D. (2014). Issues of cultural diversity in acquired brain injury (ABI) rehabilitation. *Neurorehabilitation*, 34(4), 645–653.

## Multimedia

- Click [Hemispheres of the Brain](#) to launch the multimedia presentation.
- Click [Cortical Anatomy and Function](#) to launch the multimedia presentation.
- Click [Brain Anatomy](#) to launch the multimedia presentation.
- Click [Pain Pathways](#) to launch the illustration.
- Click [Major Motor Pathways](#) to launch the multimedia presentation.

### u03a1 - Anatomy and Physiology

To prepare for this assignment, complete the following:

1. Choose one neural pathway (for example, visual system, auditory pathways, or Papez circuit). In your assignment, you will explain how it works and how it affects behavior.
2. Search the Capella library and the Internet for scholarly, peer-reviewed, and professional articles on the pathway you have chosen. Find at least three resources to support your work, including one research study that involves this pathway and the area of psychology in which you work or are currently studying.

## Requirements

For the neural pathway you have selected, complete the following:

- Explain the structure of the pathway.
- Explain how messages are transmitted to the brain along this pathway.
- Analyze the relationship between the pathway and behavior.

Using the research study you located, complete the following:

- Explain the purpose of the study. What question were the researchers trying to answer?
- Summarize the findings or conclusions of the study.
- Explain how the findings or conclusions of the study can be useful to you in your professional work.

## Additional Requirements

- Include a title page and reference page.
- Number of pages: 4–6
- At least 3 current scholarly or professional resources.
- APA format.
- Times New Roman font, 12 point.

- Double-spaced.

**Note:** Your instructor may also use the Writing Feedback Tool to provide feedback on your writing. In the tool, click the linked resources for helpful writing information.

Course Resources

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[APA Style and Format](#)

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[Writing Feedback Tool](#)

### u03d1 - Brain Structures

Pick a brain structure (for example, the hypothalamus, hippocampus, amygdala, et cetera). Describe examples of behavioral, cognitive, emotional, or other phenomena that would occur if this structure were to be stimulated or inhibited (damaged). Support your ideas using the course text and at least one other scholarly source. Reference your sources in standard APA format.

### Response Guidelines

Respond to at least two other learners. Your response is expected to be substantive in nature and to reference the assigned readings as well as other theoretical, empirical, or professional literature to support your views and writings. Reference your sources using standard APA guidelines.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

### u03d2 - Pathways

Pick a pathway in the brain or interconnected set of structures (for example, basal ganglia, limbic system, visual cortices, frontal lobe, et cetera). Describe examples of behavioral, cognitive, emotional or other phenomena that would occur if this structure were to be stimulated or inhibited (damaged). Make sure to support your ideas using the textbook and at least one other scholarly source. Reference your sources in standard APA format.

### Response Guidelines

Respond to at least one other learner. Your response is expected to be substantive in nature and to reference the assigned readings as well as other theoretical, empirical, or professional literature to support your views and writings. Reference your sources using standard APA guidelines.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

## Unit 4 >> Sleep & Biological Rhythms

### Introduction

This unit explores a central aspect of human and animal life: sleep. The brain is simplistically described as the organ that controls the muscles and regulates level of arousal. It is clear the brain controls muscular movement and the sleep-wake cycle. However, the term *behavior* is commonly

associated with movement, and sleep is associated with a relative absence of movement (aside from REM, the rapid eye movements that accompany dreaming). Nevertheless, sleep is considered a behavior. As we explore sleep, we will cover the stages of sleep, sleep disorders, the physiological mechanisms of sleep, and biological rhythms.

Sleep appears to be necessary for the survival of all higher organisms. While it is seldom viewed as a behavior, that is what it certainly is. Although we spend one-third of our lives sleeping, we usually have only a handful of dreams by which to remember our sleep time. The entire sleep cycle, which takes about 90 minutes, is characterized by alternating cycles of REM and non-REM sleep (stages 1–4). The four stages of non-REM sleep are distinguished largely by the frequency and amplitude of the associated brain waves, while REM sleep is accompanied by rapid eye movement and muscular paralysis (Carlson, 2014).

All higher organisms have one or more mechanisms that regulate biological rhythms and internal states, triggered by factors such as hunger, thirst, and body temperature. Although some of these mechanisms are only now being elucidated, a vast amount of experimental and clinical evidence indicates that the hypothalamus is generally implicated. Internal regulatory processes that modulate our biological rhythms and behavioral cycles are often characterized as biological clocks (Carlson, 2014). These cycles, which can range in length from around 24 hours (circadian) to a year (circannual) or more, control some of the most important aspects of our lives, including daily patterns of activity, the alternation of sleep and wakefulness, and even the onset of puberty and menopause.

Because the suprachiasmatic nucleus of the hypothalamus (SCN) regulates and synchronizes many biobehavioral processes in mammals, it is often referred to as the master clock of the body. Damage to the SCN can dramatically affect an organism's patterns of activity and sleep. The SCN modulates sleep with melatonin, a brain chemical produced in the pineal gland.

