Psych 4320 Spring 2021

Morality and the Evolution of Cooperation*

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1 Motivation and overview

Morality that values cooperation is a universal characteristic of human societies, as demonstrated by anthropological studies and analyses of ethnographic records from all over the world. Our readiness to cooperate (along with the sophistication we bring to the table, made possible by the use of language) has propelled our species to planetary dominance. In this seminar, we shall take up some of the central questions arising in connection with the evolutionary origins, the psychological underpinnings, and the social dynamics of human cooperation.

The central insight that unifies the explanations of cooperation offered by the relevant disciplines is that **human cooperation is *conditional***. It has been noted already by Darwin that unconditional cooperation with non-kin (pure altruism) is evolutionarily unsustainable. Theoretical analyses and, more recently, computational simulations, have shown how cooperation can nevertheless emerge and persist if it is conditioned on cultural-evolutionary processes such as niche construction (which can enable cooperation among non-kin), reputation tracking (which helps identify repeat non-cooperators), and altruistic punishment (which can amortize the cost of confronting a non-cooperator). The choice of readings for this seminar reflects the importance of these and other factors in understanding the nature of humans as conditional cooperators.

Attaining such understanding requires mastery of **computational methods in social sciences**. While evolutionary science, social psychology, and sociology are of key importance to the understanding of the world we live in, the complexity of the processes they study presents a challenge to the traditional scientific method, which tries to derive mathematical models from experimental data. This is why in these disciplines, scientists often resort to simulation, using an agent-based modeling (ABM) approach. In evolutionary ABM, simulated actors (agents) carrying various traits of interest share an environment in which

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they undertake actions and compete for resources. The agent's cumulative outcomes determine its fitness, which in turn affects its chances for reproduction. The effectiveness of traits can then be assessed by tracking their prevalence in the population over evolutionary time. Similarly, in computational social science, the ABM approach involves simulated agents with controlled cognitive abilities, "personalities," and interpersonal attitudes. The social dynamics that arises out of the agents' interactions is then analyzed and used to support theory development.

2 Notes for participants

This section contains essential information for participants: format description, inclusion statement,[1] ground rules for discussion, and credit requirements.

2.1 Format

2.1.1 The prerequisites

At least one course in a social science (psychology, sociology, anthropology), or permission of instructor. In addition, students who choose to include computer simulations in their final project (see below) must be able to write code (preferably in Python).

2.1.2 The plan for the course

The course consists of two parts:

Part I *Lectures* by the instructor, introducing the themes and the basic readings that cover the necessary conceptual tools.

Part II *Presentations* by the students, based on the remainder of the readings.

2.1.3 Student presentations

Students will present in teams of 2. Each student will participate in two presentations. The Piazza app on Canvas can be used for discussing any presentation-related issues and for forming the teams. The Piazza signup link for this course is: https://piazza.com/cornell/spring2021/cogst4310psych4320bionb4330.

2.2 Diversity, inclusion, and ground rules for discussion

Unlike in a large-enrollment lecture-based course, in which some students may choose, and succeed, to remain virtually anonymous, in a small-class seminar setting you are required to speak in front of the class (when presenting) and are expected to contribute to the discussion on other occasions. Because *your* informed opinion on every aspect of the material is unique and valuable, I shall strive to facilitate the conversation so as to make all voices heard. In this, I'll be counting on your help, and on the help of your classmates.

[1] The remarks in section 2.2, which are specific to this course, are intended to supplement the official Cornell statement on diversity and inclusion, which covers dimensions such as gender, race, socio-economic background, etc., and which can be found here: `http://diversity.cornell.edu/`.

Even matters of "consensus" are not always easy to talk about, as the rare dissenters who dare voice their opposition know full well; how then should we approach potentially controversial topics? With care and compassion, diligence, openness, and daring: care for our shared humanity; diligence with regard to the relevant knowledge and findings; openness to informed dissent; and daring to venture into uncharted territory, as befits good education.

If at any point during the semester (no matter whether in class or after hours) you feel that you need to talk about any of these things, please let me know immediately — doing so will be my top priority.

2.3 Credit and grading

There are three components to getting credit for this course:

1. Attend and contribute to the discussion during the **weekly meetings**. During the **closing discussion** in week 14, offer brief (5 min or so) remarks summing up your impressions and lessons from the semester.

2. By noon on the Monday for which readings have been assigned, post on the Canvas discussion board **questions** on the material (at least 10 questions should be submitted by the end of the semester). Be prepared to raise these questions in class.

