

# Psychological & Brain Sciences

Contact: Shelley Kohlman  
 Phone: 314-935-5169  
 Email: skohlman@wustl.edu  
 Website: <https://psych.wustl.edu/undergraduate-program>

## Majors

### The Major in Psychological & Brain Sciences

The field of psychology encompasses a large and diverse area of study that is empirical, theoretical, and practical. As the science concerned with the study of behavior, psychology includes such areas as the biological bases of behavior; brain-behavior interactions; learning; memory; cognition; motivation; emotion; sensation and perception; the study of social interactions, persuasion and attitudes; aging and development; personality; clinical, psychopathology and health psychology; and leisure and work experiences. Psychology is a valuable multipurpose discipline in which to major. It has relevance for those considering careers in law, medicine, the health professions, education, and business. In addition, it provides important skills and knowledge for those who may not be planning additional schooling.

**Total units required:** 34 units, of which at least 25 must be at the 300 level or above

**Required courses:**

- Psych 100B Introduction to Psychology is a prerequisite for all upper-level courses (300 level and above). Exemption from Psych 100B Introduction to Psychology is possible in the following circumstances:
  - Completion of an equivalent course transferred from another institution, if approved by the director of undergraduate studies.
  - An Advanced Placement (AP) psychology test score of 5, an International Baccalaureate (IB) score of 6 or 7, or a British A-Level grade of A. (**Note:** The AP, IB, or British A-Level earns an exemption from Psych 100B Introduction to Psychology but no units of credit toward the major.)
- Psych 300 Introduction to Psychological Statistics
  - Math 2200, Math 3200, or DAT 120 may substitute for Psych 300 Introduction to Psychological Statistics but earn no units of credit toward the major. No AP math course can substitute for Psych 300 Introduction to Psychological Statistics.
- Psych 301 Experimental Psychology or Psych 3011 Experimental Psychology

**Core requirements:** At least one course from each of the following five categories:\*

*Social/Personality:*

Code	Title	Units
Psych 305	Health Psychology	3
Psych 315	Introduction to Social Psychology	3
Psych 353	Psychology of Personality	3
Psych 367	Positive Psychology: The Science of Happiness	3
Psych 395	Prejudice, Stereotyping, & Discrimination	3
Psych 396	Psychological Dynamics of Empathy	3
Psych 4099	Human Evolutionary Psychology	3

*Mental Health/Affective:*

Code	Title	Units
Psych 3195	Abnormal Child Psychology	3
Psych 354	Psychopathology and Mental Health	3
Psych 3501	Psychotherapy: Introduction to Practice and Research	3
Psych 3645	Understanding Emotions	3
Psych 367	Positive Psychology: The Science of Happiness	3
Psych 4765	Inside the Disordered Brain: Biological Bases of the Major Mental Disorders	3

*Biological/Neurological Bases of Behavior:*

Code	Title	Units
Psych 330	Sensation and Perception	3
Psych 3401	Biological Psychology	3
Psych 345	Genes, Environment, and Human Behavior	3
Psych 3604	Cognitive Neuroscience	3
Psych 4046	Developmental Neuropsychology (Writing Intensive)	3
Psych 4182	Perception, Thought and Action	3
Psych 4765	Inside the Disordered Brain: Biological Bases of the Major Mental Disorders	3

*Behavior and Cognition:*

Code	Title	Units
Psych 360	Cognitive Psychology	3
Psych 361	Psychology of Learning	3
Psych 358	Language Acquisition	3
Psych 380	Human Learning and Memory	3
Psych 4099	Human Evolutionary Psychology	3
Psych 433	Psychology of Language	3

*Lifespan Development:*

Code	Title	Units
Psych 219	The Infant Mind: Sophomore Seminar	3
Psych 321	Developmental Psychology	3
Psych 325	Psychology of Adolescence	3
Psych 326	Introduction to the Psychology of Aging	3
Psych 358	Language Acquisition	3
Psych 4046	Developmental Neuropsychology (Writing Intensive)	3
Psych 427	Social Gerontology	3

\* If a course falls into more than one category, it can be used to fulfill only one of those categories (i.e., no double-counting).