#### Reference

Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson.

## Learning Activities

### u04s1 - Studies

## Readings

Read the following:

- Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson. ISBN: 9780205940240.
  - Chapter 8, "Sleep and Biological Rhythms," pages 189–216, in your course text.
- Kagan, A., Özmerdivenli, R., Degirmenci, Y., Çağlar, M., Basbug, A., et al. (2015). Evaluation of sleep in women with menopause: Results of the Pittsburg Sleep Quality Index and polysomnography. *Journal of The Turkish German Gynecological Association; Istanbul*, 16(3) 149-152.
- Lastella, M., Roach, G. D., Halson, S. L., Gore, C. J., Garvican-Lewis, L. A., & Sargent, C. (2014). The effects of transmeridian travel and altitude on sleep: Preparation for football competition. *Journal of Sports Science & Medicine*, 13(3), 718–720.
- Lahart, I. M., Lane, A. M., Hulton, A., Williams, K., Godfrey, R., Pedlar, C., & . . . Whyte, G. P. (2013). Challenges in maintaining emotion regulation in a sleep and energy deprived state induced by the 4800km ultra-endurance bicycle race: the Race Across America (RAAM). *Journal of Sports Science & Medicine*, 12(3), 481–488.
- Mavroudis, P. D., Scheff, J. D., Calvano, S. E., & Androulakis, I. P. (2013). Systems biology of circadian-immune interactions. *Journal of Innate Immunity*, 5(2), 153–162.

## Multimedia

- Click [The Biological Sleep Clock](#) to launch the illustration.

### u04d1 - Sleep Disorders

Locate and read a recent, full-text article from the Capella Library about sleep disorders (such as narcolepsy or sleep deprivation). Then, answer the following:

- Why is sleep important to human functioning?
- What was the central finding of the article?
- How can you use the results of this article within your area of specialization? Be specific in your examples.
- Cite and reference your article using APA formatting.

## Response Guidelines

Respond to at least one other learner. Your response is expected to be substantive in nature and to reference the assigned readings, as well as other theoretical, empirical, or professional literature to support your views and writings. Reference your sources using standard APA guidelines.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

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[Finding Articles for Your Discussion Post](#)

### u04d2 - Sleep and Cognition

Locate and read a recent, full-text article from the Capella Library about the overlap between sleep and cognition. Then, answer the following:

- Discuss the neurotransmitters and brain structures involved in sleep. Explore their function in cognition.
- Hypothesize how sleep might impact cognitive functioning based on the shared brain structures and neurotransmitters.
- Reference your source using standard APA guidelines.

## Response Guidelines

Respond to at least two other learners. Your response is expected to be substantive in nature and to reference the assigned readings, as well as other theoretical, empirical, or professional literature to support your views and writings. Reference your sources using standard APA guidelines.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

### Unit 5 >> Reproductive Behavior

#### Introduction

This unit explores the biological basis of reproductive and sexual behavior, along with the biological determinants of sex and gender. Sexual imagery bombards us constantly via radio, television, magazines, movies, advertisements, and the Internet. It is therefore only natural that psychologists are extremely interested in the mechanisms that guide and shape our sexual behavior and eating habits.

Some of the most powerful influences on sexual behavior are exerted by hormones (Carlson, 2014). Under the control of the pituitary gland, which is often called the master gland of the endocrine system, hormones are produced in various endocrine glands throughout the body. Among the many things affected by hormones are gender identification, genital development, the onset of puberty, height and weight, and physical arousal. Interestingly, certain hormones can even act as neurotransmitters and vice versa.

While the influence of hormones is undeniably powerful, it is important to realize that hormonal effects on behavior do not occur in a vacuum but can be modulated by experience and environmental factors. It can thus be difficult to separate innate sexual behaviors from those that are learned. This is particularly true of the human species, which is among the few species that engage in sexual behavior for pleasure (other higher primates share this proclivity) (Carlson, 2014).

The learned nature of much of our sexual behavior opens the door to moral, social, and cultural influences. In fact, what one society considers aberrant sexual behavior may be considered entirely appropriate in another. As you progress through this unit, carefully consider which sexual behaviors are learned, which ones are controlled by hormones or genetics, and which ones fall somewhere in between.

Reference

Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson.

## Learning Activities

### u05s1 - Studies

## Readings

Read the following:

- Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson. ISBN: 9780205940240.
  - Chapter 9, "Reproductive Behavior," pages 217–243, in your course text.
- Moreno, J. A., Arango Lasprilla, J. C., Gan, C., & McKerral, M. (2013). Sexuality after traumatic brain injury: A critical review. *NeuroRehabilitation*, 32(1), 69–85.
- Kelly, G., & Simpson, G. (2011). Remediating serious inappropriate sexual behavior in a male with severe acquired brain injury. *Sexuality & Disability*, 29(4), 313–327.
- Sinclair, D., Purves-Tyson, T. D., Allen, K. M., & Weickert, C. S. (2014). Impacts of stress and sex hormones on dopamine neurotransmission in the adolescent brain. *Psychopharmacology*, 231(8), 1581–1599.

