PSYC207: Collective Behavior & Decision-Making in Human and Animal Groups

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Spring 2022

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campus map

Web: **course webpage**
Class Hours: MW 3:30–4:45pm
Class Room: ATL 2428
pronouns: she/her

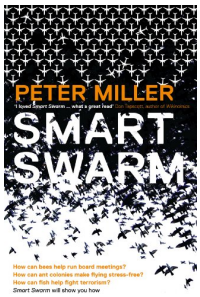
Contents

1 Course Description

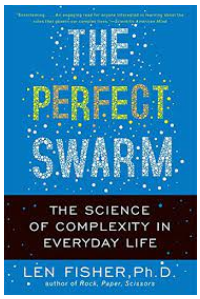
Understanding how groups come together and make decisions is one of science's main challenges. The social dynamics of groups are also an important part of many human activities including the selection of social norms, traffic jams, the growing use of crowd-sourcing and viral marketing in social networks, and the influence of media on the outcome of democratic processes. Through lectures, discussion, and mathematical demonstrations, this course will provide an overview of the fundamental principles underlying the organization of animal societies. We will consider what we can learn about human societies from studying the behaviors of other animal groups taking a systems-level approach. This course is inherently interdisciplinary covering animal behavior and ecology, evolutions of sociality, development of social conventions, and application of the group intelligence to politics, business, and artificial intelligence. **Note that while we will use mathematical simulations in this class to study behavior and students will be expected to be familiar with some equations, students will not be expected to solve any mathematical equations, or program simulations themselves.**

2 Reading Materials

The lectures in this course are based on a variety of materials and numerous texts. Some readings and activities are linked on the syllabus, but not all. Be sure to check the relevant ELMS module for all required and supplemental readings, videos and activities. The following two books are recommended pop-sci readings, but should not be necessary for success in the course.



The Smart Swarm
Peter Miller
ISBN-13:9781583334287
ISBN-10: 1583334289
Amazon Price $17.00



The Perfect Swarm
Len Fisher
ISBN-13:9780465020249
ISBN-10:0465020240
Amazon Price: $14.99

3 Other Materials

Throughout the semester, we will challenge ourselves to test ideas and observe complex systems in action. Simulations and models will be used from the following websites: Explorable explanations, Complexity explorables and The Swarm Lab. **Therefore, a laptop or computer will be necessary for the course**.

4 Prerequisites

Prerequisites: PSYC100

5 Course Objectives

After successfully competing this course, students should be able to do the following:

1. **Explain** major concepts and theories in the field of collective behavior and cri
2. **Describe** the relevance of mathematical modeling for understanding biological and psychological phenomena and use mathematical models to make predictions about behavior
3. **Apply** findings from collective behavior to solve problems in human society

Psychology Program Learning Objectives

In addition to the specific course content learning goals, this course includes assessments and activities designed to help meet the learning objective's of the psychology major.

1. Describe key concepts, principles, and overarching themes in psychology related to collective behavior
2. Use scientific reasoning to interpret psychological phenomena
3. Engage in innovative and integrative thinking and problem solving
4. Exhibit the ability to work respectfully and constructively with individuals of different backgrounds, values, and experiences
5. Demonstrate effective writing for different purposes
6. Exhibit effective presentation skills for different purposes
7. Interact effectively with others

Course Assessments have been designed to meet the above learning objectives.

6 Assessments & Activities

Course structure

The course structure is based on research that in-class activities and low-stakes assessments used during classroom time promotes learning and that small amounts of studying and review over time is more beneficial to learning than cramming (Dempster, 1988; Novak, 1990; Sisti, Glass & Shors, 2007). Lectures will include periods of traditional presentation of content material as gathered from a variety of textbooks and internet sources. Periods of class time will also be devoted to quizzes, worksheets, case studies, discussions, and problem sets. This is especially true for days with notes active learning worksheets due. During these days students will need to bring a computer to class to run simulations and 'explorables' to build and enhance on the content. Students will be responsible for material covered in assigned readings and lectures. Lecture power points will be posted to ELMS, however lecture material will go beyond the slides, so reading the slides posted is not a substitute for attending class.

Exams

The intention of the exams are to assess your understanding of the material (reading and in-class) as well as your critical thinking. The exams will be directly tied to the course objectives and the specific learning objectives of each class. Exams may include a mixture of objective questions, including multiple choice, True or False, matching and fill in the blank and short answer. Exam material will be based on what is covered in class, and the blended learning focusing on the learning objectives. **Make-up examinations will be given only for University approved reasons**. Please refer to the most recent UMCP catalog for details.

