NEUROSCIENCE AND BEHAVIOR

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The Department of Psychology (https://psychology.columbia.edu/) offers
students a comprehensive curriculum in psychological science, including
research methods, cognition, neuroscience, developmental, social, and
clinical areas. The curriculum prepares majors for graduate education
in these fields and also provides a relevant background for social work,
education, medicine, law, and business. Psychology course offerings
are designed to meet the varying needs and interests of students, from
those wishing to explore a few topics in psychology or to fulfill the
science requirement, to those interested in majoring in Psychology
(https://psychology.columbia.edu/content/psychology-major/) or in
Neuroscience and Behavior (https://psychology.columbia.edu/content/
neuroscience-behavior-major/).

Program Goals

The department’s program goals (https://psychology.columbia.edu/
content/psychology-program-goals/) start with the development of a
solid knowledge base in psychological science. Consistent with the
value psychology places on empirical evidence, courses at every level of
the curriculum nurture the development of skills in research methods,
quantitative literacy, and critical thinking, and foster respect for the
ethical values that undergird the science of psychology.

Most of these program goals (https://psychology.columbia.edu/
content/psychology-program-goals/) are introduced in PSYC UN1001
The Science of Psychology, the recommended first psychology course
required for all majors that satisfies the prerequisite for most 2000-level
courses. These goals are extended and reinforced in our statistics (1600-
level) and research methods (1400-level) research methods courses,
as well as in the 2000-level lecture courses and 3000- and 4000-level
seminars. Each of the 2000-level lecture courses enables students to
study systematically, and in greater depth, one of the content areas
introduced in PSYC UN1001 The Science of Psychology. These lecture
courses are the principal means by which psychology majors satisfy
the distribution requirements, ensuring not only depth but also breadth
of coverage across three central areas of psychology: (1) perception
and cognition, (2) psychobiology and neuroscience, and (3) social,
personality, and abnormal psychology. To complete the major, students
take one or more advanced seminars and are encouraged to participate in
supervised research courses, where they have the opportunity to explore
research questions in depth and further develop their written and oral
communication skills.

Research Participation

All qualified students are welcome to apply to join a research lab and
contribute to ongoing projects. Students may volunteer to work in a
lab, register for supervised individual research (PSYC UN3950 (https://
psychology.columbia.edu/content/supervised-individual-research/)
Supervised Individual Research), or participate in the department’s
two-year Honors Program (https://psychology.columbia.edu/
content/honors-program/). Information on faculty research (https://
psychology.columbia.edu/content/faculty/) is available on the
departmental website. Students are advised to read about research
laboratories on faculty lab sites (https://psychology.columbia.edu/
content/lab-websites/) and visit the professor’s office hours to discuss
opportunities. At the beginning of the fall term, the department also
hosts a Lab-Preview (https://psychology.columbia.edu/sites/default/
files/content/Lab%20Preview%20Handout%20Fa18%20-%20Final.pdf)
for students to learn about research opportunities (https://
psychology.columbia.edu/content/research-opportunities/) for the
upcoming semester.

Program Planning

Majors and concentrators in psychology and majors in neuroscience
and behavior should begin planning a program of study as early as
possible. All necessary forms and information are available in Program
Planning Tips (https://psychology.columbia.edu/content/program-
planning-tips/). All majors and concentrators in Psychology (https://
psychology.columbia.edu/content/psychology-major/) and majors in
Neuroscience and Behavior (https://psychology.columbia.edu/
content/neuroscience-behavior-major/) should complete a Major
Requirement Checklist (https://psychology.columbia.edu/content/major-
concentration-requirement-checklists/) before consulting a program
adviser to discuss program plans. At minimum, all students must submit
a Major Requirement Checklist (https://psychology.columbia.edu/
content/major-concentration-requirement-checklists/) prior to the start of
their final semester, so that graduation eligibility can be certified.
Advising

The Department of Psychology offers a variety of advising resources to provide prospective and current undergraduate majors and concentrators with the information and support needed to successfully plan their programs. An overview of these resources is provided on the Psychology Undergraduate Advising Resources website (https://psychology.columbia.edu/content/advising/).

Students are encouraged to consult with Peer, Faculty, and Program Advisers as they plan their course of study in Psychology or Neuroscience and Behavior. Faculty and Peer Advisers are important contacts for general advice on class choices, research opportunities, and post-graduation plans. For definitive answers to questions regarding major requirements and other aspects of your degree, including transfer credit, current and prospective majors should consult their Program Adviser (Director of Undergraduate Studies) or the Undergraduate Curriculum Assistant (https://psychology.columbia.edu/content/elizabeth-walters/) in the departmental office. Program Adviser assignments (https://psychology.columbia.edu/content/advisors/) and contact information are provided on the departmental website. For additional information about program, faculty, peer, and pre-clinical advising, please see the Psychology Undergraduate Advising Resources website (https://psychology.columbia.edu/content/advising/).

Email Communication

The department maintains an e-mail distribution list with the UNIs of all declared majors and concentrators. Students are held responsible for information sent to their Columbia e-mail addresses. Students should read these messages from the department regularly and carefully. They are intended to keep students informed about deadlines, requirements, events, and opportunities. Prospective majors or concentrators who would like to be added to the e-mail distribution list should contact the Undergraduate Curriculum Assistant (uca@psych.columbia.edu) in the departmental office.

Guide to Course Numbers

Course numbers reflect the structure of the Psychology curriculum:

- The 1000-level comprises introductions to psychology, introductory research methods courses, and statistics. PSYC UN1001 The Science of Psychology is an introductory course with no prerequisites, which can serve as the prerequisite for most of the 2000-level courses. The 1400s contain the research methods laboratory courses, and the 1600s contain statistics courses; these two course types are designed to prepare students to be able to understand, critique, and conduct the types of research found in many psychology and neuroscience labs.
- The 2000-level comprises lecture courses that are introductions to areas within psychology; most require PSYC UN1001 The Science of Psychology as a prerequisite.
- The 3000-level comprises more advanced and specialized undergraduate courses; most are given in a seminar format and require instructor permission.
- The 3900s are the courses providing research opportunities for undergraduates.
- The 4000-level comprises advanced seminars suitable for both advanced undergraduates and graduate students.

Subcategories within the 2000-, 3000-, and 4000-levels correspond to the three groups in our distribution requirement for undergraduate Psychology majors:

1. Perception and cognition (2200s, 3200s, and 4200s),
2. Psychobiology and neuroscience (2400s, 3400s, and 4400s), and
3. Social, personality, and abnormal psychology (2600s, 3600s, and 4600s).

Note that Barnard psychology courses do not follow the same numbering scheme.

Honors Program

The department offers a two-year Honors Program (https://psychology.columbia.edu/content/honors-program/), designed for a limited number of juniors and seniors interested in conducting original research. Beginning in the first term of junior year and continuing through senior year, students take PSYC UN3910 Honors Seminar and simultaneously participate in an honors research course (PSYC UN3920 Honors Research) under the supervision of a member of the department. Students make a formal presentation and complete an honors essay based on this research toward the end of their senior year.

To qualify for honors, students must take a total of 6 points beyond the number required for their major and satisfy all other requirements for the major. The additional 6 points may include the Honors Seminar and Honors Research courses. Interested students should apply at the end of their sophomore year, and are also required to identify and meet with a potential faculty mentor prior to applying. Instructions and an application form are available on the Honors Program page of the department website. Typically no more than 10% of graduating majors receive departmental honors in a given academic year.