### u05d1 - Biological Basis of Parental Behavior

Locate and read a recent, full-text article from the Capella library about the biological basis of parental behavior. Compare and contrast the neural structures and chemicals involved with maternal behavior with those involved with paternal behavior. How might these neural underpinnings relate to how men and women are socialized to care for their children? Reference your source in standard APA format.

## Response Guidelines

Respond to at least two other learners. Your response is expected to be substantive in nature and to reference the assigned readings, as well as other theoretical, empirical, or professional literature to support your views and writings. Reference your sources using standard APA guidelines.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

### u05d2 - Biology of Sexual Orientation

Most researchers in the area of human sexuality believe that human sexual orientation is largely biologically determined and not a matter of choice. Describe the biological (anatomical, physiological, genetic, chemical) correlates of sexual orientation. Apply this information to how the general public could be educated about the role of biology in education about sexual orientation. Make sure to support your ideas using the textbook and at least one other recent scholarly source. Reference your sources in standard APA format.

## Response Guidelines

Respond to at least two other learners. Your response is expected to be substantive in nature and to reference the assigned readings, as well as other theoretical, empirical, or professional literature to support your views and writings. Reference your sources using standard APA guidelines.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

## Unit 6 >> Ingestive Behavior

### Introduction

This unit discusses the biological basis of hunger and thirst. The central concept for this unit is the idea of homeostasis (Carlson, 2014). Homeostasis is a process that allows the body to maintain itself at an optimal level. Homeostasis means that for each bodily process (system variable), there is an optimal value (set point) that is monitored by a detector. Should the detector notice that the system variable has gone too far astray from its set point, a correction must be made to restore homeostasis. This simple process should govern our ingestive behavior (eating and drinking). The individual mechanisms that govern hunger and thirst are different—but the same general process is applied to both drive states.

A purely biological explanation of hunger and thirst, however, does not fully explore the factors that govern ingestive behavior. For example, if weight were simply maintained by an easily regulative homeostatic controller, obesity and eating disorders would be unlikely to exist. Instead, it seems that cultural and cognitive factors can also exert a powerful influence on these behaviors.

### Learning Activities

#### u06s1 - Studies

## Readings

Read the following:

- Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson. ISBN: 9780205940240.
  - Chapter 11, "Ingestive Behavior," pages 266–297, in your course text.
- Weltens, N., Zhao, D., & Oudenhove, L. V. (2014). [Where is the comfort in comfort foods? Mechanisms linking fat signaling, reward, and emotion.](#) *Neurogastroenterology & Motility*, 26(3), 303–315.
- Wollburg, E., Meyer, B., Osen, B., & Löwe, B. (2013). [Psychological change mechanisms in anorexia nervosa treatments: How much do we know?](#) *Journal of Clinical Psychology*, 69(7), 762–773.
- Brambilla, F., Grave, R. D., Amianto, F., & Fassino, S. (2014). [Lack of efficacy of psychological and pharmacological treatments of disorders of eating behavior: Neurobiological background.](#) *BMC Psychiatry*, 14(1), 1–14.
- Keel, P. K., & Forney, K. J. (2013). [Psychosocial risk factors for eating disorders.](#) *International Journal of Eating Disorders*, 46(5), 433–439.
- Rhea, D. J., & Thatcher, W. G. (2013). [Ethnicity, ethnic identity, self-esteem, and at-risk eating disordered behavior differences of urban adolescent females.](#) *Eating Disorders*, 21(3), 223–237.

#### u06a1 - The Drive States

To prepare for this assignment, complete the following:

1. Choose one of the drive states—sleep, reproductive, or ingestive (eating)—that is most relevant to your professional interests or goals.
2. Look for peer-reviewed research articles on the topic. You will need at least three relevant resources to use in this assignment to support your work.

## Requirements

For the drive state you have selected, complete the following:

- Describe the biological mechanisms involved in this drive.
- Explain how the drive state affects behavior.
- Analyze the social and cultural factors that can affect the drive state.
- Analyze the ethical issues faced by researchers studying the drive state.
- Choose a scenario from within your specialization and describe how an individual's problems with a drive state would impact his or her sphere of activity (for example, athlete, mental health client, employee, student, substance abuser client, professional colleague, a consultant's client, et cetera). What evidence-based intervention or coping mechanism would you recommend?

## Additional Requirements

- Include a title page and reference page.

- Number of pages: 4–6.
- At least 3 current scholarly or professional resources.
- APA format.
- Times New Roman font, 12 pt.
- Double-spaced.

