Course Information

Course Number: PSYC 689
Course Title: Special Topics in Categories and Concepts
Section:
Time: Tuesdays 12:45 – 3:45
Location: PSYC 336
Credit Hours: 3

Instructor Details

Instructor: Dr. Darrell A. Worthy
Office: PSYC 267
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E-Mail: worthyda@tamu.edu (preferred method of contact)
Office Hours: By appointment

Course Description

The goal of this course is to expose students to prominent research related to how people learn and reason about categories and concepts, and to stimulate critical thinking about the research and current directions of the field. The readings for the course come directly from high-impact, peer-reviewed journals, and they cover a broad range of topics related to conceptual and categorical thinking. The format will allow students to improve their speaking and discussion skills, and the material covered will improve students' knowledge base of one of the most actively researched topics in psychology. The course is centered on readings from cognitive psychology and cognitive neuroscience, but students with focuses in other areas of psychology, as well as students in business, economics, and marketing may benefit from the course.

Course Prerequisites

None.

Special Course Designation

None

Course Learning Outcomes

To gain knowledge of scholarly research on categories and concepts. This knowledge should help students produce better research and will prepare them for their eventual qualifying examinations. Students are also expected to learn from other students' perspectives. If students conduct research that is related to the work covered in the course, then this course may help those students design better studies that are more likely to be published in top academic journals.

Textbook and/or Resource Materials

None.

Readings will be distributed via email or on ecampus or canvas (if we are forced to switch from ecampus to canvas).

Grading Policy and Requirements

Group discussion: The most important contribution each person can make is to actively participate in the discussions of each week's readings. Seminars with intensive, active participation are perhaps one of the most valuable forums for learning in graduate school. Students will come with different perspectives and backgrounds, and the amalgamation of these different views leads to a much richer learning experience for all involved. There is certainly some individual variability in the tendency to participate in these types of discussions, but it is critical to an academic career to develop the ability to do so. To succeed in the field you must be willing to share your ideas in the face of criticism, and the seminar format offers you an excellent opportunity to practice doing so. It is also important to mention any difficulties you had in understanding specific points of the articles.

Written reactions: Each person should submit a brief written reaction to the readings that are to be discussed each week. **Reactions will be due to me, via email, by Thursday at 4 PM each week.** The purpose of Reactions should not be simple summaries of the articles. A brief summary is fine to begin the reaction, but the goal is to give your personal reaction, as a scientist, to the contents of the articles. The ideas presented in your reactions can be anything from connections to other research (from this class or elsewhere), to extensions or improvements on the methods used, to new experiment ideas you generated from reading the article, to criticisms of the authors' methods, logic, or conclusions. The minimum length for reactions is one double spaced page, and there is no maximum. The reaction paper is over all three readings, but you do not have to give equal length to all three. All reactions must be submitted as a Word Document (.doc or .docx) or as a pdf. Each reaction paper will be worth 5 points and the reaction paper with the lowest grade will be dropped.

Presenting articles and leading discussion: On the first day of class we will assign presenters for each article. Each student will likely have to present at least 2-3 articles during the semester, depending on class size. The presenter is expected to more thoroughly read the material, and should come to class with a general idea of how they are going to present the article. The presenter should first summarize the article, and then discuss implications for other domains, limitations, points of debate or contention mentioned in the article, and other important things to discuss in relation to the article.

Final exam: The final exam is open-book and in a take-home essay format. The exam will be emailed to students by at least 48 hours before the due date and will return the exam via email.

Grading

Group discussion: 50 points
Written reactions: 50 points (Due by 4 PM the day before each class)
Leading discussion: 50 points
Exam Questions: 10 points
Final exam: 100 points

Final grades will be determined based on the following point system:
A - 233-260 points
B – 207-232 points

C – 181-206 points
D – 155-180 points
F – 154 or fewer points

Late Work Policy

For late weekly reaction papers I will take:
1 point off if submitted between 4 PM – 7 PM on Thursday night
2.5 points off if submitted between 7 PM Thursday – 10 AM Friday (day of class)
No credit will be given if submitted after 10 AM on the day of class.

If you are sick and cannot present your article then you can talk to me about possibly making that up; however, please make every effort to present your assigned articles so that the class functions smoothly.

For the late final exams I will take:
5 points off if submitted after 5 PM on April 30th, but before 9 AM on Monday May 3rd.
An additional 10 points off for each 24 hour period after. For example, if turned in on Monday May 3rd at 7 PM I would take a total of 15 points off, May 4th would be 25 points off etc.

Course Schedule

8/31 Introduction to course, and assignment of articles to weekly presenters.

9/7 Foundations
Collins, A. M. and Quillan, M. R. (1969). Retrieval time form semantic memory. *Journal of Verbal Learning and Verbal Behavior*, 8, 241-248.

Rosch, E. and Mervis, C. B. (1975). Family resemblance: Studies in the internal structure of categories. *Cognitive Psychology*, 7, 573-605.