Requirements for Admission to Graduate Programs in Psychology

Most graduate programs in psychology, including those in clinical psychology, require:

An undergraduate course in introductory psychology:
PSYC UN1001 The Science of Psychology

A course in statistics such as one of the following:
PSYC UN1610 Introductory Statistics for Behavioral Scientists
PSYC UN1660 Advanced Statistical Inference
STAT UN1001 Introduction to Statistical Reasoning
STAT UN1101 Introduction to Statistics
STAT UN1201 Calculus-Based Introduction to Statistics

A laboratory course in research methods such as one of the following:
PSYC UN1420 RESEARCH METHODS - HUMAN BEHAVIOR
PSYC UN1450 Experimental Psychology: Social Cognition and Emotion
PSYC UN1455 Experimental Psychology: Social and Personality
PSYC UN1490 RESEARCH METHODS - COGNITION/DECISION MAKING

Students should also take a variety of more advanced undergraduate courses and seminars. Students interested in PhD programs in any area of psychology are very strongly encouraged to participate in a research
lab and enroll in PSYC UN3950 (http://bulletin.columbia.edu/search/?P=PSYC%20UN3950/) Supervised Individual Research. Students are also encouraged to apply for the Psychology Honors Program at the end of their sophomore year.

Students interested in clinical psychology should obtain experience working in a community service program in addition to supervised individual research experience. Students should consult the department's pre-clinical adviser, Prof. E'mett McCaskill (https://psychology.columbia.edu/content/emett-mccaskill/), and attend the department's pre-clinical advising events for more information. Additional resources to help prepare students for graduate study in psychology, and for careers in clinical psychology, are available on the Department of Psychology's website (https://psychology.columbia.edu/).

Online Information
The Department of Psychology website (https://psychology.columbia.edu/) provides access to a wide variety of information for majors and prospective majors. Among other useful resources, students will find syllabi posted for most lecture and lab courses and for many advanced seminars. Students should read the on-line course syllabi prior to registering for psychology courses. For assistance in finding all necessary resources, students should contact the undergraduate curriculum assistant (uca@psych.columbia.edu).

Science Requirement
PSYC UN1001 The Science of Psychology, PSYC UN1010 Mind, Brain and Behavior (no longer offered), and any PSYC course in the 2200- or 2400-level may be used to fulfill the science requirement.

2600-level and some other psychology courses, including PSYC BC1001 Introduction to Psychology and other Barnard psychology courses, may not be used to fulfill the science requirement.

With prior departmental approval, 3- and 4-point courses numbered in the 32xx, 34xx, 42xx, and 44xx, and some additional courses, may partially fulfill the science requirement. For more detailed information regarding psychology courses that may be applied toward the science requirement, see Core Requirements (http://bulletin.columbia.edu/general-studies/undergraduates/degree-fulfillment/core/) in the General Studies bulletin.

Evening and Columbia Summer Courses
The department normally offers at least one lab course (currently PSYC UN1420 RESEARCH METHODS - HUMAN BEHAVIOR and PSYC UN1450 Experimental Psychology: Social Cognition and Emotion) in the late afternoon with evening labs. A number of other courses are occasionally offered in late afternoon and evening hours. No more than one quarter of the courses required for the major are normally available in the evening. Working students may find the wide variety of early morning (8:40 a.m.) classes, as well as Summer Session offerings, helpful in completing degree requirements.

Any course offered by the Psychology Department during the Summer Session is applicable toward the same major requirement(s) as the corresponding course of that same number offered during the academic year. For instance, PSYC S1001D The Science of Psychology meets the same major requirements as does PSYC UN1001 The Science of Psychology.

See Summer Courses (https://gs.columbia.edu/summer-courses/) for policies governing Summer Session courses.

Professors
Niall Bolger
Lila Davachi
Geraldine Downey
William Fifer (Psychiatry, Pediatrics)
Norma Graham
Carl Hart
Tory Higgins
Donald C. Hood
Nikolaus Kriegeskorte
Janet Metcalfe
Kevin Ochsner (Chair)
Shige Oishi (Visiting Professor)
Rae Silver (Barnard)
Daphna Shohamy
Herbert Terrace
Nim Tottenham
Sarah M.N. Woolley

Associate Professors
Valerie Purdie-Greenaway
Randy Auerbach (Psychiatry)

Assistant Professors
Mariam Aly
Christopher Baldassano
Robert Brotherton (Barnard)
Larisa Heiphetz
Micheal Wheaton (Barnard)
Sarah Canetta (Psychiatry)

Lecturers in Discipline
Katherine Fox-Glassman
Patricia Lindemann
Caroline Marvin
Alfredo Spagna

Adjunct Faculty
Tal Ben-Shahar
Jennifer Blaze
Helen Brew
Frances Champagne
James Curley
David Friedman
Karyn Gunnet-Shoval
Nora Isacoff
Tina Kao
Scott Kaufman
Karen Kelly
Svetlana Komissarouk
Victoria Leavitt
E'mett McCaskill
Michele Miozzo
Jenna Reinen
Svetlana Rosis
Eric Schoenberg
Ciara Torres
Guidelines for all Psychology Majors, Concentrators, and Interdepartmental Majors

Double Majors/Concentrations
All students attempting to complete double majors, double concentrations, or a combination of a major and a concentration should consult the college rules for double counting of courses (https://www.college.columbia.edu/news/committee-instruction-announces-updated-academic-policy/).

Overlapping Courses
Students cannot receive credit for two courses—one completed at Columbia and one at another institution (including Barnard)—if those courses have largely overlapping content. For example, PSYC UN1001 The Science of Psychology is similar in content to introductory psychology courses offered at many other institutions, including Barnard; only one such course will receive credit. Similarly, PSYC UN2630 Social Psychology and PSYC BC1138 Social Psychology have overlapping content; only one will receive credit. Please refer to the table of Overlapping Courses (https://psychology.columbia.edu/sites/default/files/content/bc_overlapping%2002.06.19.pdf) for a partial list of courses at Columbia and Barnard that are known to overlap.

Grade Requirements for the Major
A grade of C- or higher must be earned and revealed on the transcript in any Columbia or Barnard course, including the first, that is used to satisfy the major requirements. The grade of P is not accepted for credit towards the Psychology major (https://psychology.columbia.edu/content/psychology-major/), Psychology concentration (https://psychology.columbia.edu/content/psychology-concentration/), or Neuroscience and Behavior major (https://psychology.columbia.edu/content/neuroscience-behavior-major/). Courses taken on a Pass/Fail basis may not be used to satisfy the major or concentration requirements unless the grade of P is uncovered by the Registrar’s deadline. Students may petition to have their P/D/F grades uncovered after the registrar’s deadline for the following three courses only: PSYC UN1001 Science of Psychology, PSYC UN1010 Mind, Brain, & Behavior (no longer offered), and PSYC UN1610 Introductory Statistics for Behavioral Scientists. Courses taken only on a Pass/Fail basis may not be used to satisfy the major or concentration requirements under any circumstances.

Major Requirement Checklist
Prior to the start of their final semester, all seniors must submit a Major Requirement Checklist (https://psychology.columbia.edu/content/major-concentration requiring-checklists/) showing all major courses they have taken and those they plan to take. The Psychology department evaluates each checklist to determine whether or not the course plan completes the major requirements and then notifies the student accordingly. If the student’s course plan changes, or if it does not satisfy the major requirements, a revised checklist must be submitted. Departmental approval of an accurate and up-to-date checklist will help ensure completion of all major requirements on time for graduation.

Major in Psychology
Please read Guidelines for all Psychology Majors, Concentrators, and Interdepartmental Majors (p. 4) above.

The Introductory Psychology Course
- PSYC UN1001 The Science of Psychology

A Statistics Course
Select one of the following:
- PSYC UN1610 Introductory Statistics for Behavioral Scientists
- PSYC UN1660 Advanced Statistical Inference
- STAT UN1001 Introduction to Statistical Reasoning
- STAT UN1101 Introduction to Statistics (formerly STAT W1111)
- STAT UN1201 Calculus-Based Introduction to Statistics (formerly STAT W1211)

A Research Methods Course
Select one of the following:
- PSYC UN1420 RESEARCH METHODS - HUMAN BEHAVIOR
- PSYC UN1450 Experimental Psychology: Social Cognition and Emotion
- PSYC UN1455 Experimental Psychology: Social and Personality
- PSYC UN1490 RESEARCH METHODS - COGNITION/DECISION MAKING

Majors are strongly advised to complete the statistics and research methods requirements, in that order, by the fall term of their junior year. Students are advised to verify the specific prerequisites for research methods courses, most of which require prior completion of a statistics course.