**Note:** Your instructor may also use the Writing Feedback Tool to provide feedback on your writing. In the tool, click the linked resources for helpful writing information.

Course Resources

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[Writing Feedback Tool](#)

### **u06d1 - Anorexia Nervosa**

Anorexia nervosa has both environmental and physical causes. Identify and discuss these two causes and what specific factors may be involved in both the physical and environmental roots of anorexia. Next, discuss how these two types of causes can inform ethical treatment of this disorder. Make sure to support your ideas using the course text and at least one other recent scholarly source. Reference your sources in standard APA format.

## **Response Guidelines**

Respond to at least two other learners. Your response is expected to be substantive in nature and to reference the assigned readings, as well as other theoretical, empirical, or professional literature to support your views and writings. Reference your sources using standard APA guidelines.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

## **Unit 7 >> Learning and Memory**

### **Introduction**

Memory, one of the most universal of behavioral processes, is exhibited in some measure by almost all animals. There is even scientific evidence that memory is to some extent possessed and utilized by individual cells. From an evolutionary standpoint, memory is highly adaptive; it helps in finding food, avoiding predators, and caring for offspring. In order to perform these tasks, the nervous system has developed a diverse anatomical and chemical system for information storage and retrieval.

In this unit, we will explore the nature of memory, its biological basis, and the different types of memory that are believed to exist. We will also review case studies involving different types of amnesia in order to learn what happens when something goes wrong in memory processing. These studies indicate that severe memory impairment often leads to confabulation and dementia, thus confirming the essential role of memory in helping us make sense of our perceptions and experiences.

The process by which the nervous system stores and retrieves information is one of the most fascinating topics in science. This unit begins with the neuroanatomy of memory, examining the parts of the brain that underlie an organism's ability to remember. It is here that we will encounter patient "H. M.," the most widely studied neuropsychological subject in history, whose case study has shaped our ideas about memory for the last 40 years (Carlson, 2014). As a treatment for intractable epilepsy, H. M. underwent the removal of large portions of both of his temporal lobes, including the hippocampus, amygdala, and overlying cortex. As a result, he developed profound anterograde amnesia (the inability to form new memories) and moderate retrograde amnesia (the inability to recall previously learned information). It was this kind of observation that first suggested that the brain supports multiple forms of memory associated with different anatomical substrates, leading to the modern distinction between declarative memory (memory of facts and events) and nondeclarative or procedural memory (memory for such tasks as riding a bicycle).

This unit also presents the case study of another famous neuropsychological patient, "R. B.," who became amnesic following coronary bypass surgery (Carlson, 2014). Upon R. B.'s death, postmortem analysis revealed brain damage that appeared to be limited to the hippocampus (so-named because of its resemblance to a seahorse). Because the case of R. B. is uncommonly well documented, it provides a fascinating look at memory and its anatomical

correlates. It is important to note the types of memory that were impaired in R. B.'s case, the neuropsychological tests that were used to evaluate his cognitive impairments, and the pattern of brain damage that was eventually discovered. It is also important to consider the meaning of these findings and their contribution to our overall knowledge of how memory works.

The hippocampus has been found to contain place cells, which are neurons that fire when an animal is in a particular location (Carlson, 2014). Thus, damage to the hippocampal formation has been found to impair the ability of test animals to keep track of their locations, even in familiar environments. More generally, disruption of hippocampal functioning has been found to impair the ability to recognize and retain spatial relationships. It has also been found that the hippocampal formation plays a strong role in memory consolidation (conversion of short-term memories into long-term memories), and that damage to it can interfere with the ability to distinguish between events that have just occurred and events that occurred some time ago. This suggests that while the hippocampus may originally have provided animals with the ability to orient themselves in space, its role has grown more complex, expanding into the realms of learning and temporal (nonspatial) relationships.

Long-term potentiation (LTP), which occurs largely in the hippocampus, facilitates perception and memory of spatial relationships and is crucially implicated in learning (Carlson, 2014). Some of the most important research on learning and memory comes from studies of the correlation between LTP and relational learning in animals. For example, it has been found that raising rats in a complex environment strengthens the synaptic connections between the entorhinal cortex and the dentate gyrus (parts of the hippocampal formation), that spatial learning tasks increase the levels of an enzyme (CaM-KII) involved in hippocampal LTP in test animals, and that a research protocol blocking NMDA (N-methyl-D-aspartate) reception and subsequent LTP in test animals also disrupts their ability to perform the Morris water maze task.

The NMDA receptor, one of four types of receptors for the neurotransmitter glutamate (glutamic acid, the brain's most important excitatory transmitter), functions as part of a glutamate ion channel. The way it does so offers a fascinating glimpse into the molecular mechanics of learning. NMDA is a ligand, a chemical that binds to a larger protein molecule at the binding site of a receptor, and a glutamate agonist, a "gating" substance that facilitates the effects of a particular neurotransmitter on a postsynaptic cell. The NMDA receptor can thus be described as a "ligand-gated ionic channel." This channel appears to be involved in synaptic plasticity and specifically in target recognition, that is, the identification by a neuron of other neuronal sites with which to synapse in the presence of a given kind of stimulus (Carlson, 2014).