Active Learning Assignments

In class, there will be discussions, case studies, small group projects analyzing simulations and models. Attendance and engaged participation are highly encouraged and will be an important factor in your overall course grade. During these active learning days, the class will be split into small groups that will work together to either scientifically analyze and evaluate a mathematical simulation and apply to course content, or work on researching and evaluating a case study. All active learning will be guided with specific learning objectives and tasks to be completed. At the end of the period, we will come back together as a class to discuss and summarize what we have learned and discovered from the activity. The purpose of the explorable simulations are to observe behavioral phenomena, get an intuitive sense of how a mathematical model works, make predictions, and connect to other course content and to your own life and society. Doing this takes time to think critically about. The purpose of researching and presenting case studies is to (1) conduct research on a topic, (2) work efficiently to present key ideas, (3) learn from your peers. The content covered on these days will be assessed during exams as well. These activities will be graded for completion and accuracy. The lowest active learning grade will be dropped.

Weekly Summaries

The purpose of this exercise is to build (1) writing and organizational skills, (2) provide strategies, accountability, and incentive for studying consistently in chunks, and (3) may help me notice if a

student missed an important point or has a misunderstanding. These assignments will be graded on sincere effort and completion.

Team Project

This will be a group project involving groups of 3–4 students (see: Life Science Education Guide to Group Work).

In with Dr. Chicoli, each group will select a topic related to course content. This could be something discussed in class that you will research in more depth, or something you are interested in that we do not have time to cover. Ideally it will be a way to apply course content to 'do good'. For example, you might want to research more into forms of democracy, efficient workplace routines, or bio-inspired swarms for medicine, rescue, or sustainability and demonstrate or propose ways in which we can work together in groups, or as a society to solve our problems. The project will be submitted in the form of a publicly accessible website to be shared with the class.

While you will work as part of a team on a related topic, grades will be a function of the amount of effort and individual contribution made as determined by your group members. Thus, you will work together, but may receive different grades depending on individual effort and contribution.

7 Grading Policy

Grades are not given, but earned. Your grade is determined by your performance on the learning assessments in the course and is assigned individually (not curved). If earning a particular grade is important to you, please speak with me at the beginning of the semester so that I can offer some helpful suggestions for achieving your goal.

All assessment scores will be posted on the course ELMS page. If you would like to review any of your grades (including the exams), or have questions about how something was scored, please email me to schedule a time for us to meet in my office.

I am happy to discuss any of your grades with you, and if I have made a mistake I will immediately correct it. Any formal grade disputes must be submitted in writing and **within one week** of receiving the grade. In your email include the questions you believe have been graded incorrectly, what you believe the correct answer should be and why, as well as course resources where you found the information supporting your claim.

Final letter grades are assigned based on the percentage of total assessment points earned. To be fair to everyone, I have to establish clear standards and apply them consistently. It is unethical to make exceptions for some and not others. **Grades will not be rounded up**. If you earn a 97.9%, you have earned an A in the course. Incomplete grades, which are awarded at the end of the semester, will not be given based on unsatisfactory performance. Students who are performing poorly should be mindful of the deadline to drop a course. You are encouraged to consult with me well in advance.

The following grading scheme will apply:

Letter Grade	Percentage Range	Letter Grade	Percentage Range	Letter Grade	Percentage Range
A^+	98.0 – 100%	C^+	77.0 – 79.9%	F	0 – 59.9%
A	93.0 – 97.9%	C	73.0 – 76.9%		
A^-	90.0 – 92.9%	C^-	70.0 – 72.9%		
B^+	87.0 – 89.9%	D^+	67.0 – 69.9%		
B	83.0 – 86.9%	D	63.0 – 66.9%		
B^-	80.0 – 82.9%	D^-	60.0 – 62.9%		

- **45%** of your grade will be determined by 2 in class midterm exams and a non-cumulative final (15% each)
- **15%** Group project
- **25%** In-class active learning activities and participation (divided evenly between assignments)
- **15%** Weekly summaries (divided evenly between assignments)

Marking System

The University's marking system is as follows:

- A+, A, A- denotes excellent mastery of the subject and outstanding scholarship
- B+, B, B- denotes good mastery of the subject and good scholarship
- C+, C, C- denotes acceptable mastery of the subject
- D+, D, D- denotes borderline understanding of the subject, marginal performance, and it does not represent satisfactory progress toward a degree
- F denotes failure to understand the subject and unsatisfactory performance

Make Ups and Late Assignments

Make-ups or extensions on examinations and projects will be given only for University approved reasons. A self-signed excused note maybe used once during the semester. In cases of severe illness, the instructor will work with the student to make alternative arrangements for make up assignments for credit, in accordance with updated University policy. Students must contact the professor within 24 hours of a missed exam or activity to arrange a make-up. Late assignments without a University approved reason will be accepted for a 10% deduction per day late starting immediately after the deadline. If 5 or more days late, the assignment will not be graded and will receive a zero. Students not feeling well should NOT come to class, and should email Dr. Chicoli to make arrangements. Please refer to the most recent UMCP catalog for more details (Course catalog).