Distribution Requirement
One course (3 points or more) must be taken from each of the following three groups (in addition to the introductory, statistics, and research methods courses described above):
- Group I—Perception and cognition: courses numbered in the 2200s, 3200s, or 4200s.
- Group II—Psychobiology and neuroscience: courses numbered in the 2400s, 3400s, or 4400s. Also PSYC UN1010 Mind, Brain and Behavior (no longer offered).
- Group III—Social, personality, and abnormal: courses numbered in the 2600s, 3600s, or 4600s.

Beginning Fall 2019, Research Methods courses will no longer fulfill any of the Group distribution requirements.

Seminar Requirement
For students entering Columbia in Fall 2013 or later, one seminar course numbered in the 3000s or 4000s must be taken for 3 or more points.

Seminars are usually taken in the senior year as a culmination of the major program. Enrollment in seminar courses requires the instructor’s permission; students are advised to contact instructors at least one month prior to registration to request seminar admission. Note that honors and supervised individual research courses (PSYC UN3910 Honors Seminar, PSYC UN3920 Honors Research, and PSYC UN3950...
No course may be counted twice in fulfillment of the above major requirements, with the following exception: a seminar course may fulfill both the seminar requirement and a group requirement if it meets the criteria for both.

**Additional Courses**

Additional psychology courses ("electives") must be taken for a total of 30 points. As described below, these may include a limited number of research courses, transfer courses, and Barnard psychology courses not approved for specific requirements.

**Research Credits**

No more than 4 points of PSYC UN3950 (http://bulletin.columbia.edu/search/?p=PSYC%20UN3950/) Supervised Individual Research or PSYC UN3920 Honors Research may be taken in any one term, and no more than 8 points total of research and field work courses (PSYC UN3950 SUPERVISED INDIVIDUAL RESEARCH, PSYC BC3466 Field Work and Research Seminar: The Barnard Toddler Center, PSYC BC3473 Clinical Field Practicum, PSYC BC3592 Senior Research Seminar and PSYC BC3599 Individual Projects) may be applied toward the major. See below for further restrictions on applying Barnard courses toward the psychology major.

**Barnard Courses**

No more than 9 points (minus any transfer credits) from Barnard psychology courses may be applied as credit toward the major. The table of approved Barnard psychology courses (https://psychology.columbia.edu/content/approved-barnard-courses/) indicates which courses have been approved for specific requirements of the psychology major. Courses not on the approved list may only be applied toward a specific requirement with prior written approval from one of the directors of undergraduate studies (https://psychology.columbia.edu/content/advising/). Courses not on the approved list for a specific requirement may be applied as elective credit toward the 30 points for the major.

Beginning in Fall 2019, Barnard Lab courses will not count towards the Research Methods requirement of the Psychology Major or Concentration.

**Transfer Credits**

No more than 9 transfer credits (or combination of transfer and Barnard credits) will be accepted toward the psychology major. Approval of transfer credits on a student’s Entrance Credit Report toward general requirements for the B.A. degree does not grant approval of these credits toward the psychology major. Students must apply for written approval of transfer credit towards the major by submitting the Major Requirement Substitution Form (https://psychology.columbia.edu/sites/default/files/content/Major%20Substitution%20Form%20(Updated%20170611).0.pdf). This form, along with additional information about transfer credits, can be found on the Transfer Credit page of our website (https://psychology.columbia.edu/content/transfer-credit/). To be approved for the major, a course taken at another institution should be substantially similar to one offered by the department, the grade received must be a B- or better, and the course must have been taken within the past 8 years. As noted above, if two courses overlap in content, only one will be applied towards the major. With the exception of approved Barnard courses, students should consult with one of the directors of undergraduate studies (https://psychology.columbia.edu/content/advisors/) before registering for psychology courses offered outside the department.

Students who have completed an introductory psychology course at another institution prior to declaring a psychology major should consult with one of the directors of undergraduate studies (https://psychology.columbia.edu/content/advisors/) to verify whether or not this course meets departmental standards for major transfer credit. If transfer credit toward the major is not approved, the student must enroll in PSYC UN1001 The Science of Psychology or PSYC BC1001 Introduction to Psychology to complete this major requirement. Beginning in Fall 2019, the Psychology Department will accept a score of 5 on the AP Psychology exam, or a score of 7 on the Higher Level IB Psychology exam, to meet the Science of Psychology requirement. The AP/IB Psychology exam does not count as a course or toward a student’s points total for their program; students placing out of the Science of Psychology requirement in this way will need to take an additional course to fulfill the required number of courses or points for their program.

The College Board Advanced Placement (AP) statistics scores do not satisfy the statistics requirement. Students who have completed AP statistics may opt to take a more advanced statistics course to fulfill this requirement with the approval of one of the directors of undergraduate studies (https://psychology.columbia.edu/content/advising/).

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**Major in Neuroscience and Behavior**

**Required Courses**

In addition to one year of general chemistry (or the high school equivalent), ten courses are required to complete the major—five from the Department of Biological Sciences and five from the Department of Psychology. For the definitive list of biology requirements, see the Department of Biological Sciences website (http://biology.columbia.edu/).

**Required Biology Courses**

1. BIOL UN2005 Introductory Biology I: Biochemistry, Genetics & Molecular Biology
2. BIOL UN2006 Introductory Biology II: Cell Biology, Development & Physiology
3. BIOL UN3004 Neurobiology I: Cellular and Molecular Neurobiology
4. BIOL UN3005 Neurobiology II: Development & Systems
5. One additional 3000- or 4000-level biology course from a list approved by the biology adviser (http://www.columbia.edu/cu/biology/pages/undergrad/cur/majors/neuro.html) to the program.

• BIOL UN3006 Physiology
• BIOL UN3022 Developmental Biology
• BIOL UN3025 Neurogenetics
• BIOL UN3031 Genetics
• BIOL UN3799 Molecular Biology of Cancer
• BIOL UN3034 Biotechnology
• BIOL UN3041 Cell Biology
• BIOL UN3073 Cellular and Molecular Immunology
• BIOL UN3193 Stem Cell Biology and Applications
• BIOC UN3300 Biochemistry
• BIOC UN3501 Biochemistry: Structure and Metabolism
• BIOL UN3310 Virology
• BIOL UN3404 Seminar on the Global Threat of Antimicrobial Resistance
• BIOC UN3512 Molecular Biology
• BIOL GU4008 The Cellular Physiology of Disease
• BIOL GU4260 Proteomics Laboratory
• BIOL GU4290 Biological Microscopy
• BIOL GU4305 Seminar in Biotechnology

4. One additional 2000- or 3000-level psychology lecture course from a list* approved by the psychology adviser (http://biology.columbia.edu/pages/neuroscience-and-behavior-major-requirements/) (https://psychology.columbia.edu/content/neuroscience-behavior-major/#/cuAccordionItem-1255) to the program:

• PSYC S2210Q Cognition: Basic Processes
• PSYC UN2215 Cognition and the Brain or PSYC S2215D Cognition and the Brain
• PSYC UN2220 Cognition: Memory and Stress
• PSYC W2225 Attention and Perception
• PSYC W2230 Perception and Sensory Processes
• PSYC UN2235 Thinking and Decision Making or PSYC S2235Q Thinking and Decision Making
• PSYC UN2250 Evolution of Cognition
• PSYC UN2280 Introduction to Developmental Psychology
• PSYC UN2420 Animal Behavior
• PSYC UN2430 Cognitive Neuroscience
• PSYC W2440 Language and the Brain
• PSYC UN2450 Behavioral Neuroscience or PSYC S2450Q Behavioral Neuroscience
• PSYC UN2460 Drugs and Behavior
• PSYC W2480 The Developing Brain
• PSYC UN2620 Abnormal Behavior or PSYC S2620Q Abnormal Behavior

*Please make careful note of this list, as courses not listed here will not count towards the P4 requirement.