As you learn about the memory system, we should consider the problems that can happen when the memory system is damaged. The damage can happen through disease or injury. The results of the injury can result in several types of cognitive dysfunction. Amnesic disorder is when only the memory is affected. Dementia is defined as a memory deficit plus at least one other cognitive deficit. Those deficits can include problems with perceptual organization, disinhibited behavior, emotional instability, language deficits, or other cognitive functions. Dementia can be caused by a variety of things such as stroke, head injury, or diseases like Parkinson's Disease. Dementia of the Alzheimer's type is the most common form of dementia.

#### Reference

Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson.

### Learning Activities

#### u07s1 - Studies

### Readings

Read the following:

- Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson. ISBN: 9780205940240.
  - Chapter 12, "Learning and Memory," pages 298–333, in your course text.
- Szajer, J., & Murphy, C. (2013). Education level predicts retrospective metamemory accuracy in healthy aging and Alzheimer's disease. *Journal of Clinical & Experimental Neuropsychology*, 35(9), 971–982.
- Manckoundia, P., Taroux, M., Kubicki, A., & Mourey, F. (2014). Impact of ambulatory physiotherapy on motor abilities of elderly subjects with Alzheimer's disease. *Geriatrics & Gerontology International*, 14(1), 167–175.
- Kawai, Y., Miura, R., Tsujimoto, M., Sakurai, T., Yamaoka, A., Takeda, A., & . . . Toba, K. (2013). Neuropsychological differentiation between Alzheimer's disease and dementia with Lewy bodies in a memory clinic. *Psychogeriatrics*, 13(3), 157–163.
- Morris, S. E., Rumsey, J. M., & Cuthbert, B. N. (2014). Rethinking mental disorders: The role of learning and brain plasticity. *Restorative Neurology & Neuroscience*, 32(1), 5–23.

### Multimedia

- Click [Language Processing](#) to launch the presentation.

### Optional Audiovisual Media

You may wish to view the following video, which presents a fascinating look at the cognitive abilities required to relearn to ride a bicycle when the steering is reversed:

- SmarterEveryDay (Producer). *The backwards brain bicycle* [Video]. Retrieved from <https://www.youtube.com/watch?v=MFzDaBzBIL0>

## u07d1 - Learning and Memory

You have been asked by a local senior center to conduct a presentation regarding culturally competent responses to Alzheimer's patients (or others diagnosed with a neurological disease associated with dementia) by mental health professionals.

For this discussion, prepare an informational flyer to support this presentation. Include the following:

- Explain how the disease affects the structure and function of the brain.
- Explain how changes in the brain due to the disease affect learning and memory, incorporating recent research findings into your description.
- Summarize the potential for ageism to affect the quality of care that an Alzheimer's patient might receive from a mental health professional.
- Suggest ways for mental health professionals, patients, and family members to collaborate effectively in prioritizing the patient's management of the disease.

Use at least three scholarly references to support your argument. You may opt to make this flyer two pages. Focus on the content rather than the formatting and graphics.

## Response Guidelines

Respond to at least one of your peers, identifying areas where additional information might have been useful to include in the flyer. Point out information or ideas that were particularly effective. Also, include one aspect of their flyer that would be particularly helpful for the intended audience.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

## Unit 8 >> Emotion

### Introduction

Emotions are the positive or negative feelings that we experience in particular situations. They correlate with patterns of physiological response and behavior observed in various species. In this unit, we will explore the patterns of response and behavior that correlate with the feelings we experience. In the course of this exploration, we will outline the physiological and behavioral patterns associated with various emotions, as well as investigate the biopsychological aspects of their subjective recognition and behavioral expression. In this context, we will explore the amazing case study of Phineas Gage (Carlson, 2014), another celebrated neuropsychological patient. Due to a bizarre accident in which a steel rod was explosively driven through his head, he suffered severe trauma to the ventromedial region of his frontal lobes with spectacular impairment of his ability to process emotions and make rational decisions.

An emotional response has three distinct components: behavioral, autonomic, and hormonal (Carlson, 2014). The behavioral component comprises the muscular movements elicited in a given situation, the autonomic component comprises the mechanisms underlying the activation of the sympathetic and parasympathetic nervous systems as a cause or effect of the perception of emotion, and the hormonal component comprises the role of hormones in emotional behavior. Also implicated in emotional behavior are numerous brain structures, particularly within the limbic system. The subjective recognition of emotion draws on a set of structures distributed throughout the human brain, including the occipitotemporal neocortex, the amygdala, the orbitofrontal cortex, and the right frontoparietal cortices. The case of Phineas Gage illustrates the role of the orbitofrontal cortex in the control and regulation of emotional behavior, while recognition of fear and anger appears to rely heavily on the amygdala, a small, almond-shaped structure that reacts to aversive stimuli and mediates the corresponding negative emotions.