3. By the end of Part I of the seminar, **choose** your teams and themes. During Part II, participate in two **presentations**.

   A typical presentation should include

   - a brief introduction to the topic and an overview of the background to the paper(s) and the relevant methodology;
   - the findings, as illustrated by the plots or (in the absence of graphics) by a concise verbal description;
   - a critique of the approach;
   - a summary of the conclusions and their significance for the seminar's themes.
   - a description of your plan for the final project based on the chosen paper(s).

   The presenting teams should meet with the instructor ahead of their presentations, to address any questions and coordinate the details.

Final grade components:

Weekly questions	30%
Participation in the discussions:	10%
Presentations:	60%

3 Weekly topics and readings

3.1 Part I: introductory lectures (4 weeks).

1. **(February 8)** OVERVIEW. MORALITY AS COOPERATION: REVIEW.

    - Dewey, J. (1903). Logical conditions of a scientific treatment of morality. *Decennial Publications of the University of Chicago, First Series*, 3, 115–139.
    - Atkisson, C. (2018). Cooperation, evolution of. In H. Callan, editor, *The International Encyclopedia of Anthropology*. John Wiley & Sons, Ltd.
    - [OPTIONAL] Gintis, H. (2003). The hitchhiker's guide to altruism: Gene-culture coevolution, and the internalization of norms. *Journal of theoretical Biology*, 220, 407–418.

2. **(February 15)** MORALITY AS COOPERATION: FINDINGS.

    - Curry, O. S., Mullins, D. A., and Whitehouse, H. (2019a). Is it good to cooperate? Testing the theory of morality-as-cooperation in 60 societies. *Current Anthropology*, 60, 1.
    - Boehm, C., Barclay, H. B., Dentan, R. K., Dupre, M.-C., Hill, J. D., Kent, S., Knauft, B. M., Otterbein, K. F., and Rayner, S. (1993). Egalitarian behavior and reverse dominance hierarchy [and comments and reply]. *Current Anthropology*, 34(3), 227–254.
    - [OPTIONAL] Curry, O. S., Chesters, M. J., and Van Lissa, C. J. (2019b). Mapping morality with a compass: Testing the theory of 'morality-as-cooperation' with a new questionnaire. *Journal of Research in Personality*, 78, 106–124; Dilevko, J. (2014). The corporate state, technology, and the demise of morality. *Journal of Information Ethics*, 23(2), 76–82. Review of C. Boehm, Moral Origins: The Evolution of Virtue, Altruism, and Shame. New York: Basic Books, 2012.

3. **(February 22)** QUESTIONS TO ASK. EXTENDED EVOLUTIONARY SYNTHESIS.

    - Dobzhansky, T. (1973). Nothing in biology makes sense except in the light of evolution. *The American Biology Teacher*, 35, 125–129.
    - Mayr, E. (1961). Cause and effect in biology. *Science*, 134, 1501–1506.
    - Tinbergen, N. (1963). On aims and methods in ethology. *Zeitschrift für Tierpsychologie*, 20, 410–433.
    - Marr, D. and Poggio, T. (1977). From understanding computation to understanding neural circuitry. *Neurosciences Res. Prog. Bull.*, 15, 470–488.
    - Laland, K. N., Uller, T., Feldman, M. W., Sterelny, K., Müller, G. B., Moczek, A., Jablonka, E., and Odling-Smee, J. (2015). The extended evolutionary synthesis: its structure, assumptions and predictions. *Proc. R. Soc. B*, 282, 20151019.

4. **(March 1)** AGENT-BASED MODELING.

    - Macy, M. W. and Willer, R. (2002). From factors to actors: computational sociology and agent-based modeling. *Annual Review of Sociology*, 28, 143–166.
    - Axelrod, R. and Tesfatsion, L. (2006). A guide for newcomers to agent-based modeling in the social sciences. In L. Tesfatsion and K. L. Judd, editors, *Handbook of Computational Economics*, volume 2, pages 1647–1659. Elsevier.

- Jackson, J. C., Rand, D., Lewis, K., Norton, M. I., and Gray, K. (2017). Agent-based modeling: A guide for social psychologists. *Social Psychological and Personality Science*, 8(4), 387–395.
- [Recommended for beginners; OPTIONAL for others] Ballow, A. L., Chludzinski, L. R., and Prieto-Langarica, A. (2020). Agent-based modeling in mathematical biology: a few examples. In H. Callender Highlander, editor, *An Introduction to Undergraduate Research in Computational and Mathematical Biology*, Foundations for Undergraduate Research in Mathematics, pages 273–298. Springer, Cham, Switzerland.