8 Campus & Course Policies

Campus Policies

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit www.ugst.umd.edu/courserelatedpolicies.html for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

Academic Integrity

As future professionals, your commitment to high ethical standards and honesty begins now at the University of Maryland. The University is one of a small number of universities with a student-administered Code of Academic Integrity and an Honor Pledge. The Code prohibits students from cheating on exams and assignments. Cheating includes, but is not limited to plagiarizing, copying another student's answers, bringing cheat notes in for the exam, etc. You will be asked to write the following signed statement on each examination or assignment. If you have any personal objection to writing this pledge, you must speak with me at the beginning of the semester explaining your position and we can work out an alternative.

I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination.

Academic Dishonesty

All students are expected to abide by the University's Code of Academic Integrity which is printed in the Undergraduate Catalog (also see StudentHonor Council). Academic dishonesty (cheating, fabrication, facilitating academic dishonesty, and plagiarism) will NOT be tolerated. The definitions for these offenses are printed in the Code of Academic Integrity, and I urge you to familiarize yourselves with them. Academic dishonesty is a serious offense and will be dealt with according to University policy. The Code of Academic Integrity is reprinted in full in the Undergraduate catalog for further information, to report Academic Dishonesty, or to inquire about serving on the Honor Council call 301-314-8204. Note that ignorance of the student conduct policy is not an accepted excuse for committing academic dishonesty. Any issues relating to academic dishonesty will be sent to the Office of Student Conduct.

It is important to note that course assistance websites, such as CourseHero, are not permitted sources, unless the instructor explicitly gives permission for you to use one of these sites. Material taken or copied from these sites can be deemed unauthorized material and a violation of academic integrity. These sites offer information that might not be accurate and that shortcut the learning process, particularly the critical thinking steps necessary for college-level assignments. Collaboration among students is encouraged when permitted. However, on exams and weekly summaries, students are expected to work independently. Examples of prohibited collaboration include: asking classmates for answers on quizzes or exams, asking for access codes to clicker polls, sharing weekly summaries, etc.

Masking Requirement

Additionally, for this semester, President Pines provided clear expectations to the University about the wearing of masks. Face coverings over the nose and mouth are required while you are indoors at all time. **Masks must be a KN-95 or N-95**. There are no exceptions. Students not wearing a proper mask will be given a warning and asked to wear one, or will be asked to leave the classroom immediately. Students who have additional issues with the mask expectation after a first warning will be referred to the Office of Student Conduct for failure to comply with a directive of University officials. Note that CDC and University guidelines may change throughout the semester. Students should stay up to date on University and campus policies. Please visit the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

Students with Disabilities

The course staff is committed to providing appropriate accommodation for students with recognized disabilities. If you have been evaluated by Disability Support Services (DSS) and qualify for specific services, **please inform me at the beginning of the semester**. If you think that you may qualify for some accommodation but have not yet been evaluated, please contact DSS at 301-314-7682 to arrange a consultation.

Religious Observances

The University System of Maryland policy "Assignments and Attendance on Dates of Religious Observance" provides that students should not be penalized because of observances of their religious beliefs; students shall be given an opportunity, whenever feasible, to make up within a reasonable time any academic assignment that is missed due to individual participation in religious observances. **It is the student's responsibility to inform me in advance of any intended absences for religious observances as soon as possible.** Assignments available for at least one week will still be due by the assigned due date, even if there is a day of religious observance sometime during that week.

Note on electronics

Research shows that hand-taking notes improves retention of material (Mueller & Oppenheimer, 2014). However, I understand that the electronic recording of notes may be routine for some

students and computer usage will be permitted for course related activities only. On days when there is a scheduled active learning activity requiring a computer, you will be required to bring one to class.

The use of phones is allowed for answering clicker questions in Turning Point. However, when not answering a clicker question, your phone should not be in use.