The interplay of emotions and biological processes is complex. Not only can emotion affect biological processes, but it can be affected by them as well. This naturally leads to a chicken-or-egg question: Which comes first—the emotion or the physical process to which it correlates? Despite a great deal of research, the fact that standard scientific models lack support for mental causation has rendered this question all but impossible to answer with confidence.

A related and equally difficult question is whether nature or nurture (biology or the environment) exerts a greater influence on the development of emotional behaviors. The reasonable answer to this question is that both nature and nurture play their parts. In this unit, we examine several theories that

have been posited to explain emotions. Pay close attention to their respective merits and shortcomings in order to decide for yourself which of them (if any) provides the best explanation.

Reference

Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson.

## Learning Activities

### u08s1 - Studies

## Readings

Read the following:

- Carlson, N. R. (2014). *Foundations of Behavioral Neuroscience* (9th ed.). Boston, MA: Pearson. ISBN: 9780205940240.
  - Chapter 10, "Emotion," pages 244–265, in your course text.
- Farb, N. A. S., Anderson, A. K., & Segal, Z. V. (2012). The mindful brain and emotion regulation in mood disorders. *Canadian Journal of Psychiatry*, 57(2), 70–77.
- Ty, M., & Francis, A. J. P. (2013). Insecure attachment and disordered eating in women: The mediating processes of social comparison and emotion dysregulation. *Eating Disorders*, 21(2), 154–174.
- de Sousa, A., McDonald, S., & Rushby, J. (2012). Changes in emotional empathy, affective responsivity, and behavior following severe traumatic brain injury. *Journal of Clinical & Experimental Neuropsychology*, 34(6), 606–623.
- Alway, Y., McKay, A., Ponsford, J., & Schönberger, M. (2012). Expressed emotion and its relationship to anxiety and depression after traumatic brain injury. *Neuropsychological Rehabilitation*, 22(3), 374–390.

### u08d1 - Traumatic Brain Injury and Emotion

For this discussion, write 500–1000 words in which you consider traumatic brain injury localized to the pre-frontal cortex. **Note:** The response for this discussion is considerably more extensive than a typical discussion response. Plan your time accordingly.

- Analyze the relationship between emotion and behavior. In other words, how does human emotion drive behavior? Does behavior affect emotion?
- Recommend 3–4 evidence-based interventions and coping mechanisms for victims and their families who are trying to deal with the aftermath of a traumatic brain injury.
- Support your analysis and recommendations with at least three scholarly references. Cite your sources using standard APA guidelines.

## Response Guidelines

Respond to at least two of your peers. What variables might play a role in the effectiveness of the recommended interventions and coping mechanisms? Examples might include age, gender, and health care access disparities across cultures or socioeconomic classes. Choose one of these factors and explore it in depth, suggesting ways to implement your peers' recommended interventions in effective and culturally competent ways. Cite at least two references in your response. Cite your sources using standard APA guidelines. Your response should be between 300 and 700 words.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

## Unit 9 >> Schizophrenia, Affective Disorders, and Anxiety Disorders

### Introduction

Many factors can cause the brain to malfunction, including trauma, drugs, toxins, hypoxia, stress, and genetic abnormalities. In previous units, we have seen some examples of what can happen when the brain malfunctions, including learning disorders, communication disorders, drug addiction, and more. In this unit, we will look at other possible problems that can arise from brain dysfunction, including mood disorders, schizophrenia, and anxiety disorders. We will focus on the possible causes of mental illness, the associated structural, physiological, and biochemical abnormalities, and possible corrective or ameliorative treatments. Perhaps, no human ailments are more personally devastating than those involving malfunctions of the brain. Our brains are the repositories of our thoughts, ideas, beliefs, emotions, hopes, dreams, and identities.

Because the brain holds the sum of what makes us uniquely human, brain disorders can rob us of our humanity. As we have seen throughout this course, damage to the brain can produce highly variable results, depending on the location and magnitude of the injury. Disturbances can run the gamut from simple motor ticks to language impairments, cognitive deficits, personality changes, and complete physical and mental incapacitation.

Unfortunately, although a great deal of work has been done on recovery from brain injury, there is yet much progress to be made. Even so, as it now stands, the prognosis remains poor for certain disorders. To understand why this is so, pay close attention to the potential mechanisms of recovery from brain injury and develop a firm understanding of the factors that influence the speed and extent of rehabilitation.

The phrases mental illness and mental disease describe another kind of brain disorder that can be as devastating as those due to functional deficits. Whereas a specific brain injury can often be pinpointed as the cause of neuropsychological impairment, the causes of mental illness tend to be multifactorial and far more difficult to identify (Carlson, 2014). In cases involving heritable disorders, it is often possible to establish a genetic link that clarifies the etiology, or causation. Even then, environmental and other factors such as injury or communicable disease may contribute. Initial causation aside, chemical imbalances in the brain appear to play a part in most forms of mental illness.

