

# PSYCHOLOGY

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Psychology is the scientific study of the mind, the brain, and human behavior. The Psychology department offers course work and research opportunities in the fields of clinical, cognitive, developmental, neuroscientific, and social psychology. By studying psychology, students better understand human behavior, including who we are, how we do the things we do, and how we enhance our lives and society. The Psychology major provides a foundation for careers in education and research; law; medicine and public health; politics and public policy; and in business fields such as marketing, finance, and management.

## COURSE NUMBERING

Courses in the department are organized so that they are best taken in several parallel sequences. Courses numbered from 120 to 190 and ending in a zero are core survey courses that introduce students to major areas of psychology and provide additional background for more advanced courses. These courses represent major content areas of psychology; students should sample broadly from them before specializing. Courses numbered from 200 to 209 focus on statistics. Courses numbered from 210 to 299 teach general methodology or data collection in various areas of psychology. Courses numbered from 300 to 399 are more advanced courses in a particular specialization. Senior seminars, whose enrollment is limited to twenty students, are numbered from 400 to 489. These seminars are best taken once a student has appropriate background. Courses numbered from 490 to 499 are special tutorial courses that require permission of the adviser and the director of undergraduate studies.

## PREREQUISITE

PSYC 110, a general survey course, is prerequisite to several 100-level and all 200-level and above courses. This prerequisite may alternatively be satisfied by a score of 5 on the Psychology Advanced Placement test.

## REQUIREMENTS OF THE MAJOR

**The major for the Class of 2018** With DUS approval, the following changes to the requirements of the major may be fulfilled by students who declared their major under previous requirements.

**The standard major for the Class of 2019 and subsequent classes** The major in Psychology for both the B.A. degree program and the B.S. degree program requires twelve term courses beyond PSYC 110, including the senior requirement.

1. Because psychology is so diverse a subject, every student is required to take four courses from the list below. Two of these courses must be from the social science point of view in psychology and two must be from the natural science point of view. At least one from each group must be a course designated as "Core" in the course listings. Students are expected to take their two core courses as early as possible in the major, normally within two terms after declaring their major.

*Social science:* PSYC 125, 126, 127, 128, 139, 140, 141, 150, 151, 180, 181, 182, 232L, 250, 280L, 313, 315, 330, 332, 334, 342, 355

*Natural science:* PSYC 120, 130, 135, 147, 149, 160, 161, 162, 171, 179, 316, 230L, 233, 260, 270, 303, 317, 318, 320, 321, 322, 324, 327, 331, 335, 337, 350, 352, 371, 372, 376

2. Because statistical techniques and the mode of reasoning they employ are fundamental in psychology, a course in statistics (PSYC 200) is required, preferably prior to the senior year. A student may substitute S&DS 103 for PSYC 200 or may substitute an examination arranged with the instructor of PSYC 200 for the course requirement. Students may take the examination only one time, and an additional course in psychology should be taken if the examination substitutes for PSYC 200.
3. To assure some direct experience in collecting and analyzing data, students must elect at least one course, preferably prior to the senior year, in which research is planned and carried out. Courses numbered between 210 and 299 fulfill this research methods requirement.
4. Students may, with permission of the DUS, count up to three term courses in other related departments toward the major. Appropriate courses are rare and students should consult with the DUS in Psychology about selecting outside courses.

Students interested in research are encouraged to take an independent study course (PSYC 493) as early as the sophomore year. Students may also take PSYC 495 for one-half course credit of independent research per term with prior permission of the faculty adviser and the DUS. To obtain permission, download the tutorial form from the department website, and submit it by the seventh calendar day after the classes begin. These independent study courses are graded P/F. No more than a total of three credits from PSYC 490-499 combined may count toward the major.

**Neuroscience track** Students with a major interest in neuroscience may wish to elect the neuroscience track. Such students are considered Psychology majors for whom the requirements have been modified to accommodate their interests, and to reflect the multidisciplinary nature of modern neuroscience and psychology. Given the broad nature of the field of neuroscience, students may wish to concentrate their studies in one area of the field (e.g., behavioral, cellular and molecular, cognitive, affective, social, clinical, or developmental). Interested students are encouraged to meet with the track adviser, Avram Holmes, 402 SSS, 436-9240,

avram.holmes@yale.edu. Majors in the neuroscience track meet with the track adviser at the beginning of each term in their junior and senior years.

