NB: this is a preliminary draft posted 23 July 2025

Psychology 414
Cognitive Psychology
Fall 2025

Course Goal: To develop an appreciation for what we know about human cognition (content), how we acquire this knowledge (methodology), and how to evaluate it (critical thinking). The course will emphasize three themes:

1. Understanding the cognitive system is a scientific undertaking. Like any other science, cognitive psychology requires formulation of theories, not just the collection of facts. (And also like any other science, proving facts and testing theories requires rigorous experimentation; one cannot rely on intuition about "how it seems like things should work".)
2. The major purpose of experiments is to help us discriminate between good theories of cognition (those that might be correct) and poor theories (those that can't be correct).
3. Because cognition arises from the brain, understanding principles of brain structure, brain function, and brain-behavior relations can give us important insights about the organization of cognitive processes.

Learning Outcomes:
Upon satisfactory completion of this course, students will be able to:
• describe the anatomical structures associated with the following major classes of cognition: perception, attention, motor control, memory, and cognitive control;
• explain the process of the transduction of information from the outside world into a neural code, and the brain's representation of that information an any of multiple mental codes;
• understand the empirical logic underlying the design of experiments in which dependence of performance (e.g., accuracy and/or reaction time) on variation of an independent variable supports inferences about cognitive mechanisms;
• critically evaluate claims about cognitive psychology and cognitive neuroscience as they appear in the popular press

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Office hours by appointment.
TA: Jung Woo Hur; office: 165 Psychology; email: jhur9@wisc.edu.
Office hours: Tues., 11:30am-12:30pm; Thurs., 8:30am-9:30am.

With the exception of time-sensitive emergencies, email is the most effective and preferred way for us to be to contacted.

Format: Two weekly lectures plus outside of class Web-based quizzes. Assigned readings will be drawn primarily from Willingham and Riener (2025) *Cognition* (5th Ed.), supplemented excerpts from the professor's textbook Postle (2020) *Essentials of Cognitive Neuroscience* (2nd ed) (and/or Postle (2026; 3nd ed)), which will be accessible as pdfs from course's Canvas page. These readings will provide important background for the lectures, and LECTURES WILL ASSUME THAT STUDENTS HAVE READ THE MATERIAL BEFORE THAT DAY'S CLASS.

There are three equally weighted **unit exams**, each testing your understanding of the material associated with one of the three sections into which the course is organized. Note that information from each of the three principal media used in the course--readings, lectures, quizzes--will appear on the unit exams. Each of the unit exams is in-class, and none is cumulative. Unit exams are multiple-choice, fill-

in-the-bubble format. There will be between 30-40 questions on each exam, and time allotted for taking each exam is 75 min – the duration of a class period.

Outside of class there will be a series of **Web-based quizzes**, administered via canvas. There will be one quiz corresponding to the content of each lecture, with the due date for each quiz falling several days after its associated lecture (due dates for each quiz are specified in the syllabus). There are fourteen quiz due dates throughout the semester and for each one a student can earn 1, .5, or 0 points. *You must complete each quiz assignment by 9:00 am on the assignment's due date in order to get full credit.* Quiz assignments submitted within one week after the due date (i.e., by *9:00 am* seven days after the due date) will receive 1/2 credit; those later than one week will receive no credit.

Grading: Grades on each exam, and for the course overall, will be assigned using criteria no more stringent than, A ≥ 90%; AB ≥ 87%; B ≥ 80%; BC ≥ 75%; C ≥ 70%; D ≥ 63%. That is, *there is no curve*, *so the grade you earn is a direct function of your own performance, and uninfluenced by the class average*[1]. Each exam counts toward 25% of your final grade. The remaining 25% is determined by the timeliness with which you perform each quiz.

At the end of the semester, there will invariably be students whose numerical grade in the course is extremely close to, but just below, a letter-grade cut-off. In order to be fair to all students, however, **we observe a strict policy of not rounding numerical grades to the nearest integer** (and not entertaining requests to deviate from this policy on an individual basis). There are no opportunities for "extra credit" projects that might boost one's score. Your final grade for the course is determined solely by your performance on the exams and the diligence with which you get your quiz assignments in on time. (The time to start concerning yourself about your grade in the course, therefore, begins on Sept. 9, not on days when exam scores are posted!)

Missing exams, make-ups, and extensions on quiz deadlines: Per University policy, you have two weeks (i.e., until 9/23/21) to make arrangements with the professor about making up an exam due to a conflict (e.g., if you know that you'll be missing class on a particular day due to a trip, a religious observance, etc.). The same policy applies to quizzes. We will not consider requests for make-ups or deadline extensions after 9/23/21 for conflicts that could have been predicted at the beginning of the semester. We are, of course, much more flexible regarding unforeseen circumstances, such as illness or a family emergency. (In cases of illness, we'll expect you to send an email to the TA (jshan23@wisc.edu) on the day of the missed lecture or, if that's not possible, to be able to supply reasonable documentation after the fact.)