Schizophrenia, one of the most devastating of all mental illnesses, takes many forms and can occur with various degrees of severity. Schizophrenia consists of positive symptoms, the presence of unusual behavior, and negative symptoms, the absence of normal behavior (Carlson, 2014). Because it has a heritable, or genetic, component, we know that it has a biological basis, and it is believed that many of its most debilitating symptoms result from faulty neurotransmission.

However, because not all individuals with a genetic predisposition for schizophrenia actually develop the disease, we know that environmental factors contribute to its emergence. The prevalent etiological theory of schizophrenia, called the dopamine hypothesis (Carlson, 2014), posits that its positive symptoms are caused by excessive dopamine neurotransmission. Evaluate this hypothesis in the course of your readings, paying close attention to its evolution over the years. Consider its implications for treatment, particularly in light of the newer atypical neuroleptic drugs now being used to treat schizophrenia.

There are two principal types of major affective (mood) disorders, bipolar and unipolar (Carlson, 2014). Bipolar disorder is characterized by cyclical episodes of mania and depression, while unipolar disorder involves depression alone. Although bipolar disorder is far from rare, unipolar disorder (chronic depression) is much more common, affecting millions of people and constituting one of the most prevalent forms of mental illness. Research shows that both of these disorders are associated with distinctive brain anomalies, have heritable components, and respond to pharmacological intervention as well as psychotherapy. Because patients suffering from mood disorders have been found to respond positively to sleep deprivation, disruption of REM sleep, and exposure to sunlight, it is clear that these disorders are somehow linked to biological rhythms.

There are four major anxiety disorders that you will learn about in this unit: panic disorder, generalized anxiety disorder, obsessive-compulsive disorder and social anxiety disorder. The commonality among these four disorders is that they are characterized by unrealistic, unfounded fear and anxiety. Nearly a quarter of people will experience an anxiety disorder at some point in their lives, making these the most common psychiatric illnesses.

#### Reference

Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson.

### Learning Activities

#### u09s1 - Studies

## Readings

Read the following:

- Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson. ISBN: 9780205940240.
  - Chapter 15, "Schizophrenia, Affective Disorders, and Anxiety Disorders," pages 389–415, in your course text.
- Lammel, S., Tye, K. M., & Warden, M. R. (2014). Progress in understanding mood disorders: Optogenetic dissection of neural circuits. *Genes, Brain & Behavior*, 13(1), 38–51.
- Yu, Y., Shen, H., Zeng, L., Ma, Q., & Hu, D. (2013). Convergent and divergent functional connectivity patterns in schizophrenia and depression. *PLOS ONE*, 8(7), 1–11.
- Grupe, D. W., & Nitschke, J. B. (2013). Uncertainty and anticipation in anxiety: An integrated neurobiological and psychological perspective. *Nature Reviews Neuroscience*, 14(7), 488–501.

- Russo, S. J., & Nestler, E. J. (2013). [The brain reward circuitry in mood disorders](#). *Nature Reviews Neuroscience*, 14(9), 609–625.

### u09d1 - Schizophrenia

For this discussion:

- Locate and read a recent, full-text article from the Capella library that examines how schizophrenia relates to genetics or brain chemistry.
- Contrast the positive and negative symptoms of schizophrenia and explain why it is thought these different symptoms might have a different physiological foundation.
- Discuss any cultural aspects involved in working with and providing treatment to a client with schizophrenia.
- Cite your source using standard APA guidelines.

### Response Guidelines

Respond to at least one other learner. Your response is expected to be substantive in nature and to reference the assigned readings, as well as other theoretical, empirical, or professional literature to support your views and writings. Reference your sources using standard APA guidelines.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

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[Finding Articles for Your Discussion Post](#)

### u09d2 - Panic Disorders

For this discussion:

- Locate and read a recent, full-text article from the Capella library that explores the biological foundation of panic.
- Summarize the article briefly, discussing the symptoms of panic disorder.
- Answer what are the biological correlates of panic.
- Cite your source using standard APA guidelines.

### Response Guidelines

Respond to at least one other learner. Your response is expected to be substantive in nature and to reference the assigned readings, as well as other theoretical, empirical, or professional literature to support your views and writings. Cite your sources using APA formatting.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

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[Finding Articles for Your Discussion Post](#)

## Unit 10 >> Autistic, Attention Deficit, Stress, and Substance Abuse Disorders

### Introduction

We complete our discussion of mental illness with a look at developmental disorders (such as autism and ADHD), stress-related disorders, and substance abuse.

Autism is marked by significant social and linguistic delays and the presence of repetitive, stereotyped behavior. Usually diagnosed in early childhood (by age 4), autism is classified in the *DSM-5* as a pervasive developmental delay (Carlson, 2014). The diagnosis of autism has dramatically increased in the past two decades.