Requirements for the neuroscience track are the same as for the standard major, with the following additional requirements:

1. Two terms of introductory biology are required for the major, either MCDB 120 or BIOL 101 and 102, and either E&EB 122 or BIOL 103 and 104. Students who have scored 5 on the Advanced Placement test in Biology may place out of these courses.
2. Students must take PSYC 160 or 170 and a data-collection course chosen from PSYC 230L, 260, or 270. MCDB 320 may substitute for the PSYC 160 or 170 requirement, or MCDB 320 and 321L may substitute for the PSYC 230L, 260, or 270 requirement, but not both. If MCDB 320 is substituted for a Psychology course, it cannot be counted as one of the two advanced science courses outside the department (see item 4 below).
3. As required for the standard major, students in the neuroscience track must take two courses from the social science list above, at least one of which must be designated as "Core" in the course listings. Students in the neuroscience track must also take a course from the natural science list in addition to the courses specified in item 2 above.
4. At least two advanced science courses must be chosen from Molecular, Cellular, and Developmental Biology and Ecology and Evolutionary Biology courses numbered 200 and above that deal with human and/or animal biology; recommended courses include MCDB 200, 202, 205, 210, MCDB 250, 250 300, 315, 320, E&EB 220, 225, and 240. Certain courses outside of these departments may also meet the advanced science requirement, including BENG 350, 421, CPSC 475, MB&B 300, 301, 420, 435, 443, 452, MATH 222, 225, 230, 231, and 241. Other courses may qualify for this requirement with permission of the neuroscience track adviser. Laboratory courses do not count toward the advanced science requirement. Students should note that many advanced science courses have prerequisites that must be taken first.

**Credit/D/Fail** No more than two term courses taken Credit/D/Fail may be applied toward the major; no 200-level course taken Credit/D/Fail may be applied toward the major.

#### SENIOR REQUIREMENT

**Standard major** Majors are required to earn two course credits from courses numbered PSYC 400–499. At least one of these courses (excluding PSYC 490–495, which can only be taken P/F) must be taken during the senior year, for which a student must write a substantial final paper (a minimum of 5,000 words) and receive a letter grade.

The B.A. degree is typically awarded to students who conduct a nonempirical literature review during senior year. There are no restrictions in the research format for the B.A.

The B.S. degree is awarded to students who conduct empirical research through PSYC 499 during senior year. An empirical research project normally includes designing an experiment and collecting and analyzing the data.

**Neuroscience track** The senior requirement for the neuroscience track is the same as for the standard major, except that the two required course credits from PSYC 400–499 must have neuroscience content. Students pursuing the B.S. degree in the track must carry out a neuroscientific empirical project in PSYC 499 and must be supervised by a faculty member within the neuroscience area of the Psychology department. Students who wish to work with an affiliated faculty member studying neuroscience outside the department must obtain permission from the neuroscience track adviser.

**Distinction in the Major** To be considered for Distinction in the Major, students must submit a senior essay to the Psychology department at least one week before the last day of classes in the term when the course used for the senior essay is taken. Senior essays that are submitted after the deadline will be subject to grade penalties. Senior essays considered for Distinction in the Major are graded by a second reader and the essay adviser.

#### ADVISING

Schedules for all majors must be discussed with, and approved by, the DUS or the adviser for the neuroscience track in Psychology. Only then may a schedule be submitted to the residential college dean's office. For questions concerning credits for courses taken at other institutions or at Yale but outside the Department of Psychology, students should consult with the DUS. For questions concerning the neuroscience track, students should consult with the adviser for the neuroscience track in Psychology.

**Computer Science and Psychology major** The interdepartmental major in Computer Science and Psychology may be considered by students with interests lying squarely between the two disciplines. See under Computer Science and Psychology for more information.