More about Quizzes: The pedagogical motivation for these quizzes is a phenomenon that has been studied extensively by cognitive psychologists, called the test-enhanced learning effect (or, sometimes, just "the test effect"). This phenomenon will be considered in some detail in the first lecture of the semester, and again in the section on learning and memory. And it works! See for your self by visiting postlab.psych.wisc.edu, navigating to "publications," and reading *Hattikudur, S. and Postle, B.R. (2011)*. Effects of test-enhanced learning in a cognitive psychology course. *Journal of Behavioral and Neuroscience Research, **9**, 151-157*, a peer-reviewed account of effects of a test-enhanced learning intervention **in this class** (as taught in the decade of the 2000s).

(Note that from a practical perspective these quizzes are best construed as "homework").

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[1] In principle, if class average grades are atypically low, we can consider scaling grades "up," which can only help everyone. In the history of me teaching this course, however, we've only had to do this once, in pandemic year 2021.

PLEASE NOTE: The customary rules of thumb about academic honesty pertain to the quizzes as well as to other aspects of this course. Thus, for example, each student is expected to perform each quiz themself. Using Chat GPT or any other AI would defeat the purpose of the quizzes altogether (we'll discuss the principle of cognitive psychology that explains why).

Please read this section carefully. Administering quizzes via Canvas is somewhat kludgy, but if you follow these instructions it will work the way that we need it to. To access each quiz, first **select the "Modules" link** from the column on the left-hand side of the of the course's home page. Note: **Do <u>not</u> select the link called "Quizzes", nor the link called "Assignments"**.

Once you're in the Modules page, scroll down until you get to the quiz that you want to take. Note that we've set it up with two constraints: 1) quizzes have to be taken in order; 2) you will not be able to proceed from one quiz to another until you get all the questions on the previous quiz correct (we'll define what this means further along).

From the Modules page, you'll be able to see that each quiz that you have successfully completed is marked with a green " ". If you've previously attempted a quiz, but didn't get all the questions correct, it will have a red "Θ" next to it. If a quiz has the red "Θ", you'll need to successfully complete that quiz before you can proceed to the next one.

Within each quiz, there are two parts: a short-answer section and two-to-four multiple-choice questions. The short-answer question within each quiz will be called "Question 1," and you need to write in a sentence or two to answer this question as accurately as you can. Once you have answered this question, hit the "Next" button at the bottom of the page, and you'll be taken to "Question 2", which will be a multiple-choice question. Once you've answered the final multiple-choice question of that quiz, click the "Submit Quiz" button. If you answered all of the multiple-choice questions correctly, the interface will allow you to proceed to the next quiz. If you answered any of the multiple-choice questions *incorrectly*, you will be taken to an overview of the quiz, the question(s) that you answered incorrectly will be highlighted in red, and feedback will be given to explain why your answer was incorrect. Once you've looked this over, you can select the "Take the Quiz again" button, and then take the quiz again. The system is set up so that you will not be able to proceed to the subsequent quiz until all the questions on the current one have been answered correctly. (Note that although Canvas does not "grade" your short-answer question, the TA will spot check short-answer questions from a randomly selected subset of students each week, and blank or otherwise "fake" responses will result in a score 0 for that quiz.)

Advice: Keep in mind that these quizzes are a tool to enhance your learning of the material from this course (see *Hattikudur, S. and Postle, B.R. (2011)*, on the previous page). To take maximal advantage of them, we suggest three things. *<u>First</u>*, although you will for-sure want to have done the assigned readings and looked over your notes beforehand, try to take the quiz without any external aids. Even if you're not sure that you know the answer, or everything that there is to be known about the question. Careful, hard thinking is an important element to making the test-enhanced learning effect work. *<u>Second</u>*, after you've completed each section of multiple choice questions, go back and look at what you wrote down for your short answer. If your short answer does not include a concept or fact that is emphasized in any of the multiple-choice questions, ask yourself why. Is there just a superficial reason, like word choice, that makes your short answer different, or did your short answer not include the important conceptual point that the multiple-choice question was probing? If it's the latter, now's the time to go back through your lecture notes and/or the reading to find the critical information. If you're still not sure that you've found it, or if you don't you fully understand it, reach out to the TA or the professor. *<u>Third</u>*, once you've completed the quiz and are comfortable that you understand what information it was probing, go to your lecture notes, and to the book, and highlight and/or annotate (e.g., by adding additional notes in the margin) what's already written there. This final step will help you the next time you look at this material, such as when you're studying for the exam.