5. One advanced psychology seminar from a list approved by the psychology adviser (https://psychology.columbia.edu/content/neuroscience-behavior-major/#/cuAccordionItem-1257) to the program:

• PSYC W3225 The Wandering Mind: Psychological Approaches to Distraction
• PSYC W3250 Seminar in Space Perception (Seminar) / PSYC G4230 Sensation and Perception (Seminar)
• PSYC W3265 Auditory Perception (Seminar)
• PSYC UN3270 Computational Approaches to Human Vision (Seminar)
• PSYC W3280 Seminar In Infant Development or PSYC S3280D Seminar in Infant Development
• PSYC S3285D The Psychology of Disaster Preparedness
• PSYC UN3290 Self: A Cognitive Exploration (Seminar)

Required Psychology Courses

1. PSYC UN1001 The Science of Psychology

2. PSYC UN2430 Cognitive Neuroscience or PSYC UN2450 Behavioral Neuroscience

• Students who have previously taken PSYC UN1010 Mind, Brain and Behavior (no longer offered) may use that course to fulfill this requirement.

3. One statistics or research methods course from the following:

• PSYC UN1450 Experimental Psychology: Social Cognition and Emotion
• PSYC UN1490 RESEARCH METHODS - COGNITION/DECISION MAKING
• PSYC UN1610 Introductory Statistics for Behavioral Scientists
• PSYC UN1660 AdvancedStatisticalInference
• STAT UN1101 Introduction to Statistics (formerly STAT W1111)
• STAT UN1201 Calculus-Based Introduction to Statistics (formerly STAT W1211)
• Please note, STAT UN1001 does not count towards the Neuroscience & Behavior major.

3. One additional 2000- or 3000-level psychology lecture course from a list approved by the psychology adviser (http://biology.columbia.edu/pages/neuroscience-and-behavior-major-requirements/) (https://psychology.columbia.edu/content/neuroscience-behavior-major/#/cuAccordionItem-1255) to the program:

• PSYC S2210Q Cognition: Basic Processes
• PSYC UN2215 Cognition and the Brain or PSYC S2215D Cognition and the Brain
• PSYC UN2220 Cognition: Memory and Stress
• PSYC W2225 Attention and Perception
• PSYC W2230 Perception and Sensory Processes
• PSYC UN2235 Thinking and Decision Making or PSYC S2235Q Thinking and Decision Making
• PSYC UN2250 Evolution of Cognition
• PSYC UN2280 Introduction to Developmental Psychology
• PSYC UN2420 Animal Behavior
• PSYC UN2430 Cognitive Neuroscience
• PSYC W2440 Language and the Brain
• PSYC UN2450 Behavioral Neuroscience or PSYC S2450Q Behavioral Neuroscience
• PSYC UN2460 Drugs and Behavior
• PSYC W2480 The Developing Brain
• PSYC UN2620 Abnormal Behavior or PSYC S2620Q Abnormal Behavior

*Please make careful note of this list, as courses not listed here will not count towards the P4 requirement.

5. One advanced psychology seminar from a list approved by the psychology adviser (https://psychology.columbia.edu/content/neuroscience-behavior-major/#/cuAccordionItem-1257) to the program:

• PSYC W3225 The Wandering Mind: Psychological Approaches to Distraction
• PSYC W3250 Seminar in Space Perception (Seminar) / PSYC G4230 Sensation and Perception (Seminar)
• PSYC W3265 Auditory Perception (Seminar)
• PSYC UN3270 Computational Approaches to Human Vision (Seminar)
• PSYC W3280 Seminar In Infant Development or PSYC S3280D Seminar in Infant Development
• PSYC S3285D The Psychology of Disaster Preparedness
• PSYC UN3290 Self: A Cognitive Exploration (Seminar)
• PSYC G4220 Cognition and Psychopathology (Seminar)
• PSYC GU4222 The Cognitive Neuroscience of Aging (Seminar)
• PSYC GU4223 Memory and Executive Function Thru the Lifespan
• PSYC GU4225 Consciousness and Attention (Seminar)
• PSYC GU4229 Attention and Perception
• PSYC G4230 Sensation and Perception (Seminar)
• PSYC GU4232 Production and Perception of Language
• PSYC GU4235 Special Topics in Vision (Seminar)
• PSYC GU4239 Cognitive neuroscience of narrative and film
• PSYC G4250 Evolution of Intelligence, Cognition, and Language (Seminar)
• PSYC GU4270 Cognitive Processes (Seminar)
• PSYC G4272 Advanced Seminar in Language Development
• PSYC G4275 Contemporary Topics in Language and Communication (Seminar)
• PSYC GU4280 Core Knowledge (Seminar)
• PSYC GU4281 The Psychology of Curiosity
• PSYC G4285 Multidisciplinary Approaches to Human Decision Making (Seminar)
• PSYC GU4287 Decision Architecture
• PSYC GU4289 The Games People Play: The Psychology of Strategic Decision Making
• PSYC S3410Q Seminar in Emotion
• PSYC S3425D Animals in Our Own Backyard: The Science of Observing Behavior
• PSYC W3435 Neurobiology of Reproductive Behavior (Seminar)
• PSYC W3440 Issues In Brain and Behavior (Seminar)
• PSYC UN3445 The Brain & Memory
• PSYC UN3450 Evolution of Intelligence and Consciousness (Seminar)/ PSYC G4450 The Evolution of Intelligence & Consciousness (Seminar)
• PSYC UN3460 Evolution of Behavior (Seminar)
• PSYC UN3470 Brain Evolution: Becoming Human (Seminar)
• PSYC UN3481 Critical Periods in Brain Development and Behavior
• PSYC S3483D The Dynamic Brain: Plasticity from Birth to Old Age
• PSYC W3484 Life Span Development: Theory and Methods
• PSYC UN3496 Neuroscience and Society or PSYC S3496Q Neuroscience and Society
• PSYC GU4420 Animal Cognition (Seminar)
• PSYC GU4430 Learning and the Brain (Seminar)
• PSYC GU4435 Non-Mnemonic Functions of Memory Systems
• PSYC GU4440 Topics in Neurobiology and Behavior (Seminar) or PSYC S4440Q Topics in Neurobiology and Behavior
• PSYC G4460 Cognitive Neuroscience and the Media (Seminar)
• PSYC G4475 Neurobiology of Social Behavior
• PSYC GU4480 Psychobiology of Infant Development (Seminar)
• PSYC G4485 Affective Neuroscience (Seminar)
• PSYC GU4486 Developmental and Affective Neuroscience (Seminar)
• PSYC GU4490 Inheritance (Seminar)
• PSYC G4492 Psychobiology of Stress
• PSYC G4495 Ethics, Genetics, and the Brain
• PSYC GU4498 Behavioral Epigenetics
• PSYC G4499 Behavioral Psychopharmacology (Seminar)
• PSYC UN3615 Children at Risk (Lecture)
• PSYC UN3620 Seminar in Developmental Psychopathology
• PSYC UN3624 Adolescent Mental Health: Causes, Correlates, Consequences
• PSYC UN3625 Clinical Neuropsychology (Seminar) or PSYC S3625D Clinical Neuropsychology Seminar
• PSYC UN3680 Social Cognitive Neuroscience (Seminar)/ PSYC GU4685 Social Cognitive Neuroscience (Seminar)
• PSYC GU4627 Seminar in Anxiety, Obsessive-Compulsive, and Related Disorders
• PSYC G4635 The Unconscious Mind (Seminar)
• PSYC GU4690 Social Factors and Psychopathology (Seminar)

Note: Students wishing to use a seminar course not listed above to meet the FS seminar requirement must contact their psychology adviser before enrolling to request permission for an exception. Generally speaking, permission for such exceptions is only granted when there is a compelling case related to the student's research or area of study. Students requesting permission to use a course not on this list must ensure that their substantive coursework in the seminar (generally their final paper) is on a neuroscience-focused topic.

