

## ENR 8150 Advanced (Not Really) Environment, Risk, and Decision Making

Spring 2019  
Kottman Hall 460, TR 12:45-2:05

**Course Instructor:** Dr. Robyn Wilson, 316D Kottman Hall  
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***Office hours by appointment only***

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**Course Description:** When we think about improving decision making for the environment, we typically look to the fields of education and marketing for insight into changing behavior at the individual level. A wealth of research in psychology and behavioral economics, however, shows that neither education nor outright persuasion will necessarily lead to more thoughtful or more informed choices. The overall goal of ENR 8150 is to explore research in these fields and to deepen your understanding of decision making under risk and uncertainty. The first half of the course will focus on the literature from judgment and decision making that indicates how individuals process information, as well as highlight potential errors in information processing that may lead to uninformed and/or biased decisions under risk and uncertainty. The second half of the course will focus on applications from the decision aiding literature meant to improve decision making in complex, risk-laden and multi-objective contexts. Both basic literature and applications from environmental contexts will be covered.

**Prerequisites:** Graduate standing or permission of instructor

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### **Course Objectives:**

This course is designed to help students...

1. Develop an understanding of the theory that underlies judgment and decision-making in multi-objective, risk-based environmental policy and management contexts.
2. Develop an understanding of the decision analytic techniques designed to improve decision-making in these contexts.

**Course Format:** Classes will combine discussion and group activities. An interactive approach such as this makes your attendance a crucial component of achieving success in this course.

### **Assignments and Exams:**

1. **Final Paper** –A 10-15 page, double-spaced paper will be due at the end of the term. The goal of this paper is to apply concepts and lessons from this course to a real-world risk-based decision making problem, both in terms of understanding why this problem exists from the perspective of information processing and potential errors in judgment and decision making, and how we might work to resolve it through the use of decision analytic techniques. **It is critical that human behavior (that is actions or a lack of action) resulting from flaws in information processing be at the core of the issue, but that the “poor” decisions by individuals accumulate to cause societal or collective problems.** The paper will be graded out of 100 and be worth 30% of your final grade.

The first half of the paper will require that you identify a multi-objective, multi-stakeholder environmental problem and describe why this problem exists from the perspective of individual decision making and action. This first half of the paper will build on your three memo assignments. The second half of the paper should focus on how this problem could be addressed or resolved given your knowledge of how individuals make decisions (e.g., how would you structure the decision process to help people avoid biases in their decision making?).

2. **Memos** – Three 1+ page single-spaced memo will be required over the course of the semester. These memos are an opportunity for you to develop the ideas for your final paper, practice applying course concepts to a real-world problem of interest, and receive initial feedback on your ideas. Each memo will be graded out of 10 points and they will be averaged to account for 20% of your final grade.

In *Memo 1*, you will outline your potential topic of interest and any relevant applications you might draw from the first few weeks of the course on the process of forming judgments, bounded rationality, etc. As described previously, these should be applications that help to explain “poor” decisions or behaviors among individuals leading to a larger-scale collective social problem. In *Memo 2*, you will outline any additional applications from the next several weeks of the course on risk, emotion, environmental decision making, etc. In *Memo 3*, you will outline any additional applications from the section of the course on cognitive and motivational biases.

These memos should be well written (in terms of complete sentences, correct grammar, etc), but do not need to follow a formal paper structure (intro, conclusion, etc). It should be your thoughts and reflections on the readings and the course concepts as they relate to your paper topic. e.g., How are preferences being constructed? How might risk perception be playing a role in “poor” decision making for this particular problem? What role does emotion vs logic play in the decisions and resulting behaviors you observe? What errors or biases in processing might be leading to these “poor” or uninformed decisions?

3. **SDM Applications** – The work for this particular assignment will largely occur in-class during the last section on encouraging better decisions (i.e., the Gregory text). However, you will be responsible for turning in your efforts to document your participation in the exercise (this will require some time outside of class). The workshop assignment will be graded out of 100 and worth 20% of your final grade.
4. **Discussion Leader** – You will sign up 3 times for a particular class topic where you will be responsible for helping facilitate discussion in class. The night before each of these sessions you will need to submit at least three discussion questions and one environmental decision making application you have drawn from the readings on the Carmen discussion forum. I will review these the morning before each class as a guide to our discussion for the day. This also gives me a chance to see how you are doing with the readings and for you to come prepared with questions for discussion that day. The entire class is expected to read these posts as a way of preparing for class, but you do not have to make a discussion post. This assignment will be graded out of 100 and worth 15% of your final grade.

5. **Attendance and Participation** –These points will be based on your attendance and participation in class (1 point for attending, up to 1 point for quality of participation during class). Your attendance and participation grade will be out of 100 points and worth 15% of your grade.