Monitoring your grade on canvas: After quiz assignments and exams have been graded, you can view your grades and keep track of your progress in the course by clicking on "**Grades**."

Periodic announcements and modifications to the syllabus will also be posted on the course's canvas page.

"Laptop lane": Taking notes in class on a laptop is permissible, *although you should know that there is research suggesting that students who do so perform worse than do their peers who take notes on paper*. Checking email/social media in class is frowned upon, and *there is strong evidence that "multitasking" on a computer during lecture negatively impacts learning.* Further, there is research suggesting that this effect even generalizes to students who are just sitting near a "multitasking" classmate – it's the "second-hand smoke" of electronic media usage. In view of this, students who want to sit with an open laptop (or electronic notepad) during lecture will be asked to sit in a dedicated section of the lecture hall, probably the right-side section of seats (as you face the front).

Slides from lecture; lectures notes; videos of lecture: With rare exception, slides presented during lecture are NOT posted before lecture. (*Guess what? There is also research suggesting that grades decline when lecture slides are made available beforehand. For this, too, we'll discuss the principle of cognitive psychology that explains why.*) Being able to sit through a presentation and selectively write down what's important, and to not write down what's not important, is an important skill that you'll often need to draw on throughout your adult life. I also don't make the powerpoint slides available after the lecture, because these can be viewed on the recording of the lecture that gets posted w/in the 24 hrs after each one.) Early in the semester we will make available to the entire class an example of "good notes" that have been taken by one of your classmates. If, in addition to this, you want advice about effective note taking, or want to have an example of your notes evaluated, the TA or the professor will be happy to help. (The exception to the "no slides" policy will be for individual images that are extraordinarily complicated, or perhaps that include hard-to-draw animations. These will either be flagged as they arise during lecture, and posted later that same day, or, in some cases, you'll be alerted ahead of time that a key slide is going to be posted prior to lecture and you'll be encouraged to bring a printout of that image to lecture in order to be able to make notes directly on it.)

Lectures will be videotaped, and each video made available within a week of each lecture, though I strive for by the end of that same day.

Readings: On the schedule that begins on the following page, assigned readings from Willingham and Riener (2025) *Cognition* (5th Ed.) will be listed as: "*W&R (2025) Chpt. x*" when an entire chapter is assigned, and as "*W&R (2025)pp. x-y*" when an excerpt is assigned. Assigned readings from Postle (2020) *Essentials of Cognitive Neuroscience* (2nd ed) (and/or Postle (2026; 3rd ed) will be listed in the format "*Postle(202x)TheBrain.pdf*."

Date	Lecture # and Topic	Reading
	Section I: Perception and Attention	
September 4	1. Introduction/History	*W&R (2025) Chpt. 1*
September 9	2. The Brain	*Postle(202x)TheBrain.pdf*
Quiz 1 due		
September 11	3. Perception, emphasis on vision	*W&R (2025) pp. 71-95*
Quiz 2 due		
September 16	4. Neuropsychology of vision	*Postle(202x)WhatWhere.pdf*
Quiz 3 due		
September 18	5. A special case of vision: word recognition; Computational modeling: Connectionism	*W&R (2025) pp. 96-107*
Quiz 4 due		
September 23	6. Attention	*W&R (2025) Chpt. 4*
Quiz 5 due		
September 25	7. Attention: Spatial cognition; Neuropsychology of attention	*Postle(202x)neglect.pdf*
Quiz 6 due		
September 30	8. Cognitive maps and their neural correlates	*Postle(202x)PlaceCells.pdf*
Quiz 7 due		
October 2	**Unit Exam 1**	
Quiz 8 due		
	Section II: Representation and Memory	
October 7	9. Mental Codes: Imagery	*W&R (2025) Appendix A*
October 9	10. Long-term memory encoding	*W&R (2025) Chpt. 7 + Postle(202x)HebbianPlasticity*
Quiz 9 due		
October 14	11. Long-term memory retrieval	*W&R (2025) Chpt. 6 + pp. 216-223*
Quiz 10 due		
October 16	12. Short-term and working memory	*W&R (2025) Chpt. 5*
Quiz 11 due		
October 21	13. Learning	*Postle(202x)ReinforcementLearning*
Quiz 12 due		
October 23	14. Mental Codes: Knowledge-based representations	*W&R (2025) Chpt. 9*
Quiz 13 due		
October 28	15. Metacognition & memory errors	*W&R (2025) pp. 224-229*
Quiz 14 due		
October 30	16. Catch up/Exam 2 review	
Quiz 15 due		