### REQUIREMENTS OF THE MAJOR

#### STANDARD MAJOR

**Prerequisite** PSYC 110

**Number of courses** 12 courses beyond prereq (incl senior req)

**Specific course required** PSYC 200

**Distribution of courses** B.A. or B.S. – 2 social science courses and 2 natural science courses, as specified; 1 course numbered PSYC 210–299

**Substitution permitted** For PSYC 200, S&DS 103 or exam arranged with instructor; up to 3 relevant courses in other depts, with DUS permission

**Senior requirement** *B.A.* – 1 course credit from PSYC 400-489 or 499 taken during senior year; 1 additional course credit from PSYC 400-499; *B.S.* – PSYC 499 taken during senior year; 1 additional course credit from PSYC 400-499

#### NEUROSCIENCE TRACK

**Prerequisite** PSYC 110

**Number of courses** 12 courses beyond prereq (incl senior req); same as for the standard major with the additional requirements listed below

**Specific courses required** MCDB 120 or BIOL 101 and 102; E&EB 122 or BIOL 103 and 104; PSYC 160 or 170; PSYC 200; PSYC 230L, 260, or 270

**Distribution of courses** *B.A.* or *B.S.* – 2 social science courses and 1 natural science course, as specified; at least 2 advanced science courses, as specified

**Substitution permitted** MCDB 320 for PSYC 160 or 170, or MCDB 320 and 321L for PSYC 230L, 260, or 270; for PSYC 200, S&DS 103 or exam arranged with instructor

**Senior requirement** *B.A.* – 1 course credit from PSYC 400-489 or 499 with neuroscience content taken during senior year; 1 additional course credit from PSYC 400-499 with neuroscience content; *B.S.* – PSYC 499 taken during senior year, with neuroscience content in a research project; 1 additional course credit from PSYC 400-499 with neuroscience content

#### FACULTY OF THE DEPARTMENT OF PSYCHOLOGY

**Professors** Woo-kyoung Ahn, John Bargh, Paul Bloom, Thomas Brown, Tyrone Cannon, BJ Casey, Marvin Chun, Margaret Clark, John Dovidio, Marcia Johnson, Jutta Joormann, Alan Kazdin, Frank Keil, Joshua Knobe, Marianne LaFrance, Gregory McCarthy, Jennifer Richeson, Peter Salovey, Laurie Santos, Brian Scholl, Nick Turk-Browne, Karen Wynn

**Associate Professor** David Rand

**Assistant Professors** Arielle Baskin-Sommers, Steve Wohn Chang, Molly Crockett, Yarrow Dunham, Dylan Gee, Avram Holmes, Julian Jara-Ettinger

**Lecturers** Nelson Donegan, Kristi Lockhart, Mary O'Brien, Matthias Siemer

#### Courses

**PSYC 110a or b, Introduction to Psychology** Staff

A survey of major psychological approaches to the biological, cognitive, and social bases of behavior. SO

\* **PSYC 125a / CHLD 125a / EDST 125a, Child Development** Nancy Close and Carla Horwitz

The reading of selected material with supervised participant-observer experience in infant programs, a day-care and kindergarten center, or a family day-care program. Regularly scheduled seminar discussions emphasize both theory and practice. An assumption of the course is that it is not possible to understand children – their behavior and development – without understanding their parents and the relationship between child and parents. The focus is on infancy as well as early childhood. Enrollment limited to juniors and seniors. WR, SO

**PSYC 126a, Attraction and Relationships** Margaret Clark

Theory and empirical research on the antecedents and consequences of attraction, and on intra- and interpersonal processes that either facilitate or interfere with the formation and maintenance of close relationships. Methodological bases for rigorous study of these topics. SO

\* **PSYC 127a or b / CHLD 127a or b / EDST 127a or b, Theory and Practice of Early Childhood Education** Carla Horwitz

Development of curricula for preschool children – infants through six-year-olds – in light of current research and child development theory. WR, SO RP

\* **PSYC 128b / CHLD 128b / EDST 128b, Language, Literacy, and Play** Nancy Close and Carla Horwitz

The complicated role of play in the development of language and literacy skills among preschool-aged children. Topics include social-emotional, cross-cultural, cognitive, and communicative aspects of play. WR, SO RP

**PSYC 130a / CGSC 110a, Introduction to Cognitive Science** Brian Scholl

An introduction to the interdisciplinary study of how the mind works. Discussion of tools, theories, and assumptions from psychology, computer science, neuroscience, linguistics, and philosophy. SO

**PSYC 130b / CGSC 130b / EDST 130, The Mental Lives of Babies and Animals** Karen Wynn

Interdisciplinary exploration of the cognitive, social, and emotional capacities of creatures lacking language and culture. The extent to which our complex psychology is unique to mature humans; the relative richness of a mental life without language or culture. Some attention to particular human populations such as children with autism and adults with language disorders. SO