Transfer Credit for Psychology Courses Taken Elsewhere

Students should consult a psychology adviser (https://psychology.columbia.edu/content/advising/) before registering for psychology courses offered outside the department. With the adviser’s approval, one, and only one, course from another institution, including Barnard, may be applied toward the psychology portion of the Neuroscience and Behavior major. Students who wish to obtain credit for a course taken at Barnard or at another institution should complete the Major Requirement Substitution Form (https://psychology.columbia.edu/content/transfer-credit/). To be approved for the major, the course should be substantially similar to one offered by this department and approved for this major, and the grade received must be a C- or better if from Barnard, or B- or better if from another institution. Beginning in Fall 2019, the Psychology department will accept a score of 5 on the AP Psychology exam, or a score of 7 on the Higher Level IB Psychology exam, to meet the PSYC UN1001 The Science of Psychology requirement. The AP/IB Psychology exam does not count as a course or toward a student’s points total for their program; students placing out of the Science of Psychology requirement in this way will need to take an additional course – approved by the Psychology adviser – to fulfill the required number of courses for their program.

Advanced Placement (AP) statistics scores will not satisfy the statistics/research methods requirement. Students who have completed AP Stats are encouraged to enroll in a 1400-level research methods course to fulfill this requirement.
Exceptions to Biology Requirements

Any exceptions must be approved in advance by a biology adviser and students must receive an email notification of that approval. Students may substitute Barnard College courses only with prior permission from an adviser.

Concentration in Psychology

Please read Guidelines for all Psychology Majors, Concentrators, and Interdepartmental Majors (p. 4) above.

A concentration in psychology (https://psychology.columbia.edu/content/psychology-concentration/) requires a minimum of 18 points, including PSYC UN1001 The Science of Psychology and courses in at least two of the three groups listed under “Distribution Requirement” for the psychology major. Restrictions on research credits, Barnard credits, and transfer credits are modified from those of the psychology major as follows:

1. Only 4 points total may be applied toward the concentration from research or field-work courses, including: PSYC UN3950 (http://bulletin.columbia.edu/search/?P=PSYC%20UN3950/) Supervised Individual Research, PSYC UN3920 Honors Research PSYC BC3466 Field Work and Research Seminar: The Barnard Toddler Center, PSYC BC3473 Clinical Field Practicum, PSYC BC3592 Senior Research Seminar, and PSYC BC3599 Individual Projects;
2. Only 5 points from Barnard (including PSYC BC1001 Introduction to Psychology) may be applied toward the concentration.
3. Only 5 points total (including any Barnard points) from approved psychology courses taken outside the department may be applied toward the concentration.

*Beginning Fall 2019, Barnard Lab courses will not count towards the Research Methods requirement of the Psychology Major or Concentration.

Except as noted above, other regulations outlined in the Psychology Major section regarding grades, transfer credits, and overlapping courses also apply toward the concentration.

PSYC UN1001 The Science of Psychology. 3 points.
CC/GS: Partial Fulfillment of Science Requirement
Enrollment may be limited. Attendance at the first two class periods is mandatory.

Prerequisites: BLOCKED CLASS. EVERYONE MUST JOIN WAITLIST TO BE ADMITTED
Broad survey of psychological science including: sensation and perception; learning, memory, intelligence, language, and cognition; emotions and motivation; development, personality, health and illness, and social behavior. Discusses relations between the brain, behavior, and experience. Emphasizes science as a process of discovering both new ideas and new empirical results. PSYC UN1001 serves as a prerequisite for further psychology courses and should be completed by the sophomore year.

<table>
<thead>
<tr>
<th>Spring 2020: PSYC UN1001</th>
<th>Course/Section</th>
<th>Times/Location</th>
<th>Instructor</th>
<th>Points</th>
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<tr>
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<td>M W 1:10pm - 2:25pm</td>
<td>Svetlana Rosis</td>
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PSYC UN1420 RESEARCH METHODS - HUMAN BEHAVIOR. 4 points.
Attendance at the first class is mandatory. Fee: $70.

Prerequisites: PSYC W1001 or PSYC W1010, and a statistics course (PSYC W1610 or the equivalent), or the instructor’s permission.
Prerequisites: (PSYC UN1001 or PSYC UN1010) and a statistics course (PSYC UN1610 or the equivalent), or the instructor’s permission.
Corequisites: PSYC UN1421 Introduction to the techniques of research employed in the study of human behavior. Students gain experience in the conduct of research, including design of simple experiments, observation and measurement techniques, and the analysis of behavioral data. $70 course fee

<table>
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<tr>
<th>Spring 2020: PSYC UN1420</th>
<th>Course/Section</th>
<th>Times/Location</th>
<th>Instructor</th>
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PSYC UN1421 Experimental Psychology: Human Behavior (Lab). 0 points.
Limited enrollment in each section.

Corequisites: PSYC UN1420
Required lab section for PSYC UN1420.

Spring 2020: PSYC UN1421

<table>
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<tr>
<th>Course Number</th>
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PSYC UN1450 Experimental Psychology: Social Cognition and Emotion. 4 points.
Attendance at the first class is essential. Priority given to psychology majors. Fee: $70.

Prerequisites: PSYC UN1001 or PSYC UN1010 and a statistics course (PSYC UN1610 or the equivalent), or the instructor's permission.

Corequisites: PSYC UN1451
An introduction to research methods employed in the study of human social cognition and emotion. Students gain experience in the design and conduct of research, including ethical issues, observation and measurement techniques, interpretation of data, and preparation of written and oral reports.

PSYC UN1451 Experimental Psychology: Social Cognition and Emotion (Lab). 0 points.
Limited enrollment in each section.

Corequisites: PSYC UN1450
Required Lab for PSYC UN1450.

PSYC UN1455 Experimental Psychology: Social and Personality. 4 points.
Fee: $70.

Prerequisites: PSYC UN1001 or PSYC UN1010 and a statistics course (PSYC UN1610 or the equivalent), or the instructor’s permission.

Corequisites: PSYC UN1456
Methodology and procedures of personality and social psychological research and exercises in data analysis and research design. Ethical issues in psychological research. Statistical concepts such as parameter estimation and testing, measurement reliability and validity, merits and limitations of correlational and experimental research designs, and empirical evaluation of theories. Note: Fee: $70

PSYC UN1456 Experimental Psychology: Social and Personality (Lab). 0 points.
Limited enrollment in each section.

Required lab for PSYC UN1455.

PSYC UN1490 RESEARCH METHODS - COGNITION/DECISION MAKING. 4 points.
Corequisites: PSYC UN1491
Corequisites: PSYC UN1491 Prerequisites: Science of Psychology (PSYC 1001) or Mind, Brain, - Behavior (PSYC 1010) or equivalent intro psych course. PSYC 1001 or equivalently, an introductory statistics course. Prerequisites: PSYC 1001 or equivalently, an introductory statistics course.
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Prerequisites: PSYC 1001 or equivalently, an introductory statistics course.

PSYC 1001 or equivalently, an introductory statistics course.

Introduction to statistics that concentrates on problems from the behavioral sciences.

Fall 2020: PSYC UN1490

<table>
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<th>Course Number</th>
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PSYC UN1610 Introductory Statistics for Behavioral Scientists. 4 points.
Lecture and lab. Priority given to psychology majors. Fee $70.