Date	Lecture # and Topic	Reading
November 4	**Unit Exam 2**	
	Quiz 16 due	
	Section III: High-Level Cognition, Cognitive Control, Communication, Consciousness	
November 6	17. Action	*Postle(202x)Action*
November 11	18. Cognitive control	*Postle(202x)CognitiveControl*
	Quiz 17 due	
November 13	19. Decision making	*W&R (2025) pp. 326-333*
	Quiz 18 due	
November 18	20. Reasoning	*W&R (2025) pp. 333-338*
	Quiz 19 due	
November 20	21. Problem solving	*W&R (2025) Chpt. 13*
	Quiz 20 due	
November 25	22. Auditory and speech perception; structure of language	*W&R (2025) Chpt. 11*
	Quiz 21 due	
December 2	23. Language comprehension and production	*W&R (2025) Chpt. 10*
	Quiz 22 due	
December 4	24. Consciousness	*Postle(202x)Consciousness*
	Quiz 23 due	
December 9	**Unit Exam 3**	
	Quizzes 24 due	

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ETHICS OF BEING A STUDENT IN THE DEPARTMENT OF PSYCHOLOGY

The members of the faculty of the Department of Psychology at UW-Madison uphold the highest ethical standards of teaching and research. They expect their students to uphold the same standards of ethical conduct. By registering for this course, you are implicitly agreeing to conduct yourself with the utmost integrity throughout the semester.

In the Department of Psychology, acts of academic misconduct are taken very seriously. Such acts diminish the educational experience for all involved – students who commit the acts, classmates who would never consider engaging in such behaviors, and instructors. Academic misconduct includes, but is not limited to, cheating on assignments and exams, stealing exams, sabotaging the work of classmates, submitting fraudulent data, plagiarizing the work of classmates or published and/or online sources, acquiring previously written papers and submitting them (altered or unaltered) for course assignments, collaborating with classmates when such collaboration is not authorized, and assisting fellow students in acts of misconduct. Students who have knowledge that classmates have engaged in academic misconduct should report this to the instructor.

ACADEMIC INTEGRITY

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison's community of scholars in which everyone's academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review. For more information, refer to https://conduct.students.wisc.edu/academic-misconduct/.

COMPLAINTS

Occasionally, a student may have a complaint about a TA or course instructor. If that happens, you should feel free to discuss the matter directly with the TA or instructor. If the complaint is about the TA and you do not feel comfortable discussing it with the individual, you should discuss it with the course instructor. Complaints about mistakes in grading should be resolved with the TA and/or instructor in the great majority of cases. If the complaint is about the instructor (other than ordinary grading questions) and you do not feel comfortable discussing it with the instructor, make an appointment to speak to the Associate Chair for Undergraduate Studies, Professor Kristin Shutts, kshutts@wisc.edu.

If you have concerns about climate or bias in this class, or if you wish to report an incident of bias or hate that has occurred in class, you may contact the Chair of the Department, Professor Allyson Bennett (allyson.j.bennett@wisc.edu) or the Chair of the Psychology Department Climate & Diversity Committee, Martha Alibali (martha.alibali@wisc.edu). You may also use the University's bias incident reporting system, which you can reach at the following link: https://doso.students.wisc.edu/services/bias-reporting-process/.

CONCERNS ABOUT SEXUAL MISCONDUCT

All students deserve to be safe and respected at UW-Madison. Unfortunately, we know that sexual and relationship violence do happen here. Free, confidential resources are available on and off campus for students impacted by sexual assault, sexual harassment, dating violence, and stalking (regardless of when the violence occurred). You don't have to label your experience to seek help. Friends of survivors can reach out for support too. A list of resources can be found at https://www.uhs.wisc.edu/survivor-resources/

If you wish to speak to someone in the Department of Psychology about your concerns, you may contact the Chair of the Department, Professor Allyson Bennett (allyson.j.bennett@wisc.edu) or the Associate Chair of Undergraduate Studies, Professor Kristin Shutts, (kshutts@wisc.edu). Please note that all of these individuals are Responsible Employees (https://compliance.wisc.edu/titleix/mandatory-reporting/#responsible-employees).

ACCOMMODATIONS POLICIES

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations, as part of a student's educational record is confidential and protected under FERPA.

UW-Madison students who have experienced sexual misconduct (which can include sexual harassment, sexual assault, dating violence and/or stalking) also have the right to request academic accommodations. This right

is afforded them under Federal legislation (Title IX). Information about services and resources (including information about how to request accommodations) is available through Survivor Services, a part of University Health Services: https://www.uhs.wisc.edu/survivor-services/ .

DIVERSITY & INCLUSION

"Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world."

https://diversity.wisc.edu/