**Elective courses:** An additional 9 units of Psychology & Brain Sciences (P&BS) course work

**6-Units Rule:** No more than 6 units from the following course types may be used to satisfy the minimum requirements for the P&BS major:

- 100-/200-level courses (other than Psych 100B Introduction to Psychology)
- Psych 333 Independent Study in Psychological & Brain Sciences
- Psych 444C Independent Study for a Concentration in Psychological and Brain Sciences
- Psych 498 Study for Honors and Psych 499 Study for Honors
- Approved School of Continuing & Professional Studies psychology classes
- Approved psychology study abroad courses from a non-psychology study abroad program
- Cross-listed courses not home-based in P&BS
- Approved transfer credits (students transferring from another college should refer to the Transfer Credit section below)

## The Major in Psychological & Brain Sciences: Cognitive Neuroscience

How does the brain think? Cognitive neuroscience refers to the scientific study of the linkage between mental functions and the operation of the brain and nervous system. The goal of cognitive neuroscience is to provide an understanding of psychological processes such as attention, memory, thinking, and emotion in terms of physical principles and biological components. At the same time, cognitive neuroscience aims to provide an understanding of the psychological constraints on how the brain functions, computes, and generates behavior. Students who pursue the undergraduate major in cognitive neuroscience will gain a strong foundation in how to study the brain and mind at various levels of analysis, including cellular biology, brain systems, cognitive and affective function, and neural computation. In addition, they will gain an appreciation of the relation

between healthy cognitive and brain function and its breakdown in various disease states and disorders. The cognitive neuroscience major provides excellent preparation for a career in health and medical professions, scientific research, computer fields, education, and law.

**Total units required:** 36-37 units/12 courses (plus prerequisites)

**Prerequisites outside of Psychological & Brain Sciences (7 units):**

Code	Title	Units
Math 132	Calculus II	3
Biol 2960	Principles of Biology I	4
<b>Total Units</b>		<b>7</b>

**Note:** Each of these prerequisites has its own prerequisites: Math 132 Calculus II requires Math 131; for Biol 2960 Principles of Biology I, taking Chem 111A and Chem 112A (concurrently) is strongly recommended. These courses are biology and pre-med prerequisites as well, and they are typically completed during a student's first year. They may alternatively be satisfied through AP credit or any other mechanism approved by the respective department or the College. These prerequisites do not earn credit toward the P&BS:CN major.

**Core requirements(19 units):**

Code	Title	Units
Psych 100B	Introduction to Psychology	3
Psych 300	Introduction to Psychological Statistics	3
Psych 301	Experimental Psychology	4
or Psych 3011	Experimental Psychology	
Psych 3401	Biological Psychology	3
or Psych 344	Principles of the Nervous System	
Psych 360	Cognitive Psychology	3
Psych 3604	Cognitive Neuroscience	3
<b>Total Units</b>		<b>19</b>

**Note:** The first three requirements (i.e., Psych 100B Introduction to Psychology, Psych 300 Introduction to Psychological Statistics, and Psych 301 Experimental Psychology/Psych 3011 Experimental Psychology) are the same as those for the regular P&BS major. Psych 344 Principles of the Nervous System is home-based in Biology; students should register under the cross-listed Psych L33 course designation, not Biol 3411 Principles of the Nervous System.

Exemption from Psych 100B Introduction to Psychology is possible in the following circumstances:

- Completion of an equivalent course transferred from another institution, if approved by the director of undergraduate studies.
- An AP psychology test score of 5, an IB score of 6 or 7, or a British A-Level grade of A. (**Note:** The AP, IB, or British A-Level earns an exemption from Psych 100B Introduction to Psychology but no units of credit toward the major.)

Math 2200, Math 3200, or DAT 120 may substitute for Psych 300 Introduction to Psychological Statistics but earn no units of credit toward the major. No AP math course can substitute for Psych 300 Introduction to Psychological Statistics.

**Additional Biological & Cognitive Distributions (two courses — one each from Distribution A and B lists):**

*Distribution A eligible courses:\**

Code	Title	Units
Psych 321	Developmental Psychology	3
Psych 330	Sensation and Perception	3
Psych 358	Language Acquisition	3
Psych 361	Psychology of Learning	3
Psych 380	Human Learning and Memory	3
Psych 4099	Human Evolutionary Psychology	3
Psych 4182	Perception, Thought and Action	3
Psych 433	Psychology of Language	3

*Distribution B eligible courses:*

Code	Title	Units
Psych 345	Genes, Environment, and Human Behavior	3
Biol 3058	Physiological Control Systems	2
Biol 3151	Endocrinology	3
Biol 328	Principles in Human Physiology	4
Biol 3421	Introduction to Neuroethology	3
Biol 3422	Genes, Brains and Behavior	3
Biol 363	The Neuroscience of Movement: You Think, So You Can Dance?	3
Physics 350	Physics of the Brain	3

**Computation requirement (one course):\***

Code	Title	Units
CSE 131	Introduction to Computer Science	3
Psych 4175	Applied Statistical Analysis with R	3
Psych 4631	Introduction to Computational Cognitive Science	3
Psych 5007	Statistics and Data Analysis in MATLAB	2

With prior approval, another course involving a significant computational/programming component may be substituted.