**Grading:**

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|---------------------------------------|------------|
| • <b>Memos</b>                        | <b>20%</b> |
| • <b>Final Paper</b>                  | <b>30%</b> |
| • <b>SDM Applications</b>             | <b>20%</b> |
| • <b>Discussion Leader</b>            | <b>15%</b> |
| • <b>Attendance and Participation</b> | <b>15%</b> |

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The course syllabus, schedule, and assigned readings are subject to change. The syllabus can be made available in alternative formats upon request; students with disabilities are responsible for making their needs known to the instructor and for seeking available assistance in a timely manner.

**Class Readings:**

There are two required course textbooks:

- Hardman, D. 2009. Judgment and Decision Making. British Psychological Society and Blackwell Publishing Limited.
- Gregory, R., L. Failing, M. Harstone, G. Long, T. McDaniels and D. Ohlson. 2012. Structured decision making: A practical guide to environmental management choices. Wiley-Blackwell: Hoboken, NJ.

The texts are available from most online retailers (and likely in the OSU bookstore). Other required readings in the form of journal articles are listed below and available on CARMEN.

**Make-up and Late Assignments:** In-class assignments and attendance/participation points cannot be made up. Late papers/memos will be accepted, but will be docked 5/1 points respectively for each day that they are late.

**Academic Misconduct:** It is expected that all students have read and understand the University's *Code of Student Conduct*, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct." The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's *Code of Student Conduct* is never considered an "excuse" for academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web pages (<http://oaa.osu.edu/coam.html>)

- *Ten Suggestions for Preserving Academic Integrity*

(<http://oaa.osu.edu/coamtensuggestions.html>)

- *Eight Cardinal Rules of Academic Integrity*

(<http://www.northwestern.edu/provost/students/integrity/rules.html>)

## Class Schedule and Readings

### How do individuals process information when making decisions?

Session 1 (1/8)– Defining Decisions and Decision Quality

Session 2 (1/10) – Predictive vs. Subjective Judgment

- Hardman, Chapters 1 & 2, “The Nature and Analysis of Judgment”
- Gigerenzer, G. (2008). Why heuristics work. *Perspectives on Psychological Science* 3(1), pp. 20-29.

Session 3 (1/15) – Biased Perception and Motivated Reasoning

- Hardman, Chapter 5, “Assessing Evidence and Evaluating Arguments”
- Jacquet, J., Dietrich, M. & Jost, J. (2014) The ideological divide and climate change opinion: “top-down” and “bottom-up” approaches. *Frontiers in Psychology*, 5:1458, pp. 1-6

Session 4 (1/17) – Expected Utility vs. Prospect Theory

- Hardman, Chapter 7, “Decision Making under Risk and Uncertainty”
- Haer et al. (2017). Integrating household risk mitigation behavior in flood risk analysis: An agent-based model approach. *Risk Analysis*, 37(10): 1977-1992.

Session 5 (1/22) - Construction of Preference

- Hardman, Chapter 8, “Preference and Choice”
- Siegrist and Sutterlin. (2014). Human and nature-caused hazards: The affect heuristic causes biased decisions. *Risk Analysis*, 34(8): 1482-1494.

Session 6 (1/24) – Naturalistic Decision Making

- Hardman, Chapter 11, “Dynamic Decisions and High Stakes”
- Kahneman, D., & Klein, G. (2009). Conditions for intuitive expertise: A failure to disagree. *American Psychologist*, 64(6), 515-526.

### **MEMO 1 DUE – Sunday, January 28<sup>th</sup>, Midnight in the dropbox**

Session 7 (1/29) – Defining Risk

- Hardman, Chapter 12, “Risk”
- Van der Linden. (2015). The socio-psychological determinants of climate change risk perceptions: Toward a comprehensive model. *Journal of Environmental Psychology*, 41: 112-124.

Session 8 (1/31) – Affect and Emotions

- Hardman, Chapter 15, “Intuition, Reflective Thinking and the Brain”
- Wieczorek Hudenko, H. 2012. Exploring the influence of emotion on human decision making in human-wildlife conflict. *Human Dimensions of Wildlife*, 17(1): 16-28.

Session 9 (2/5) – CLASS CANCELLED!!!!

- Session 10 (2/7) – Construal Level Theory of Psychological Distance (*Guest Facilitator*)
- Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review*, 117, 440–463.
  - Brugger et al. (2015). Psychological responses to the proximity of climate change. *Nature Climate Change*, 5: 1031-1037.

- Session 11 (2/12) – Game Theory and Commons Dilemmas
- Hardman, Chapter 14, “Cooperation and Coordination”
  - van Vugt, M. (2009). Averting the Tragedy of the Commons: Using social psychological science to protect the environment. *Current Directions in Psychological Science*, 18(3): 169-173.

- Session 12 (2/14) – Information Processing and Environmental Decision Making Wrap-up
- Kleindorfer, P.R. 1999. Chap. 2, pp. 37-56 in Sexton, K., A. A. Marcus, K. W. Easter, and T. D. Burkhardt, editors, *Better Environmental Decisions: Strategies for governments, businesses, and communities*. Island Press, Washington D.C.
  - Campbell-Arvai et al. 2018. Decision Making about the Environment. Pp. 487-511 in Terry Marsden (Ed.) *The Sage Handbook of Nature*.