Shepard, R.N, Hovland, C.I., & Jenkins, H.M. (1961). Learning and memorization of classifications. *Psychological Monographs: General and Applied*, 75, Whole No. 517.

9/14 Broader Issues
Murphy, G. I. and Medin, D. L. (1985). The role of theories in conceptual coherence. *Psychological Review*, 92. 289-316.

Barsalou, L. W. (1985). Ideals, central tendency, and frequency of instantiation as determinants of graded structure of categories. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 11, 629-654.

Markman, A. B. and Ross, B. H. (2003). Category Learning and Category Use. *Psychological Bulletin*.

9/21 Representations

Nosofsky, R.M. (1992). Similarity scaling and cognitive process models. *Annual Review of Psychology*, 43, 25-53.

Smith, J. D. and Minda, J. P. (1998). Prototypes in the mist: The early epochs of category learning. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 24, 1411-1436.

Mack, M. L., Love, B. C., & Preston, A. R. (2016). Dynamic updating of hippocampal object representations reflects new conceptual knowledge. *Proceedings of the National Academy of Sciences*, 113(46), 13203-13208.

Optional:

Ashby, F.G., & Lee, W.W. (1991). Predicting similarity and categorization from identification. *Journal of Experimental Psychology: General*, 120(2), 150-172.

9/28 Similarity

Shepard, R. N. (1987). Toward a universal law of generalization for psychological science. *Science*, 237, 1317–1323.

Tversky, A. (1977). Features of similarity. *Psychological Review*, 84, 327-352.

Goldstone, R. L. (1994). The role of similarity in categorization: Providing a groundwork. *Cognition*, 52, 125-157.

10/5 Rational Approaches

J. B. Tenenbaum, T. L. Griffiths (2001). Generalization, similarity, and Bayesian inference. *Behavioral and Brain Sciences*, 24, 629-641.

Sandborn, A.N., Griffiths, T.L., & Navarro, D.J. (2010). Rational approximations to rational models: Alternative algorithms for category learning. *Psychological Review, 117*(4), 1144-1167.

Jekel, F., Scholkopf, B., & Wichmann, F. A. (2008). Generalization and similarity in exemplar models of categorization: Insights from machine learning. *Psychonomic Bulletin and Review* 15, 256-271.

Optional

Jekel, F., Scholkopf, B., & Wichmann, F. A. (2007). A tutorial on kernel methods for categorization. *Journal of Mathematical Psychology*, 51(6), 343-358.

10/12 Flexible Representations
Smith, E. E., Patalano, A. L., and Jonides, J. (1998). Alternative strategies of categorization. *Cognition*, 65, 167-196.

Kovacs, P., Helie, S., Tran, A.N., & Ashby, F.G. (2020). A neurocomputational theory of how rule-guided behaviors become automatic. *Psychological Review*.

Love, B.C., Medin, D.L, & Gureckis, T.M (2004). SUSTAIN: A Network Model of Category Learning. *Psychological Review*, 111, 309-332.

Optional:
Nosofsky, R. M., and Palmeri, T. J., and Mckinley, S. C. (1994). Rule-plus-exception model of classification learning. *Psychological Review*, 104, 266-300.

10/19 Neural Models
Ashby, F. G., & Ell, S. W. (2001). The neurobiology of category learning. *Trends in Cognitive Sciences*, 5, 204-210.

Ashby, F.G., & Rosedahl, L. (2017). A neural interpretation of exemplar theory. *Psychological Review, 124*(4), 472-482

Zeithamova, D., Mack, M.L., Braunlich, K., Davis, T., Seger, C.A., van Kesteren, M.T.R., & Wutz, A. (2019). Brain mechanisms of concept learning. *Journal of Neuroscience, 39*(42), 8259-8266.

Optional:
Ashby, F.G., Maddox, W.T. (2005) Human Category Learning. *Annual Review of Psychology*, 56, 149-78.

10/26 – Clinical Populations
Knowlton, B. J., & Squire, L. R. (1993, December 10). The learning of natural categories: Parallel memory systems for item memory and category-level knowledge. *Science*, 262, 1747-1749.

Nosofsky, R. M., and Zaki, S. R. (1998). Dissociations between categorization and recognition in amnesic and normal individuals: An exemplar-based interpretation. *Psychological Science*, 9, 247-255.

Shohamy, D., Myers, C.E., Onlaor, S., & Gluck, M.A. (2004). Role of the basal ganglia in category learning: How do patients with Parkinson's disease learn? *Behavioral Neuroscience, 118*(4), 676-686.

11/2 Interactions with Perception

Goldstone, R. L. (1994). Influences of categorization on perceptual discrimination. *Journal of Experimental Psychology: General*, 123, 178-200.

Schyns, P. G., Goldstone, R. L., & Thibaut, J-P (1998). Development of features in object concepts. Behavioral and Brain Sciences, 21, 1-54. Note: Commentaries following this article are partially optional. Pick a few that look interesting.