**Capstone/Depth requirement (three courses):\***

*Capstone/Depth eligible courses:*

Code	Title	Units
Psych 4046	Developmental Neuropsychology (Writing Intensive)	3
Psych 4048	Neuropsychology of Dementia	3
Psych 4175	Applied Statistical Analysis with R	3
Psych 4182	Perception, Thought and Action	3
Psych 4413	Advanced Cognitive Neuroscience (Writing Intensive) (or Psych 4412 Advanced Cognitive Neuroscience)	3
Psych 4450	Functional Neuroimaging Methods	3
Psych 4512	Neurobiology of Learning & Memory	3

Psych 4631	Introduction to Computational Cognitive Science	3
Psych 4746	Biological Pathways to Psychopathology: From Genes and the Environment to Brain and Behavior	3
Psych 4765	Inside the Disordered Brain: Biological Bases of the Major Mental Disorders	3
Psych 488	The Cognitive Neuroscience of Film	3
Biol 404	Laboratory of Neurophysiology	4
Biol 4030	Biological Clocks	3
Biol 4580	Principles of Human Anatomy and Development	3
Biol 4582	The Physiology and Biophysics of Consciousness (by approval)	2
Phil 4212	Philosophy of Neuroscience	3

*Additional Capstone/Depth eligible courses:* With prior approval, FYP 3001 Ampersand: Research in Mind, Brain, Behavior (two consecutive semesters must be completed) or Psych 333 (all 3 units must be completed in one semester and in one lab to be considered for approval) can satisfy up to 3 units of the Capstone/Depth requirement.

The Honors Program in Psychology (Psych 498/Psych 499; 3 units total) and Psych 444B (3 units) can satisfy up to 6 units of the Capstone/Depth requirement.

In total, no more than 6 units of the above may be applied to the Capstone/Depth requirement.

\* If a course falls into more than one category, it can be used to fulfill only one of those categories (i.e., no double-counting).

## Acceptance into the Psychological & Brain Sciences: Cognitive Neuroscience Major

Acceptance into the major is contingent upon an application and then approval by the major committee. As part of this application, the student will meet with an appropriate advisor who will carefully review the requirements and oversee the student's progress. A brief, one-page statement from the student about why they feel the cognitive neuroscience major is appropriate for them will be requested as part of the application.

Washington University students will be considered for admission to the cognitive neuroscience major no sooner than during their third semester (sophomore year). Decisions are based on the student's statement and academic record as well as the interview with the major advisor.

## Additional Information

**Transfer Credit:** If accepted by the College of Arts & Sciences, transfer credits will be evaluated by the director of undergraduate studies in the P&BS department for their applicability toward either major in P&BS.

## Senior Honors Program in Psychological & Brain Sciences

**Senior Honors:** The primary goal of the honors program in P&BS is to provide students who have achieved a superior academic record with the opportunity to conduct a comprehensive empirical investigation under the direction of a faculty member.

To be admitted into the honors program, students must meet the following requirements:

- Have overall and P&BS grade point averages of at least 3.65
- Complete both Psych 300 and Psych 301(or Psych 3011)
- Have an approved honors research advisor

## Concentrations in Psychological & Brain Sciences

To augment either of the P&BS majors, the department offers concentrations for students who wish to engage more intensively with a specific area within the discipline. A concentration is meant as an enrichment of the major, and students can pursue one of our six concentrations in psychology.

A concentration requires 12 units, which include required and elective courses (one of which must be at the 400 level) and an approved research assistantship (Psych 444C Independent Study for a Concentration in Psychological and Brain Sciences) or an approved internship, practicum, or honors thesis.

A concentration will be a valuable experience for students planning on graduate study in psychology or related fields or for those who have a particular interest or want to gain expertise in one of the approved concentrations. Each concentration will have a member of the faculty as the contact person who will meet with and advise students in the concentration.

Courses taken for a concentration may be used to fulfill no more than one of the core categories or distribution requirements of a P&BS major. No more than 3 units of course work taken for a concentration may be applied to the P&BS major. None of the units for a concentration can be counted for any other major or minor (i.e., there is no double-counting). For students pursuing the cognitive neuroscience major, the cognitive neuroscience concentration is not an option.