Prerequisites: PSYC UN1001 or equivalently, an introductory statistics course.

Corequisites: PSYC UN1611
Recommended preparation: one course in behavioral science and knowledge of high school algebra.

Corequisites: PSYC UN1611

Introduction to statistics that concentrates on problems from the behavioral sciences.

Spring 2020: PSYC UN1610

<table>
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<th>Course Number</th>
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Fall 2020: PSYC UN1610

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<td>Katherine Fox-Glassman</td>
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PSYC UN1611 Introductory Statistics for Behavioral Scientists (Lab). 0 points.
Limited enrollment in each section.

Corequisites: PSYC UN1610
Required lab section for PSYC UN1610.

<table>
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<th>Spring 2020: PSYC UN1611</th>
<th>Course</th>
<th>Section/Call Number</th>
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PSYC UN1910 Research Ethics in Psychology. 4 points.
Prerequisites: (PSYC UN1001) or equivalent introductory course in psychology.
This course explores the ethical theory, principles, codes and standards applicable to research in psychology and the complexities inherent in ethical research practice.

PSYC UN2220 Cognition: Memory and Stress. 3 points.
CC/GS: Partial Fulfillment of Science Requirement
Attendance at the first class is mandatory.

Prerequisites: PSYC UN1001 or PSYC UN1010 or the instructor’s permission.
Memory, attention, and stress in human cognition.

PSYC UN2235 Thinking and Decision Making. 3 points.
CC/GS: Partial Fulfillment of Science Requirement

Prerequisites: an introductory course in psychology.
Models of judgment and decision making in both certain and uncertain or risky situations, illustrating the interplay of top-down (theory-driven) and bottom-up (data-driven) processes in creating knowledge. Focuses on how individuals do and should make decisions, with some extensions to group decision making and social dilemmas.

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<tr>
<th>Spring 2020: PSYC UN2235</th>
<th>Course</th>
<th>Section/Call Number</th>
<th>Times/Location</th>
<th>Instructor</th>
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PSYC UN2250 Evolution of Cognition. 3 points.
CC/GS: Partial Fulfillment of Science Requirement

Prerequisites: PSYC UN1001 or PSYC UN1010 or the instructor’s permission.
A systematic review of different forms of cognition as viewed in the context of the theory of evolution. Specific topics include the application of the theory of evolution to behavior, associative learning, biological constraints on learning, methods for studying the cognitive abilities of animals, levels of representation, ecological influences on cognition, and evidence of consciousness in animals.

PSYC UN2280 Introduction to Developmental Psychology. 3 points.
CC/GS: Partial Fulfillment of Science Requirement
Enrollment may be limited. Attendance at the first two classes is mandatory.

Prerequisites: PSYC UN1001 or PSYC UN1010 or the equivalent.
Introduction to the scientific study of human development, with an emphasis on psychobiological processes underlying perceptual, cognitive, and emotional development.

PSYC UN2420 Animal Behavior. 3 points.
CC/GS: Partial Fulfillment of Science Requirement

Prerequisites: PSYC UN1001 or PSYC UN1010 or a college-level biology course, or the instructor’s permission.
Introduction to behavioral systems, evolution of behavioral traits, and analysis of behavior. Topics include reproductive and social behavior, mating systems, competition, cooperation, communication, learning, development and the interplay of genes and environment.

PSYC UN2430 Cognitive Neuroscience. 3 points.
CC/GS: Partial Fulfillment of Science Requirement

Prerequisites: PSYC UN1001 or equivalent introductory course in Psychology
This course provides an in-depth survey of data and models of a wide variety of human cognitive functions. Drawing on behavioral, neuropsychological, and neuroimaging research, the course explores the neural mechanisms underlying complex cognitive processes, such as perception, memory, and decision making. Importantly, the course examines the logic and assumptions that permit us to interpret brain activity in psychological terms.
PSYC UN2450 Behavioral Neuroscience. 3 points.
CC/GS: Partial Fulfillment of Science Requirement

Prerequisites: PSYC UN1001 or PSYC UN1010 or the instructor’s permission.

Examines the principles governing neuronal activity, the role of neurotransmitter systems in memory and motivational processes, the presumed brain dysfunctions that give rise to schizophrenia and depression, and philosophical issues regarding the relationship between brain activity and subjective experience.

Fall 2020: PSYC UN2450
Course Number | Section/Call Number | Times/Location | Instructor | Points | Enrollment
--- | --- | --- | --- | --- | ---
PSYC 2450 | 001/10093 | M W 1:10pm - 2:25pm Room TBA | Alfredo Spagna | 3 | 106/110

PSYC UN2620 Abnormal Behavior. 3 points.

Prerequisites: An introductory psychology course.

Examines definitions, theories, and treatments of abnormal behavior.

Fall 2020: PSYC UN2620
Course Number | Section/Call Number | Times/Location | Instructor | Points | Enrollment
--- | --- | --- | --- | --- | ---
PSYC 2620 | 001/10095 | T Th 6:10pm - 7:25pm Room TBA | E’mett McCaskill | 3 | 170/170

PSYC UN2630 Social Psychology. 3 points.

Surveys important methods, findings, and theories in the study of social influences on behavior. Emphasizes different perspectives on the relation between individuals and society.

Fall 2020: PSYC UN2630
Course Number | Section/Call Number | Times/Location | Instructor | Points | Enrollment
--- | --- | --- | --- | --- | ---
PSYC 2630 | 001/10096 | T Th 2:40pm - 3:55pm Room TBA | Tory Higgins | 3 | 150/150

PSYC UN2640 Introduction to Social Cognition. 3 points.

Prerequisites: an introductory course in psychology or the instructor’s permission.

An introduction to basic concepts in social cognition. Topics include attribution theory (how we explain our own and other’s behavior), social categories and schema (social perception and stereotyping), the social self (the development and maintenance of a self-concept), attention and consciousness, person memory, affect and cognition, and social inference, among others.

PSYC UN2670 Social Development. 3 points.

Prerequisites: PSYC UN1001 or PSYC UN1010, or the equivalent.

This lecture course introduces students to the study of typical human social development with a particular focus on genetic, familial and peer influences on the development of social behaviors during early childhood.

PSYC UN3270 Computational Approaches to Human Vision (Seminar). 3 points.

This course will be offered in Fall 2016.

Prerequisites: some background in psychology and/or neurophysiology (e.g., PSYC UN1001, PSYC UN1010, PSYC UN2230, PSYC UN2450, BIOL UN3004 or BIOL UN3005) is desirable. See instructor if you have questions about your background. Some background in mathematics and computer science (e.g., calculus or linear algebra, a programming language) is highly recommended.

Study of human vision—both behavioral and physiological data—within a framework of computational and mathematical descriptions. Please contact Prof. Graham by e-mail (nvg1@columbia.edu) if you are interested in this course.

Fall 2020: PSYC UN3270
Course Number | Section/Call Number | Times/Location | Instructor | Points | Enrollment
--- | --- | --- | --- | --- | ---
PSYC 3270 | 001/10097 | | Norma Graham | 3 | 0/12

PSYC UN3445 The Brain & Memory. 4 points.

Prerequisites: (PSYC UN1010) or Equivalent introductory course in neuroscience or cognitive psychology and the instructor’s permission. This seminar will give a comprehensive overview of episodic memory research: what neuroimaging studies, patient studies, and animal models have taught us about how the brain creates, stores, and retrieves memories.

PSYC UN3450 Evolution of Intelligence and Consciousness (Seminar). 3 points.

Prerequisites: PSYC UN1001 or PSYC UN1010, and the instructor’s permission.

A systematic review of the implications of Darwin’s theory of evolution and Freud’s theory of the unconscious for contemporary studies of animal and human cognition.