**PSYC 140b / EDST 140b, Developmental Psychology** Frank Keil

An introduction to research and theory on the development of perception, action, emotion, personality, language, and cognition from a cognitive science perspective. Focus on birth to adolescence in humans and other species. Prerequisite: PSYC 110. SO

**PSYC 147a / NSCI 147a, Animal Models of Clinical Disorders** Nelson Donegan

An interdisciplinary approach to understanding and treating psychiatric disorders, integrating clinical psychology, psychiatry, and advances in basic neuroscience. Focus on how research with animal models can advance our understanding of psychiatric disorders and generate more effective treatments for patients. Topics include drug addiction, depression, Parkinson's disease, and schizophrenia. SC, SO

**PSYC 150b / EDST 160b, Social Psychology** John Bargh

Study of social cognition, attitudes and persuasion, group processes, intergroup processes, prosocial behavior, aggression, and conformity. Theories, methodology, and applications of social psychology. Prerequisite: PSYC 110. SO

**PSYC 151a / EDST 150a, Theory and Practice of Emotional Intelligence** Marc Brackett

The role of emotions and emotional intelligence in everyday life and in education. Why emotions matter; how emotional intelligence is defined, measured, and taught; social and emotional learning. Research, theory, educational practices, and government policies that promote students' social, emotional, and academic competence from preschool through high school. SO

**PSYC 157b, Psychology and the Good Life** Laurie Santos

Psychological insights into how to live a better life and build a better world. Topics include scientifically-validated strategies for becoming happier, achieving behavior change, handling cognitive biases, and picking a meaningful career. Discussion of psychological insights into protecting the environment, improving education, promoting charitable giving, and inspiring healthier lifestyles. Students will practice strategies taught in the course to promote their own positive behavior change. SO

**PSYC 160a / NSCI 160a, The Human Brain** Gregory McCarthy

Introduction to the neural bases of human psychological function, including social, cognitive, and affective processing. Preparation for more advanced courses in cognitive and social neuroscience. Topics include memory, reward processing, neuroeconomics, individual differences, emotion, social inferences, and clinical disorders. Neuroanatomy, neurophysiology, and neuropharmacology are also introduced. SC

**PSYC 162a, Evolution of Cooperation** David Rand

Exploration of how the "selfish" process of evolution could have given rise to "altruistic" cooperation, and our willingness to invest time, money, and effort to help others. Evolutionary game theory and empirical/experimental data on human behavior combined to understand cooperation, with introduction to economic games such as the Prisoner's Dilemma, evolutionary theories such as reciprocity, kin selection, and group selection, and psychological motivations such as fairness, altruism, and spite. SO

**PSYC 179a, Thinking** Woo-kyoung Ahn

A survey of psychological studies on thinking and reasoning, with discussion of ways to improve thinking skills. Topics include judgments and decision making, causal learning, logical reasoning, problem solving, creativity, intelligence, moral reasoning, and language and thought. SO

**PSYC 200b, Statistics** Dylan Gee

Measures of central tendency, variability, association, and the application of probability concepts in determining the significance of research findings. QR

**PSYC 230b / NSCI 240b, Research Methods in Human Neuroscience** Gregory McCarthy

Experience in methods of human neuroscience research. Focus on functional magnetic resonance imaging, electroencephalography, and evoked potentials. Some attention to psychophysiological techniques such as the measurement of skin conductance. Students design experiments, acquire data, and perform analyses. Extensive use of MATLAB. Prerequisites: PSYC 110, 170, and a course in statistics, or permission of instructor. SC

**PSYC 232b, Research Methods in Social Decision Making** David Rand

Introduction to the psychology of social interaction using approaches inspired by game theory and experimental economic and theoretical biology. Students become familiar with key concepts from these areas, including utility theory, Nash equilibria, evolutionary stability, social preference models, and regression analysis. SO

**PSYC 233a, Research Methods in Cognition and Emotion** Matthias Siemer

Current methods of empirical research in the psychological study of human emotion and its regulation. Focus on cognitive-experimental approaches. Students design a study on a topic related to emotion regulation, conduct an experiment, collect data, and perform statistical analyses. Prerequisites: PSYC 110 or 131 and a course in statistics, or with permission of instructor. SO