All electronics should only be used for course work. If you are found to be using electronics for other tasks (including work for other courses). If you are found to be using electronics for other purposes you may be asked to put it away or may not receive credit for the day's active learning.

9 Resilience and Academic Success

Taking personal responsibility for your own learning means acknowledging when your performance does not match your goals and doing something about it. I encourage you to visit the following campus resources for additional help:

- Tutoring, general: tutoring.umd.edu
- Writing Center, for help with written assignments ter.ps/writing
- Student Resources go.umd.edu/assistance).
- Counseling Center - Includes DSS, learning assistance, & traditional counseling services counseling.umd.edu. (Note: I am a Responsible University Employee and any and all disclosures of different types of sexual misconduct disclosed to me I am obligated to report to the Title IX Office.)
- Academic Achievement Program - http://www.aap.umd.edu AAP provides academic and counseling services to promote the access and success of low income, first generation immigrant college students at the University of Maryland.
- Office of Civil Rights & Sexual Misconduct (Title IX Office)- https://www.ocrsm.umd.edu/

Most services free because you have already paid for it, and everyone needs help. I encourage all students to ask for help both in and outside of the classroom! Also see the following article encouraging students to visit office hours or make a one-on-one appointment with your professors: Office hours

10 Basic Needs & Security

If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live and believe this may affect your performance in this course, please visit go.umd.edu/basic-needs for information about resources the campus offers you and please let me know if I can help in any way.

11 Commitment to Open Inquiry, Viewpoint Diversity, and Constructive Disagreement

Positive class community and climate is important for everyone's personal and academic success in the course. In order to create a classroom environment that supports respectful, critical inquiry through the free exchange of ideas, the following principles will guide interactions among students and professors in this class:

- Treat every member of the class with respect, even if you disagree with their opinion;
- Treat every opinion as open to examination, even if it comes from someone with more experience or expertise than you;
- Reasonable minds can differ on any number of perspectives, opinions, and conclusions;
- Some perspectives, opinions, and conclusions are unreasonable or based on falsehoods and should be identified as such;
- No ideas are immune from scrutiny and debate;
- You will not be graded on whether your professor or peers agree with your opinions;
- You will be graded on the evidence and reasoning that leads to those opinions.

Students will be invited to share their thoughts in class and a diversity of opinions is welcome. Respectful communication is expected, even when expressing differing perspectives. Supporting one's statements with research findings is highly encouraged. In accordance with free speech statutes, speech that contains threats of violence is prohibited.

As a human, behavior-centered discipline, we value a strong understanding of diversity. Diversity refers to differences in race, ethnicity, culture, gender, sexual orientation, religion, age, abilities, class, nationality, and other factors. The Department of Psychology at the University of Maryland is committed to creating a respectful and affirming climate in which all students, staff, and faculty are inspired to achieve their full potential. We believe that actively fostering an affirming environment strengthens our department as a whole. A department that values and celebrates diversity among its students, staff and faculty is best able to develop the strengths and talents of all members of the department community.

12 Reporting Racism and Other Forms of Hate and Bias.

If you experience racism or other form of bias or hate in this class or any psychology course, we encourage you to do at least one of the following: Please report the experience to the instructor or teaching assistant and/or use report to the Department of Psychology's Diversity and Inclusion Committee using this link (reports can be made anonymously). Please also report all incidents of hate and bias to the Office of Diversity and Inclusion at https://www.diversity.umd.edu/hbrp/.

13 Names/Pronouns & Self Identifications

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering inclusive and equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.).

ELMS- Canvas now allows you to enter your preferred pronouns as well as provide pronunciation for your name. How? Sign in on elms.umd.edu.

- Update pronouns at: Account → Settings → Edit Settings → Pronouns
- Update name pronunciation at: Account → Namecoach

Please note that the pronouns someone indicates are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

14 Course Outline

Note: This is a tentative schedule, and subject to change as necessary. Monitor the course ELMS page for current deadlines. In the unlikely event of a prolonged university closing, or an extended absence from the university, adjustments to the course schedule, deadlines, and assignments will be made based on the duration of the closing and the specific dates missed. All assignments and lectures will be posted on ELMS. Important academic dates:

- Schedule Adjustment Period ends: February 4, 2022
- Drop a Course with "W" Deadline: April 8, 2022