Fall 2020: PSYC UN3450
Course Number | Section/Call Number | Times/Location | Instructor | Points | Enrollment
--- | --- | --- | --- | --- | ---
PSYC 3450 | 001/10105 | T 2:10pm - 4:00pm 200c Schermerhorn Hall | Herbert Terrace | 3 | 18/16

PSYC UN3615 Children at Risk (Lecture). 4 points.

Prerequisites: PSYC UN1010, PSYC UN2280, PSYC UN2620, or PSYC UN2680, and the instructor’s permission.

Considers contemporary risk factors in children’s lives. The immediate and enduring biological and behavioral impact of risk factors.

PSYC UN3625 Clinical Neuropsychology (Seminar). 3 points.

Prerequisites: an introductory course in neuroscience, like PSYC UN1010 or PSYC UN2450, and the instructor’s permission.

Analysis of the assessment of physical and psychiatric diseases impacting the central nervous system, with emphasis on the relationship between neuropathology and cognitive and behavioral deficits.

Spring 2020: PSYC UN3625
Course Number | Section/Call Number | Times/Location | Instructor | Points | Enrollment
--- | --- | --- | --- | --- | ---
PSYC 3625 | 001/11013 | M 12:10pm - 2:00pm 200c Schermerhorn Hall | E’mett McCaskill | 3 | 18/16
PSYC UN3690 The Self in Social Context (Seminar). 4 points.
Prerequisites: PSYC UN1001 or UN1010, or the equivalent, and the instructor's permission.
This course centers on understanding the self embedded in the social context. We will integrate knowledge from various areas of psychology (developmental, cognitive, social cognition) with a main focus in social psychology. This course will provide the opportunity to gain an understanding of research in the following areas: the development of self in a social context, the relationship between the self and the broader socio-cultural context, the impact of self-involvement on social/cognitive processes, and contemporary research on individual differences.

PSYC UN3691 Interpersonal Cognition Seminar: Close Relationships, Identity, and Memory. 4 points.
Prerequisites: PSYC UN2630 or PSYC UN2640 Instructor permission.1 course in research methods
What makes people 'click'? How does interpersonal closeness develop? How do close relationships influence our thought processes, behaviors, and identities? How do our conversations with relationship partners change our memories of events and our perceptions of reality? And finally, what are the implicit and explicit cognitive mechanisms underlying these processes?

The primary objective of this course will be to provide you with the relevant literature, theoretical background, methodological proficiency, and critical thinking and communication skills to articulate your own answers to these questions, and to propose future studies in the field.

PSYC UN3910 Honors Seminar. 1 point.
Year-long course. Students receive credit only after both terms have been completed. May be repeated for additional credit.

Prerequisites: open to students in the honors program only.
Discussion of a variety of topics in psychology, with particular emphasis on recent developments and methodological problems. Students propose and discuss special research topics.

PSYC UN3920 Honors Research. 1-4 points.
May be repeated for additional credit.

Prerequisites: open to students in the honors program only.
Except by special permission of the director of undergraduate studies, no more than 4 points of individual research may be taken in any one term. This includes both PSYC UN3950 and PSYC UN3920. No more than 12 points of PSYC UN3920 may be applied toward the honors program in psychology. Special research topics arranged with the instructors of the department leading toward a senior honors paper.
PSYC UN3950 SUPERVISED INDIVIDUAL RESEARCH. **0 points.**
1-4 points. May be repeated for credit. Prerequisites: the instructor’s permission. Except by special permission of the director of undergraduate studies, no more than 4 points of individual research may be taken in any one term. This includes both PSYC UN3950 and PSYC UN3920. No more than 8 points of PSYC UN3950 may be applied toward the psychology major; and no more than 4 points toward the concentration. Readings, special laboratory projects, reports, and special seminars on contemporary issues in psychological research and theory.

PSYC GU4222 The Cognitive Neuroscience of Aging (Seminar). **4 points.**
Prerequisites: courses in introductory psychology and cognitive psychology; and the instructor’s permission. Comprehensive overview of various conceptual and methodologic approaches to studying the cognitive neuroscience of aging. The course will emphasize the importance of combining information from cognitive experimental designs, epidemiologic studies, neuroimaging, and clinical neuropsychological approaches to understand individual differences in both healthy and pathological aging.

PSYC GU4223 Memory and Executive Function Thru the Lifespan. **4 points.**
Prerequisites: the instructor’s permission, plus PSYC UN1001 or PSYC UN1010, or the equivalent. Optimal preparation will include some background in experimental design and statistics. Memory and executive processing are critical cognitive functions required for successfully navigating everyday life. In lifespan studies, both exhibit relatively long developmental trajectories followed by stasis and then relative decline in old age. Yet, neither memory nor executive function is a unitary construct. Rather, each is comprised of separable components that may show different developmental trajectories and declines or maintenance at older ages. Moreover, memory is malleable and is a reconstruction of past experience, not an exact reproduction. We will discuss a range of topics related to the development, maintenance and potential decline in memory and executive function from infancy through old age.

PSYC GU4235 Special Topics in Vision (Seminar). **3 points.**
This course will be offered in Fall 2016. May be repeated for additional credit.

Prerequisites: the instructor’s permission. Please contact Prof. Graham by e-mail (nvg1@columbia.edu) if you are interested in this course.

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### Course Schedule

**Spring 2020: PSYC UN3950**

<table>
<thead>
<tr>
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**Fall 2020: PSYC GU4223**

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**PSYC GU4232 Production and Perception of Language. **4 points.**
Prerequisites: two courses in Psychology and the instructor’s permission. Topics include phonetic expression, motoric and perceptual organization, speech codes and memory codes, spoken word recognition, phrase formation, and the effects of context in perception and production.

**PSYC GU4235 Special Topics in Vision (Seminar).** **3 points.**
This course will be offered in Fall 2016. May be repeated for additional credit.

Prerequisites: the instructor’s permission. Please contact Prof. Graham by e-mail (nvg1@columbia.edu) if you are interested in this course.

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PSYC GU4244 Language and Mind. 4 points.
CC/GS: Partial Fulfillment of Science Requirement
Prerequisites: PSYC UN1001 and Preferably, an additional course in psychology, focusing on cognition, development, or research methods. Instructor permission required.
This seminar explores the relationship between language and thought by investigating how language is mentally represented and processed; how various aspects of language interact with each other; and how language interacts with other aspects of cognition including perception, concepts, world knowledge, and memory. Students will examine how empirical data at the linguistic, psychological, and neuroscientific levels can bear on some of the biggest questions in the philosophy of mind and language and in psychology.

PSYC GU4245 Auditory Perception. 4 points.
Prerequisites: PSYC UN1010 or PSYC UN1010 or the equivalent; background in statistics/research methods recommended
How does the human brain make sense of the acoustic world? What aspects of auditory perception do humans share with other animals? How does the brain perform the computations necessary for skills such as sound localization? How do we focus our auditory attention on one voice in a crowd? What acoustic cues are important for speech perception? How is music perceived? These are the types of questions we will address by studying the basics of auditory perception from textbook readings and reviews, and reading classic and current literature to understand scientific progress in the field today.

PSYC GU4247 Cognitive Processes (Seminar). 3 points.
Prerequisites: For undergraduates: one course in cognitive psychology or cognitive neuroscience, or the equivalent, and the instructor's permission.
Metacognition and control processes in human cognition. Basic issues include the cognitive mechanisms that enable people to monitor what they know and predict what they will know, the errors and biases involved in self-monitoring, and the implications of metacognitive ability for people's self-determined learning, behavior, and their understanding of self.