**\* PSYC 235a, Research Methods, Writing Intensive** Jennifer Richeson

Introduction to general principles and strategies of psychological research. Topics include generating and testing hypotheses, laboratory and field experiments, scale construction, sampling, archival methods, case studies, ethics and politics of research, and Internet and cross-cultural methods. Hands-on research experience in laboratories. Prerequisites: PSYC 200 or S&DS 103, or permission of instructor. WR, SO

**PSYC 248a / ANTH 148La / NSCI 265a, Hormones and Behavior** Claudia Valeggia and Eduardo Fernandez-Duque

Introductory laboratory focusing on the interaction between hormones and behavior from an evolutionary and developmental perspective. Students gain competency in basic laboratory techniques (pipetting, diluting, aliquotting, etc.) and develop a small, group research project. Additional study of the theoretical background on which any laboratory work is developed through reading and discussing primary scientific literature on both human and non-human primates. SC ½ Course cr

**\* PSYC 258b / NSCI 258b, Computational Methods in Human Neuroscience** Nicholas Turk-Browne

This course provides training on how to use computational science for the advanced analysis of brain imaging data, primarily from functional magnetic resonance imaging (fMRI). Topics include scientific programming, high-performance computing, machine learning, network/graph analysis, real-time neurofeedback, nonparametric statistics, and functional alignment. Prerequisites: CPSC 100 or upper level course involving programming (CPSC 201, CPSC 202, and knowledge of Python preferred); PSYC 160; PSYC 230 preferred. QR, SC

**PSYC 270a or b / NSCI 235a or b, Research Methods in Behavioral Neuroscience** Nelson Donegan

Students design and conduct research to study brain function and behavior. Emphasis on hands-on participation in behavioral and neuroscience techniques. Prerequisites: PSYC 160 or 170, and a course in statistics, or with permission of instructor. SC

**PSYC 303b / NSCI 355b, Social Neuroscience** Molly Crockett

Exploration of the psychological and neural mechanisms that enable the formation, maintenance, and dissolution of social relationships. Topics include the neuroscience of how we form impressions and decide whether to instigate relationships with others; how we build relationships through trust, cooperation, attachment, conflict, and reconciliation; and group-level processes including intergroup bias, moral judgment, and decision making. Prerequisite: PSYC 110 or permission of instructor. SC

**\* PSYC 313a / CGSC 313a / PHIL 305a, Philosophy for Psychologists** Joshua Knobe

Introduction to frameworks developed within philosophy that have applications in psychological research. Principal topics include the self, causation, free will, and morality. Recommended preparation: a course in philosophy or psychology. HU, SO

**PSYC 317a / EDST 237a / LING 217a, Language and Mind** Maria Piñango

The structure of linguistic knowledge and how it is used during communication. The principles that guide the acquisition of this system by children learning their first language and adults learning a second language. The processing of language in real-time. Language breakdown as a result of brain damage. SO

**PSYC 318b / LING 220b, General Phonetics** Jonathan Manker

Investigation of possible ways to describe the speech sounds of human languages. Acoustics and physiology of speech; computer synthesis of speech; practical exercises in producing and transcribing sounds. SO

**PSYC 321b / NSCI 346b, Psychopharmacology** Thomas Brown

Study of therapeutic and recreational drugs that affect the central nervous system and influence mood, cognition, perception, and behavior. Drugs considered vary from psychotropic to hypnotic to narcotic. Prerequisite: PSYC 160 or 170 or equivalent, or permission of instructor. SC

**PSYC 327a / LING 227a, Language and Computation I** Robert Frank

Design and analysis of computational models of language. Topics include finite state tools, computational morphology and phonology, grammar and parsing, lexical semantics, and the use of linguistic models in applied problems. Prerequisite: prior programming experience or permission of instructor. QR, SO

**PSYC 330b, Psychology and the Law** Kristi Lockhart

Contributions of psychological theory and research to our understanding of the law and the criminal justice system. Topics include criminality, eyewitness testimony, lie detection, jury decision making, the death penalty, the insanity defense, civil commitment, prisons, repressed memories, children as witnesses and defendants, and the role of psychologists as expert witnesses and trial consultants. SO

**\* PSYC 334a / CHLD 334a, Developmental Psychopathology** Fred Volkmar, Eli Lebowitz, and Denis Sukhodolsky

Study of developmental psychopathology during childhood and adolescence, team taught by a child psychiatrist and three psychologists. Topics include: aspects of normal development, assessment methods, clinical disorders, treatment, and legal and social policy issues. Review of normative development, followed by discussion of theoretical approaches to understanding developmental aspects of common mental health conditions in childhood. Attention to treatment models as well as relevant issues of culture and ethnicity in the expression of psychopathology. PSYC 130, 140, 180, or equivalent, or with permission of instructor.