## **MEMO 2 DUE – Sunday, February 17<sup>th</sup>, Midnight in the dropbox**

### **What are some of the common errors in information processing that lead to “bad” decisions?**

- Session 13 (2/19) – Cognitive Biases: Representativeness & Availability
- Hardman, Chapter 3, “Judging Probability and Frequency”
  - Sunstein, C. 2006. The availability heuristic, intuitive cost-benefit analysis and climate change. *Climatic Change*, 77: 195-210.

- Session 14 (2/21) – Cognitive Biases: Anchoring and Hindsight
- Hardman, Chapter 4, “Judgmental Distortions”
  - Joireman, J. et al. (2010). Effect of outdoor temperature, heat primes and anchoring on beliefs in global warming. *Journal of Environmental Psychology*, 30: 358-367.

- Session 15 (2/26) – Cognitive Biases: Association, Causation, Counterfactuals
- Hardman, Chapter 6, “Covariation, Causation and Counterfactual Thinking”
  - Attari et al. (2017). Perceptions of water systems. *Judgment and Decision Making*, 12(3): 314-327.

- Session 16 (2/28)- Decision Making Biases: Discounting and Myopia (*Guest Facilitator*)
- Hardman, Chapter 10, “Judgment and Choice Over Time”
  - Hardisty et al. (2012). About time: An integrative approach to effective environmental policy. *Global Environmental Change*, 22:684-694.

- Session 17 (3/5) – Motivational Biases: Ingroup Biases & Outgroup Homogeneity
- Hardman, Chapter 13, “Decision Making in Groups and Teams”
  - Karns, G.R., A. Heeren, E.L. Toman, R.S. Wilson, H.K. Szarek, and J.T. Bruskotter. 2018. Should grizzly bears be hunted or protected? Social and organizational affiliations influence scientific judgments. *Canadian Wildlife Biology & Management* 7(1), 18-30.

Session 18 (3/7) – Motivational Biases: Attribution Errors

- Plous, S. 1993. *The Psychology of Judgment and Decision Making*. McGraw Hill: New York, NY. Ch. 16, pp. 174-188
- Rickard, L.N. (2014). Perception of risk and the attribution of responsibility for accidents. *Risk Analysis*, 34(3): 514-528.

## **SPRING BREAK (March 11-15)**

Session 19 (3/19) - Motivational Biases: Confirmation Bias, Confidence and Optimism

- Hardman, Chapter 9, "Confidence and Optimism"
- Trumbo et al. (2014). An assessment of change in risk perception and optimistic bias for hurricanes among gulf coast residents. *Risk Analysis*, 34(6): 1013-1024.

Session 20 (3/21) – Review and Applications

- Maguire, L. A., and E. A. Albright. 2005. Can behavioral decision theory explain risk-averse fire management decisions? *Forest Ecology and Management* 211:47-58.
- Marx and Weber. (2012). Decision making under climate uncertainty. In Eds. T. Dietz and D. Bidwell *Climate Change in the Great Lakes Region*. Michigan State University Press: East Lansing, MI. pp. 99-128.

## **MEMO 3 DUE – Sunday, March 24<sup>th</sup>, Midnight in the dropbox**

### **How can we help individuals and groups make better decisions?**

Session 21 (3/26) – Debiasing and Choice Architecture

- Montibeller and Von Winterfeldt. (2015). Cognitive and motivational biases in decision and risk analysis. *Risk Analysis*, 35(7):1230-1251.
- Shu and Bazerman. (2012). Cognitive barriers to environmental action: Problems and solutions. In P. Bansal and A.J. Hoffman (Eds.) *The Oxford Handbook of Business and the Natural Environment*. 18 pages.

Session 22 (3/28) - Foundations of Structured Decision Making (SDM)

- Gregory et al. - pp. 1 - 46

Session 23 (4/2) – SDM: Decision Sketching

- Gregory et al. – pp. 47 - 68

Session 24 (4/4) – SDM: Objectives and Performance Measures

- Gregory et al. – pp. 69 – 121

Session 25 (4/9) – SDM: Incorporating Uncertainty

- Gregory et al. – pp. 122 - 149

Session 26 (4/11) – SDM: Alternatives and Consequences

- Gregory et al. – pp. 150 - 207

Session 27 (4/16) – SDM: Making Tradeoffs  
- Gregory et al. – pp. 208-238

Session 28 (4/18): SDM Wrap-up  
- Gregory et al. – pp. 239-288

**SDM Application Materials Due – Sunday, April 21<sup>st</sup>, Midnight in the Dropbox**

**Final Paper Due - Wednesday, April 24<sup>th</sup>, Midnight in the Dropbox**