PSYC GU4250 Evolution of Intelligence, Cognition, and Language (Seminar). 3 points.
Prerequisites: PSYC UN1001 or PSYC UN1010 or the equivalent, based on instructor assessment, plus one of the instructors' permission.
How did language evolve and why are human beings the only species to use language? How did the evolution of social intelligence, in particular, cooperation, set the stage for the origin of language and consciousness? We will explore how psychologists, philosophers, neuroscientists, anthropologists, biologists and computational scientists, among others, have collaborated during recent years to produce important insights in the evolution of intelligence, consciousness and language.

PSYC GU4265 Animal Cognition (Seminar). 3 points.
Prerequisites: For undergraduates: the instructor’s permission.
Seminar concerning a nonverbal animal’s use of internal representations as a basis for action. Topics include how inanimate objects, concepts, number, space, language, agency, morality and the social world. We will look at which aspects of knowledge are uniquely human, which are shared with other animals, and how this knowledge changes as children develop.

PSYC GU4270 Core Knowledge (Seminar). 4 points.
Prerequisites: For undergraduates: courses in introductory psychology, cognitive or developmental psychology, and the instructor’s permission.
Core Knowledge explores the origins and development of knowledge in infants and children, with an additional emphasis on evolutionary cognition. In this course, we will examine evidence from cognitive psychology, developmental psychology, comparative psychology, neuroscience, and linguistics to look at the child's conception of objects, number, space, language, agency, morality and the social world. We will look at which aspects of knowledge are uniquely human, which are shared with other animals, and how this knowledge changes as children develop.

PSYC GU4275 The Games People Play: The Psychology of Strategic Decision Making. 3 points.
CC/GS: Partial Fulfillment of Science Requirement
Prerequisites: (PSYC UN2235) or equivalent course on judgment and decision-making
A seminar course exploring strategic decision making (also known as behavioral game theory). This course examines the psychology underlying situations in which outcomes are determined by choices made by multiple decision makers. The prime objective will be to examine the use of experimental games to test psychological theories.

PSYC GU4280 Learning and the Brain (Seminar). 4 points.
Prerequisites: courses in introductory psychology and/or neuroscience, and the instructor’s permission.
What are the neural mechanisms that support learning, memory, and choices? We will review current theories in the cognitive neuroscience of human learning, discuss how learning and decision making interact, and consider the strengths and weaknesses of two influential methods in the study of human brain and behavior—functional imaging and patient studies.
PSYC GU4440 Topics in Neurobiology and Behavior (Seminar). 3 points.
Prerequisites: the instructor’s permission.
Examines current topics in neurobiology and behavior.

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Fall 2020: PSYC GU4440

PSYC GU4480 Psychobiology of Infant Development (Seminar). 4 points.
Prerequisites: (PSYC UN1001 or PSYC UN1010) and a course in developmental psychology, and the instructor’s permission.
The focus of the seminar is on human development during the fetal period and early infancy. We will examine the effects of environmental factors on perinatal perceptual, cognitive, sensory-motor, and neurobehavorial capacities, with emphasis on critical conditions involved in both normal and abnormal brain development. Other topics include acute and long term effects of toxic exposures (stress, smoking, and alcohol) during pregnancy, and interaction of genes and the environment in shaping the developing brain of “high-risk” infants, including premature infants and those at risk for neurodevelopamental disorders such as Sudden Infant Death Syndrome.

Spring 2020: PSYC GU4480

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PSYC GU4486 Developmental and Affective Neuroscience (Seminar). 4 points.
Prerequisites: courses in developmental psychology, and either research methods or affective neuroscience, and the instructor’s permission.
Introduction to leading theoretical perspectives employed by developmental psychologists in the study of affective neuroscience. Exploration of the developmental brain and behavior relationships in humans and animal models of typical and atypical emotional behavior, with a critical reading of recent research findings in the field.

PSYC GU4490 Inheritance (Seminar). 4 points.
Prerequisites: basic knowledge of biology and neuroscience recommended; the instructor’s permission required.
Explores the concept of inheritance and the mechanisms through which inheritance is mediated. Will focus on the generational transmission of physiology and behavior, but will also consider the inheritance of culture and language.

PSYC GU4498 Behavioral Epigenetics. 4 points.
Prerequisites: basic background in neurobiology (for instance PSYC UN1010, UN2450, UN2460, UN2480, and GU4499) and the instructor’s permission.
This course will provide an overview of the field of epigenetics, with an emphasis on epigenetic phenomena related to neurodevelopment, behavior and mental disorders. We will explore how epigenetic mechanisms can be mediators of environmental exposures and, as such, contribute to psychopathology throughout the life course. We will also discuss the implications of behavioral epigenetic research for the development of substantially novel pharmacotherapeutic approaches and preventive measures in psychiatry.

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PSYC GU4615 The Psychology of Culture and Diversity (Seminar). 4 points.
Prerequisites: the instructor’s permission; some basic knowledge of social psychology is desirable.
A comprehensive examination of how culture and diversity shape psychological processes. The class will explore psychological and political underpinnings of culture and diversity, emphasizing social psychological approaches. Topics include culture and self, culture and social cognition, group and identity formation, science of diversity, stereotyping, prejudice, and gender. Applications to real-world phenomena discussed.

Fall 2020: PSYC GU4615

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PSYC GU4635 The Unconscious Mind (Seminar). 4 points.
Prerequisites: the instructor’s permission; some basic knowledge of social psychology is desirable.
Discussion of the unconscious mind from the perspective of social cognition, with an emphasis on both theoretical and empirical background, as well as current issues in measuring automatic processing. Topics include: implicit memory systems; unconscious attitudes, goals and behavior, emotions, and decision making; the activation and deactivation of knowledge systems; and priming.

PSYC GU4645 Culture, Motivation, and Prosocial Behavior. 4 points.
Prerequisites: Some knowledge of Research Methods, Statistics, and Social Psychology, plus Instructor’s Permission.
Reviews and integrates current research on three important topics of social psychology: culture, motivation, and prosocial behavior. Discussions and readings will cover theoretical principles, methodological approaches, and the intersection of these three topics. Students will write a personal research proposal based on the theories presented during the seminar.

Fall 2020: PSYC GU4645

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PSYC GU4672 Moral Psychology. 4 points.
Prerequisites: Two courses in psychology, including at least one course with a focus on social and/or developmental psychology, and permission of the instructor.
Review of theories and current research on moral cognition and behavior. Topics include definitions of morality, the development of moral cognition, the role that other aspects of human experience (e.g., emotion, intentions) play in moral judgments, and the relationship between moral psychology and other areas of study (e.g., religious cognition, prejudice and stereotyping, the criminal justice system).

PSYC GU4682 FAQs about Life: Applications of Psychological Research to Everyday Experiences. 4 points.
Prerequisites: Two courses in psychology, with at least one focusing on statistics and/or research methods in psychology, and permission of the instructor.
Review of basic psychological research that is relevant to questions people frequently encounter during the course of everyday life. Potential topics for this seminar include research on decision-making, emotion, and/or interpersonal relationships.

PSYC GU4685 Social Cognitive Neuroscience (Seminar). 3 points.
Prerequisites: for graduate students, course equivalents of at least two of the following courses: PSYC UN1001, PSYC UN1010, PSYC UN2630, PSYC UN3410, PSYC UN3480, and PSYC UN3485; and/or the instructor’s permission.
An introduction to the emerging interdisciplinary field of social cognitive neuroscience, which examines topics traditionally of interest to social psychologists (including control and automaticity, emotion regulation, person perception, social cooperation) using methods traditionally employed by cognitive neuroscientists (functional neuroimaging, neuropsychological assessment).

PSYC GU4686 Barriers and Levers for Behavior Change. 4 points.
Prerequisites: (PSYC UN1001 or PSYC UN1010) and prior coursework in research methods/statistics. A prior course related to social, applied, and cultural psychology or decision making will also be helpful.
Seminar course exploring individual, social, and cultural barriers and levers for behavior change, with a focus on social issues, such as motivating pro-environmental action, encouraging positive health behavior change, and promoting charitable giving.