**PSYC 335a / NSCI 340a, Cognitive Neuroscience** Staff

Examination of the fundamental and advanced principles underlying several cognitive functions from the perspectives of modern cognitive, systems, and computational neuroscience. Discussion of cognition in both humans and animal models through research of general neurobiological principles followed by several key examples from research studies that have influentially shaped the field. Prerequisite: PSYC 160 or specific chapter readings from the instructor. SC

**PSYC 342a / WGSS 315a, Psychology of Gender** Marianne LaFrance

Exploration of the relationship between gender and psychological processes at individual, interpersonal, institutional, and cross-cultural levels. SO

\* **PSYC 350b / CHLD 350b / EDST 350b, Autism and Related Disorders** Fred Volkmar and James McPartland

Weekly seminar focusing on autism and related disorders of socialization. A series of lectures on topics in etiology, diagnosis and assessment, treatment and advocacy, and social neuroscience methods; topics cover infancy through adulthood. Supervised experience in the form of placement in a school, residence, or treatment setting for individuals with autism spectrum disorders. Details about admission to the course are explained at the first course meeting. Prerequisite: an introductory psychology course. SO

**PSYC 352b / CGSC 352b / NSCI 352b, Arrested or Adaptive Development in the Adolescent Brain** BJ Casey

Study of empirical and theoretical accounts of adolescent-specific changes in the brain and in behavior that relate to the development of self control. Discussions will focus on adaptive and arrested adolescent brain development in the context of relevant legal, social, and health policy issues. SC

\* **PSYC 355a / EDST 355a, Clinical Psychology in the Community** Kristi Lockhart

Mental disorders as they are treated within a community setting. Students participate in a fieldwork placement, working either one-on-one or in groups with the psychiatrically disabled. Seminar meetings focus on such topics as the nature of severe mental disorders, the effects of deinstitutionalization, counseling skills, and social policy issues related to mental health. Prerequisite: PSYC 180 or permission of instructor.

\* **PSYC 372a / LING 490a, Research Methods in Linguistics** Raffaella Zanuttini

Development of skills in linguistics research, writing, and presentation. Choosing a research area, identifying good research questions, developing hypotheses, and presenting ideas clearly and effectively, both orally and in writing; methodological issues; the balance between building on existing literature and making a novel contribution. Prepares for the writing of the senior essay.

**PSYC 376a / NSCI 341a, Learning and Memory** Thomas Brown

The basic facts, general principles, and theories that describe how higher animals, from mice to humans, are changed by their experiences. The historically separate fields of learning and memory research desegregated under a neuroscientific perspective that recognizes the evolutionary continuity among higher animals. Prerequisite: Introductory courses in biology and psychology, or permission of instructor. SC, SO

\* **PSYC 402a, Topics in Infant Studies** Karen Wynn

Advanced topics in infant cognitive, social, and emotional development. Attention to infant attachment strategies as well as maternal and paternal investment and attachment. Perspectives from biology; anthropology; and developmental, comparative, clinical, physiological, and evolutionary psychology. SO

\* **PSYC 404a, Topics in Cognition and Emotion** Matthias Siemer

An overview of current research questions and results in the area of cognition and emotion. Exploration of both basic research questions as well as implications of cognitive approaches towards emotions for domains such as emotional disorders and psychological resilience and well-being. Prerequisite: PYSC 110. SO RP

\* **PSYC 409a, Science of Free Will** Thomas Brown

The scientific facts and arguments behind the theory that free will is an illusion or invalid construct. Implications of this theory for religion, law, and morality. Supporting evidence drawn from the fields of psychology, neuroscience, genetics, physics, and complex adaptive systems. SO

\* **PSYC 412a / CGSC 412a, Theories of Human Uniqueness** Mark Sheskin

Overview of several theories of human uniqueness. Foundational topics include human language vs. animal communication, human moral psychology vs. animal social behavior, and transmission of human culture vs. intergenerational learning in animals. Debates include how theories of human uniqueness relate to each other, and whether any constitute a categorical difference between human and nonhuman animals.