Date	Day	Topic	Readings/Videos	Due
Module 1: What is Collective Behavior ?				
Jan. 24	M	Introduction to collective behavior: Why and how we study it	Read: Syllabus	Pre-course and syllabus quiz, Bingo game
Jan. 26	W	Getting together and the role of feedback	Readings on ELMS and On Power Laws	
Module 2: Forming Groups and Moving Together				
Jan. 31	M	Introduction to graph theory and networks	Read Gentle Graph Theory, also see Ch 1-2 Robin Wilson Introduction to Graph Theory	weekly summary #1 due
Feb. 2	W	Moving together, emergent behavior and SPP models	in class: Flock N Roll and This app lets you explore a simple model of aggregation and segregation between two types of particles	active learning

Date	Day	Topic	Readings/Videos	Due
Module 3: Social Movements and Mass Hysteria				
Feb. 7	M	Social Movements	Read: The 25% revolution AND Lumen Learning	weekly summary #2 due
Feb. 9	W	Mass Hysteria	Read Couzin's lab work on locusts, Play: Wolfram Brownian Motion in 2D and Supplemental; PopSci article, Dyson et al.,2015	active learning: case studies in mass hysteria
Module 4: Graph Theory and Information Spread				
Feb. 14	M	Information Spread through a Graph	The Wisdom or Madness of Crowds	weekly summary #3 due, (start 2 day active learning)
Feb. 16	W	Information Spread through a Graph	The Wisdom or Madness of Crowds	active learning pt. 2, due
Module 5: Exam Review & Exam 1				
Feb. 21	M	Exam Review		bring questions
Feb. 23	W	Exam 1		Good Luck
Module 6: Decision making				
Feb. 28	M	Decision making is difficult	Read: Game Theory Introduction	group project formation
Mar. 2	W	Rational agents?	Play The Taxi Cab Problem and Play: Game Theory	active learning

Date	Day	Topic	Readings/Videos	Due
Module 7: Echo chambers and Segregated Societies				
Mar. 7	W	Echo chambers in social media	Play: Echo Chambers	weekly summary #4 due and active learning
Mar. 9	W	Segregated Societies and the Schelling Model	Play: Thriling-Milling-Schelling-Herrings and Polygons	active learning
Module 8: Group decision-making				
Mar. 14	M	Condorcet's theorem and decision-making in groups	Read: The Smart Swarm, Ch. 2 Honeybees pgs. 33-63 and Opinion dynamics	active learning
Mar. 16	W	Wisdom of (diverse) crowds	Read: How Bees Choose Home and Play: This app let's you explore a model of collective nest selection in honeybees presented in Seeley et al. (2012)	active learning
Module 9: Spring Break				
Mar. 21	M	Spring Break	No class	Enjoy
Mar. 23	W	Spring Break	No class	Enjoy
Module 10: Group Politics				
May 2	M	Electoral Systems	Read Electoral systems and explore Ace Project	
May 4	W	Voting and ballots	Play Ballot	active learning (exam next week!)

Date	Day	Topic	Readings/Videos	Due
Module 11: Exam Review & Exam 2				
Mar. 28	M	Exam 2 Review		Bring questions
Mar. 30	W	Exam 2		Good Luck
Module 12: Termites and Stigmergy				
Apr. 4	M	stigmergy	Read: What termites can teach architects AND Read: Buildings inspired by termite mounds AND Watch Termite-inspired robotics AND Watch: Termites: The Inner Sanctum	
Apr. 6	W	Applications of stigmergy	Read: Moses et al., 2019	Active learning - research, presentation and discussion of case studies
Module 13: Slime molds and highways				
Apr. 11	M	Slime molds and optimal pathways	Read slime molds and highways and Supplemental: Marwan, 2010; Amoeba-Inspired network design-Watch: A slime mold can solve mazes	
Apr. 13	W	Small world networks and phantom traffic jams	Read Phantom traffic jams, in class Play: Berlin at 8am	Active Learning

Date	Day	Topic	Readings/Videos	Due
Module 14: Fireflies and synchronization				
Apr. 18	W	Brain oscillations, applause, and social copying	Supplemental Readings: Heggli et al, 2019 and Néda et al.,2000	
Apr. 20	M	Fireflies & The Kuramoto model and coupled oscillators	Watch: Fireflies fire in sync to attract mates and Play: Complexity-oscillators	Active Learning
Module 15: Epidemics and herd immunity				
Apr. 25	M	Modeling the spread of (mis) information as an epidemic	Active Learning - Cellular automats and SIRS probability models active learning	
Apr. 27	W	How herd immunity works	Play: Herd immunity	Active Learning
Module 16: Semester Wrap-Up				
May 9	M	Last day of classes	Review for final	Projects Due
May 14	SAT	FINAL EXAM	GOOD LUCK!	