Corral, D., Kurtz, K. J., & Jones, M. (2018). Learning relational concepts from within-versus between-category comparisons. *Journal of Experimental Psychology: General*, 147(11), 1571.

Optional:

Richardson, D., Spivey, M., Barsalou, L., McRae, K. (2003). Spatial representations activated during real-time comprehension of verbs. *Cognitive Science*, 27(5), 767-780.

11/9 Attention, Recency, and Uncertainty

Jones, M., Love, B.C., & Maddox, W.T.E. (2006). Recency effects as a window to generalization: Separating decisional and perceptual sequential effects in category learning. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 32, 316-332.

Seger, C.A., Braunlich, K., Wehe, H.S., & Liu, Z. (2015). Generalization in Category Learning: The Roles of Representational and Decisional Uncertainty. *Journal of Neuroscience, 35*(23), 8802-8812.

Leong, Y.C., Radulescu, A., Daniel, R., DeWoskin, V., & Niv, Y. (2017). Dynamic interaction between reinforcement learning and attention in multidimensional environments.

Optional:

Stewart, N. Brown, G. D. A., & Chater, N. (2002). Sequence effects in categorization of simple perceptual stimuli. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 28, 3-11.

11/16 Induction

Osherson, D. N., Smith, E. E., Wilkie, O., Lopez, A., and Shafir, E. (1990). Category-based induction. Psychological Review, 97, 185-200.

Sloman, S. A. (1993). Feature-based induction. Cognitive Psychology, 25, 231-280.

Heit, E. and Rubinstein, J. (1994). Similarity and property effects in inductive reasoning. Journal of Experimental Psychology: Learning, Memory, and Cognition, 20, 411- 422.

11/30 Roles and Relations

Markman, A. B. and Gentner, D. (1993). Structural alignment during similarity comparisons. Cognitive Psychology, 25, 431- 467.

Goldwater, M.B., && Schalk, L. (2016). Relational categories as a bridge between cognitive and educational research. *Psychological Bulletin, 142*(7), 729-757.

Goldwater, M. B., Don, H. J., Krusche, M. J., & Livesey, E. J. (2018). Relational discovery in category learning. *Journal of Experimental Psychology: General*, 147(1), 1.

Optional:
Jones, M., & Love, B.C. (2007). Beyond common features: The role of roles in determining similarity. Cognitive Psychology, 55, 196-231.

12/7 No class. Final exam due by 5 PM

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to Student Rule 7 in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" (Section 20.1.2.3, Student Rule 20).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu. Disabilities may include, but are not limited to attentional, learning, mental

health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see University Rule 08.01.01.M1):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, you will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with Counseling and Psychological Services (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's Title IX webpage.

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in proper self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at suicidepreventionlifeline.org.

COVID-19 Temporary Amendment to Minimum Syllabus Requirements

Campus Safety Measures

To promote public safety and protect students, faculty, and staff during the coronavirus pandemic, Texas A&M University has adopted policies and practices for the Fall 2020 academic term to limit virus transmission. Students must observe the following practices while participating in face-to-face courses and course-related activities (office hours, help sessions, transitioning to and between classes, study spaces, academic services, etc.):

- Self-monitoring—Students should follow CDC recommendations for self-monitoring. **Students who have a fever or exhibit symptoms of COVID-19 should participate in class remotely and should not participate in face-to-face instruction.**
- Face Coverings—Face coverings (cloth face covering, surgical mask, etc.) must be properly worn in all non-private spaces including classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource and support offices, and outdoor spaces where 6 feet of physical distancing is difficult to reliably maintain. Description of face coverings and additional guidance are provided in the Face Covering policy and Frequently Asked Questions (FAQ) available on the Provost website.
- Physical Distancing—Physical distancing must be maintained between students, instructors, and others in course and course-related activities.
- Classroom Ingress/Egress—Students must follow marked pathways for entering and exiting classrooms and other teaching spaces. Leave classrooms promptly after course activities have concluded. Do not congregate in hallways and maintain 6-foot physical distancing when waiting to enter classrooms and other instructional spaces.
- To attend a face-to-face class, students must wear a face covering (or a face shield if they have an exemption letter). If a student refuses to wear a face covering, the instructor should ask the student to leave and join the class remotely. If the student does not leave the class, the faculty member should report that student to the Student Conduct office for sanctions. Additionally, the faculty member may choose to teach that day's class remotely for all students.

Personal Illness and Quarantine

Students required to quarantine must participate in courses and course-related activities remotely and **must not attend face-to-face course activities**. Students should notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities.

Students experiencing personal injury or Illness that is too severe for the student to attend class qualify for an excused absence (See Student Rule 7, Section 7.2.2.) To receive an excused absence, students must comply with the documentation and notification guidelines outlined in Student Rule 7. While Student Rule 7, Section 7.3.2.1, indicates a medical confirmation note from the student's medical provider is preferred, **for Fall 2020 only, students may use the Explanatory Statement for Absence from Class form in lieu of a medical confirmation. Students must submit the Explanatory Statement for Absence from Class within two business days after the last date of absence.**