### The Six Concentrations

#### Cognition in Children

This concentration allows students to acquire deeper knowledge of cognitive and social-cognitive processes that occur during infancy and early childhood. The courses for this concentration consider child development more generally and then explore in more depth the development of cognitive, conceptual, linguistic, and social abilities.

*Advisor/coordinator:* Professor Lori Markson

*Course work required:*

Code	Title	Units
Psych 321	Developmental Psychology	3

*Electives* (must include two courses, at least one of which is at the 400 level):

Code	Title	Units
Psych 219	The Infant Mind: Sophomore Seminar	3
Psych 358	Language Acquisition	3
Psych 4046	Developmental Neuropsychology (Writing Intensive)	3
Psych 4099	Human Evolutionary Psychology	3
Psych 4591	The Development of Social Cognition	3
or Psych 4592	Development of Social Cognition (Writing Intensive)	

*Research mentorship:* Prior approved research mentorship with a relevant faculty member and successful completion of a research paper (i.e., Psych 444C Independent Study for a Concentration in Psychological and Brain Sciences or Psych 498 Study for Honors/Psych 499 Study for Honors)

*Relevant faculty:* Lori Markson and Rebecca Treiman (other potential faculty mentors may be approved)

#### Cognitive Neuroscience

This concentration allows students to acquire deeper knowledge of the relation between mind and brain. The courses for the concentration consider the neurobiological basis of psychological function at a more general level and then explore, in greater depth, specialized topics related to how higher cognitive processes (e.g., memory, attention, perception, emotion) emerge from brain function.

*Advisor/coordinator:* Professor Todd Braver

*Course work required:*

Code	Title	Units
Psych 3604	Cognitive Neuroscience	3

*Electives* (must include two courses, at least one of which is at the 400 level):

Code	Title	Units
Psych 330	Sensation and Perception	3
Psych 3401	Biological Psychology	3
Psych 345	Genes, Environment, and Human Behavior	3
Psych 4046	Developmental Neuropsychology (Writing Intensive)	3
Psych 4048	Neuropsychology of Dementia (Neuropsychology of Dementia)	3
Psych 4182	Perception, Thought and Action	3
Psych 4413	Advanced Cognitive Neuroscience (Writing Intensive) (or Psych 4412 Advanced Cognitive Neuroscience)	3
Psych 4450	Functional Neuroimaging Methods	3

Psych 4746	Biological Pathways to Psychopathology: From Genes and the Environment to Brain and Behavior (Biological Pathways to Psychopathology)	3
Psych 4765	Inside the Disordered Brain: Biological Bases of the Major Mental Disorders (Inside the Disordered Brain)	3
Psych 488	The Cognitive Neuroscience of Film	3

*Research mentorship:* Prior approved research mentorship with a relevant faculty member and successful completion of a research paper (i.e., Psych 444C Independent Study for a Concentration in Psychological and Brain Sciences or Psych 498 Study for Honors/Psych 499 Study for Honors)

*Relevant faculty:* Deanna Barch, Ryan Bogdan, Todd Braver, Ian Dobbins, Denise Head, Wouter Kool, Kathleen McDermott, Zachariah Reagh, and Jeff Zacks (other potential faculty mentors may be approved)

## Reading, Language and Language Acquisition

This concentration provides students with a deep and broad knowledge of linguistic development. The courses take an in-depth look at the development of written and spoken language.

*Advisor/coordinator:* Professor Rebecca Treiman

*Course work required:*

Code	Title	Units
Ling 170D	Introduction to Linguistics	3

*Electives* (must include two courses, at least one of which is at the 400 level):

Code	Title	Units
Psych 234	Introduction to Speech, Language, and Hearing Sciences	3
Psych 358 or Psych 358W	Language Acquisition	3
Psych 433	Psychology of Language	3
Psych 4351 or Psych 4352	Reading and Reading Development (Writing Intensive)	3

*Research mentorship:* Prior approved research mentorship with a relevant faculty member and successful completion of a research paper (i.e., Psych 444C Independent Study for a Concentration in Psychological and Brain Sciences or Psych 498 Study for Honors/Psych 499 Study for Honors)

*Relevant faculty:* Rebecca Treiman, Lori Markson, Mitchell Sommers, and Kristin Van Engen (other potential faculty mentors may be approved)

## Lifespan Development

Many introductory courses in developmental psychology focus on the changes that occur from birth to adolescence. The concentration in lifespan development provides students with an understanding of the cognitive and physiological changes that occur over the lifespan, with a primary focus on older adulthood. A major goal of the concentration is to provide students with an understanding of the similarities and differences in development at different stages of the lifespan.