3.2 Part II: selected project topic presentations (9 weeks)

5. **(March 8)** ALTRUISTIC PUNISHMENT.

   - Boyd, R., Gintis, H., Bowles, S., and Richerson, P. J. (2003). The evolution of altruistic punishment. *Proceedings of the National Academy of Science*, 100, 3531–3535.
   - Boyd, R., Gintis, H., and Bowles, S. (2010). Coordinated punishment of defectors sustains cooperation and can proliferate when rare. *Science*, 328, 617–620.
   - Smirnova, D. (2019). Altruistic punishment and other theories. Independent Undergraduate Research in Psychology (Cornell University) term project. Advisor: S. Edelman.

6. **(March 15)** EVOLUTION OF CONSCIENCE AND THE INTERNALIZATION OF NORMS.

   - Epstein, J. M. (2001). Learning to be thoughtless: social norms and individual competition. *Computational Economics*, 18, 9–24.
   - Gavrilets, S. and Richerson, P. J. (2017). Collective action and the evolution of social norm internalization. *Proceedings of the National Academy of Science*, 114(23), 6068–6073.
   - Smirnova, D. and Odouard, V. (2021). How selfish genes beget selfless beings: the evolution of conscience. Independent Undergraduate Research in Psychology (Cornell University) term project. Advisor: S. Edelman.

7. **(March 22)** COMMON MORALITY.

   - Lindström, B., Jangard, S., Selbing, I., and Olsson, A. (2018). The role of a "common is moral" heuristic in the stability and change of moral norms. *Journal of Experimental Psychology: General*, 147(2), 228–242.
   - Gavin, M. (2018). An agent-based computational approach to "The Adam Smith Problem". *Historical Social Research*, 43(1), 308–336.

8. **(March 29)** EVOLUTION OF POWER. SOCIAL CONFLICT AND CIVIL VIOLENCE.

   - Makowsky, M. D. and Smaldino, P. E. (2016). The evolution of power and the divergence of cooperative norms. *Journal of Economic Behavior & Organization*, 126, 75–88.
   - Epstein, J. M. (2002). Modeling civil violence: an agent-based computational approach. *Proceedings of the National Academy of Science*, 99, 7243–7250.
   - [OPTIONAL] Lemos, C. M. (2018). *Agent-Based Modeling of Social Conflict: From Mechanisms to Complex Behavior*. Springer, Cham, Switzerland.

9. **(April 5)** PUBLIC POLICY AND CULTURE. POLARIZATION.

    - Diallo, S. Y., Shults, F. L., and Wildman, W. J. (2020). Minding morality: ethical artificial societies for public policy modeling. *AI & SOCIETY*.
    - Li, J. and Xiao, R. (2017). Agent-based modelling approach for multidimensional opinion polarization in collective behaviour. *Journal of Artificial Societies and Social Simulation*, 20(2), 4.
    - [OPTIONAL] Voinea, C. F. and Neumann, M. (2020). Political culture: a theory in search for methodology. *Quality & Quantity*, 54, 335–360. An editorial.

10. **(April 12)** POLITICAL STABILITY. ENVIRONMENTAL JUSTICE.

    - Vallier, K. (2017). Three concepts of political stability: an agent-based model. *Social Philosophy & Policy Foundation*, 34(1), 232–259.
    - Liuzzi, D. and Vié, A. (2019). Staring at the abyss: a neurocognitive founded agent based model of collective-risk social dilemma under the threat of environmental disaster. Technical Report 3484791, SSRN.

11. **(April 19)** ECONOMICS OF UTOPIA. COLLECTIVE ACTION THEORY AND COMPLEX SOCIETIES.

    - Almudi, I., Fatas-Villafranca, F., Izquierdo, L. R., and Potts, J. (2017). The economics of utopia: a co-evolutionary model of ideas, citizenship and socio-political change. *Journal of Evolutionary Economy*, 27, 629–662.
    - DeMarrais, E. and Earle, T. (2017). Collective action theory and the dynamics of complex societies. *Annual Review of Anthropology*, 46, 183–201.

12. **(April 26)** [Wellness break — no class]

13. **(May 3)** THE ORIGINS AND PSYCHOLOGY OF HUMAN COOPERATION [REVIEW].

    - Henrich, J. and Muthukrishna, M. (2021). The origins and psychology of human cooperation. *Annual Review of Psychology*, 72(24), 1–34.

3.3 Conclusions (1 week)

14. **(May 10)** CLOSING GENERAL DISCUSSION.

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