\* **PSYC 414b / WGSS 466b, Gender Images: A Psychological Perspective** Andrea Celeste Vial Vazquez

The nature and psychological impact of exposure to visual images that portray various dimensions of gender, such as sex differences and sexuality, in various media, including advertising, television, film, and Facebook. How to empirically decode gender images in contemporary media as well as assess their range of influences. The overall aim is to understand how visual representations of gender affect psychological identity and well-being. SO

\* **PSYC 425b / CGSC 425b, Social Perception** Brian Scholl

Connections between visual perception, among the earliest and most basic of human cognitive processes, and social cognition, among the most advanced forms of higher-level cognition. The perception of animacy, agency, and goal-directedness; biological motion; face perception (including the perception of facial attractiveness); gaze processing and social attention; "thin-slicing" and "perceptual stereotypes"; and social and cultural influences on perception. SO

\* **PSYC 428a / NSCI 442a, Neuroscience of Decision-Making** Molly Crockett

An overview and examination of the neuroscience of decision making. Interdisciplinary course highlighting research from cognitive neuroscience, psychology, behavioral economics, finance, marketing, computer science, and public health. Topics include utility and value, reinforcement learning, risky decision making, impulsivity and self control, social decision making, psychopathology, and commercial applications (e.g., neuromarketing and neurofinance). Permission of the instructor. SC

\* **PSYC 437b / CGSC 437b, Minds, Brains, and Machines** Julian Jara-Ettinger

Exploration of the implications that the brain is a kind of computer that gives rise to the mind. Readings combine classical and cutting-edge research in psychology, philosophy, and artificial intelligence. SO RP

\* **PSYC 477b / EDST 377b, Psychopathology and the Family** Kristi Lockhart

The influence of the family on development and maintenance of both normal and abnormal behavior. Special emphasis on the role of early childhood experiences. Psychological, biological, and sociocultural factors within the family that contribute to variations in behavior. Relations between family and disorders such as schizophrenia, depression, anorexia nervosa, and criminality. Family therapy approaches and techniques. SO

\* **PSYC 493a or b, Directed Research** Woo-kyoung Ahn

Empirical research projects or literature review. A student must be sponsored by a faculty member, who sets the requirements and supervises the student's progress. To register, the student must download a tutorial form from <http://psychology.yale.edu/undergraduate/undergraduate-major-forms>, complete it with the adviser, and submit it to the director of undergraduate studies by the seventh calendar day from the beginning of the term. The normal minimum requirement is a written report of the completed research or literature review, but individual faculty members may set alternative equivalent requirements. May be elected for one or two terms. May not be used for the Psychology senior requirement.

\* **PSYC 495a or b, Research Topics** Woo-kyoung Ahn

Empirical research project or literature review. A student must be sponsored by a faculty member, who sets the requirements and supervises the student's progress. To register, the student must download a tutorial form from <http://psychology.yale.edu/undergraduate/undergraduate-major-forms>, complete it with the adviser, and submit it to the director of undergraduate studies by the seventh calendar day from the beginning of the term. The normal minimum requirement is a written report of the completed research or literature review, but individual faculty members may set alternative equivalent requirements. May be elected for one or two terms. May be repeated for credit. May not be used for the Psychology senior requirement. ½ Course cr

\* **PSYC 499a or b, Senior Essay** Woo-kyoung Ahn

Independent senior research project (either empirical research or literature review), conducted under the guidance of a faculty adviser who sets the requirements and supervises the research. To register, the student must download a tutorial form from <http://psychology.yale.edu/undergraduate/undergraduate-major-forms>, complete it with the adviser, and submit it to the director of undergraduate studies by the seventh calendar day from the beginning of the term. The normal minimum requirement is a written report of the completed research or literature review, but individual faculty members may set alternative equivalent requirements. A paper of 5,000 words or more meets the writing needed for the senior requirement. To be considered for Distinction in the Major, the paper should be submitted at least one week before the last day of classes and will be graded by the adviser and a second reader assigned by the DUS.