*Advisor/coordinator:* Professor Mitchell Sommers

*Course work required:*

Code	Title	Units
Psych 326 & Psych 427	Introduction to the Psychology of Aging and Social Gerontology	6

*Electives* (must include one of the following courses):

Code	Title	Units
Psych 321	Developmental Psychology	3
Psych 4048	Neuropsychology of Dementia (Neuropsychology of Dementia)	3
Psych 4301	Contemporary Topics in Cognitive Development	3

*Research mentorship or internship experience:* Students can complete this aspect of the concentration with either a prior approved research mentorship or an approved internship related to older adults (i.e., Psych 225 Internship in Psychology, Psych 444C Independent Study for a Concentration in Psychological and Brain Sciences, or Psych 498 Study for Honors/Psych 499 Study for Honors). Successful completion of a paper is required in all cases.

*Relevant faculty for research mentorship:* Mitchell Sommers, Brian Carpenter, Sandra Hale, Denise Head, Lori Markson, and Rebecca Treiman (other potential faculty mentors may be approved)

*Possible internships:* Prior approved internship related to older adults and successful completion of a paper. Options may include work in an assisted-living facility or another community-based program designed to assist older adults. Other internships are available; consult Dr. Denise Head for opportunities.

## Experimental Psychopathology

This concentration allows students to acquire more advanced knowledge of the ways in which psychologists study mental disorders. Current research demonstrates the importance of integrating psychological and biological variables to better understand the classification, etiology, and treatment of a wide variety of mental disorders, including schizophrenia, mood disorders, anxiety disorders, substance use disorders, and eating disorders. Students who pursue this concentration will develop a broad-based appreciation for conceptual and methodological issues that are central to research in psychopathology.

*Advisor/coordinator:* Professor Deanna Barch

*Course work required:*

Code	Title	Units
Psych 354	Psychopathology and Mental Health	3

*Electives* (must include two courses, at least one of which is at the 400 level):

Code	Title	Units
Psych 345	Genes, Environment, and Human Behavior	3
Psych 3501	Psychotherapy: Introduction to Practice and Research	3
Psych 4541	Personality and Psychopathology	3
Psych 4557	Biopsychosocial Aspects of Eating Disorders and Obesity	3
Psych 4746	Biological Pathways to Psychopathology: From Genes and the Environment to Brain and Behavior (Biological Pathways to Psychopathology)	3
Psych 4765	Inside the Disordered Brain: Biological Bases of the Major Mental Disorders (Inside the Disordered Brain)	3

*Research mentorship:* Prior approved research mentorship with a relevant faculty member and successful completion of a research paper (i.e., Psych 444C Independent Study for a Concentration in Psychological and Brain Sciences or Psych 498 Study for Honors/Psych 499 Study for Honors)

*Relevant faculty:* Deanna Barch, Ryan Bogdan, Josh Jackson, Renee Thompson, and Denise Wilfley (other potential faculty mentors may be approved)

## Personality and Individual Differences

This concentration allows students to acquire deeper knowledge of how and why individuals differ from one another and the ways in which individual (e.g., personality) and group (e.g., gender) differences influence behavior, emotion, experience, identity, and psychopathology. The core course for the concentration (Psych 353) considers personality more generally. The seminars explore, in depth, specific aspects of personality and individual differences, including biological bases of individual differences (i.e., genetics), the interpersonal processes associated with personality and personality judgment, individual differences in self and identity, group differences, and personality pathology.

*Advisor/coordinator:* Professor Tammy English

*Course work required:*

Code	Title	Units
Psych 353	Psychology of Personality	3

*Electives* (must include two courses, at least one of which is at the 400 level):

Code	Title	Units
Psych 345	Genes, Environment, and Human Behavior	3
Psych 3645	Understanding Emotions	3
Psych 367	Positive Psychology: The Science of Happiness	3
Psych 413	Contemporary Topics in Social Psychology	3
Psych 4541	Personality and Psychopathology	3
Psych 4555	Emotion Regulation	3
Psych 4557	Biopsychosocial Aspects of Eating Disorders and Obesity	3

*Research mentorship:* Prior approved research mentorship with a relevant faculty member and successful completion of a research paper (i.e., Psych 444C Independent Study for a Concentration in Psychological and Brain Sciences or Psych 498 Study for Honors/Psych 499 Study for Honors)

*Relevant faculty:* Tammy English, Patrick Hill, Josh Jackson, Michael Strube, Jesse Sun, Renee Thompson, and Emily Willroth (other potential faculty mentors may be approved)