Another prominent psychiatric diagnosis often made in childhood is attention deficit (hyperactivity) disorder (ADD/ADHD). Children with ADHD have a hard time concentrating, avoiding distractions, sitting still, and completing a task. Although most children will, at some point, exhibit characteristics of ADHD, in the disorder the behaviors are pervasive, chronic, and interfere with a child's ability to learn.

Stress disorders describe the physiological and psychological consequences of stress. Stress is a general term that can refer to the body's stress response (activation of the hypothalamus-pituitary-adrenal axis or sympathetic nervous system) or a stressor (stressful situation) (Carlson, 2014). The evolutionary history and function of the stress response was to mobilize bodily resources to allow escape from a dangerous situation. Essentially, the stress response was meant to be a short-term solution to a short-term problem. Stress-related disorders happen when this short-term fix because activated chronically in response to a long-term problem.

Substance abuse and addiction occurs when the reinforcing effects of a drug are so powerful for some subjects who are exposed to them that these subjects are unable to resist returning to the drug. Addictive behavior brings steadily diminishing returns, for after repeated administrations of a drug, more of it is needed to achieve the same effect as before (Carlson, 2014). This phenomenon is known as tolerance (that is, tolerance of the body to a drug).

When administration of a drug is stopped for any length of time, withdrawal ensues. Despite the fact that withdrawal can be extremely unpleasant, avoiding it is not the primary reason for addiction. Addiction is mainly due to the powerful reinforcing effects of the drug relative to a given subject.

Interestingly, most people who are exposed to potent addictive drugs do not become drug addicts. Research supports the theory that the likelihood of addiction, particularly to alcohol or nicotine, is strongly affected by heredity. For example, animal studies have shown that it is possible to breed animals that do or do not prefer alcohol. Because the level of dopamine release is lower in alcohol-preferring rats, it has been tentatively inferred that alcoholism, or alcohol addiction, may be related to dopamine neurotransmission, and specifically to the presence of the A1 allele of the D2 dopamine-receptor gene.

#### Reference

Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson.

## Learning Activities

### u10s1 - Studies

## Readings

Read the following:

- Carlson, N. R. (2014). *Foundations of behavioral neuroscience* (9th ed.). Boston, MA: Pearson. ISBN: 9780205940240.
  - Chapter 16, "Autistic, Attention-Deficit, Stress, and Substance Abuse Disorders," pages 416–444, in your course text.
- Chiao, J. Y., & Blizinsky, K. D. (2013). Population disparities in mental health: Insights from cultural neuroscience. *American Journal of Public Health, 103*(S1), S122–S132.

### u10a1 - Psychological Disorders

Think about the psychological disorders you are most likely to work with professionally. Which is the most significant in the work you do or would like to do? Research this disorder and locate at least three peer-reviewed articles to support your work in this assignment.

## Requirements

For the psychological disorder you selected, complete the following:

- Explain how the disorder influences behavior.
- Describe how structural, anatomical, physiological, and cultural factors affect behavior associated with the disorder.

- Explain how culture and lived experience influence psychology professionals' understanding of the disorder.
- Analyze current treatments for the disorder in terms of both efficacy and ethics.

## Additional Requirements

- Include a title page and reference page.
- Number of pages: 5–7
- At least 3 current scholarly or professional resources.
- APA format.
- Times New Roman font, 12 point.
- Double-spaced.

**Note:** Your instructor may also use the Writing Feedback Tool to provide feedback on your writing. In the tool, click the linked resources for helpful writing information.

Course Resources

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[Writing Feedback Tool](#)

### u10d1 - Drug Reactivity

For this discussion:

- Locate and read a recent, full-text article from the Capella Library on a drug (for example, heroin or Prozac), its behavioral correlates, and its place in the pharmacopoeia.
- Summarize the major effects of the drug based on your literature review and the text readings.
  - Link these effects to the various receptors that have been identified in brain.
  - Distinguish between physical and psychological addiction.
- Cite your source using standard APA guidelines.

## Response Guidelines

Respond to at least one other learner. Your response is expected to be substantive in nature and to reference the assigned readings, as well as other theoretical, empirical, or professional literature to support your views and writings. Reference your sources using standard APA guidelines.

Course Resources

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Psychology Attributes and Evaluation of Discussion Contributions

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[Finding Articles for Your Discussion Post](#)

### u10d2 - Autism and Vaccinations

Despite the lack of evidence supporting a causal link, many parents still are afraid that vaccinations will cause their children to develop autism.

- Briefly discuss the biological evidence presented in this unit about autism. You may also want to consider what methodological concerns would be helpful in determining a causal link between vaccines and deleterious health outcomes.
- Frame your response in a way to demonstrate to parents that the causes of autism are not related to vaccinations. Make sure to support your ideas using the textbook and at least one other recent scholarly source.
- Reference your sources in standard APA format.