

The Science of Behavior Change

Instructors: Professors Katherine Milkman (kmilkman@wharton.upenn.edu) and Angela Duckworth (aduckworth@characterlab.org)

Office hours: Mondays, 1-1:30pm. Each student must sign up for one 15 minute slot with Katy and one 15 minute slot with Angela during the semester. Please sign up as needed via the [online scheduling tool](#).

Teaching assistants: Heather Graci (hgraci@wharton.upenn.edu)

Schedule: Synchronous, interactive classes via Zoom on Wednesdays from 9:00am to 12:00pm. Students must log in using their University of Pennsylvania Zoom accounts. The typical class will follow the format below:

- 8:55: Zoom room open. Please use this time to address any tech problems (and feel free to email your TA to troubleshoot).
- 9:00: Introduction, housekeeping items, and opening activity.
- 9:15: Interactive discussion about the first assigned reading.
- 9:45: 15-MINUTE BREAK
- 10:00: Interactive discussion about other assigned readings.
- 10:45: 15-MINUTE BREAK
- 11:00: Guest speaker.

Course Overview

This seminar introduces advanced undergraduates to sustainable strategies for behavior change in health, education, and savings. It is intended for juniors and seniors who are seriously considering an advanced degree in behavioral science or a related field.

Weekly readings cover classic and current research from both psychology and economics. To help students develop the skill of reading and critiquing scientific literature, we assign different students to lead a portion of our class each week.

Although there are no formal prerequisites for this class, it is particularly well-suited to students who have taken (and enjoyed) courses like OIDD 290: Decision Processes, PPE 203/PSYC 265: Behavioral Economics and Psychology, PSYC 266: Positive Psychology, and MKTG 266: Marketing for Social Impact. Auditing is not permitted.

Class Participation

This seminar's success will depend entirely on students' level of participation. Students should attend each class and come prepared to discuss each assigned reading in detail. Read *all* assigned articles *in entirety and very carefully* before each class unless instructed to skim sections.

Assignments

1. Pairs Presentation

Pairs of students will be responsible for leading the discussion of assigned articles for each class. You and your partner should be prepared to do the following when you lead:

1. Lead a 5-minute activity (e.g., a thought experiment, a survey designed to illustrate a key point from the reading, paired conversations in Zoom break-out rooms) (5 minutes).
2. For each paper assigned, the presenters should note one key strength and one key weakness and then open the floor for discussion about other strengths and weaknesses of the research (1 minute per paper).
3. Be prepared to note key themes across the assigned readings, incorporating comments from the discussion to close the discussion segment of class (3 minutes total)

2. Behavior Change Program First-Person Experience (*propose program by 9/16, begin participating in program by 9/23, present observations about your experience on 11/18, and turn in paper by 12/2*)

Participate in one professional behavior change program of your choosing (e.g., Weight Watchers, StickK, Fabulous, Headspace, Zombies Run! 5k Training, Charity Miles 100). Write your own (4 to 5 page double-spaced, excluding references) report that:

1. Describes the design of this program
2. Relates this program to concepts discussed in the course
3. Suggests improvements to this program, and
4. Includes 5 to 10 references from the scientific literature.

In-class presentations will be 2 minutes in length and due on 11/18. Presentations may include slides, though they are not required. They should cover points 1-3 above. You can choose to participate in the same program as your other classmates, but each of you still must separately submit this form and complete all assignments **independently**. You will be grouped together for in-class presentations and notified in advance, though each of you should reflect on your own experiences.

NOTE: For programs that are not free, course funds may be used to cover the cost of enrollment. Please work with the course TA to get approval for (1) your selected behavior change program (before enrolling) and (2) having any associated costs covered by the course.

3. Literature Review (Due: 10/14)

You will be required to complete one (4 to 5 pages double-spaced, excluding references) literature review on a behavior change strategy. The paper should be in APA format (see <http://www.apastyle.org/>). You are encouraged to include 10 to 15 citations. Ideally, this literature review will cover a topic that becomes central to the focus of your final research proposal on a novel behavior change intervention (e.g., if your proposed behavior change intervention will rely heavily on reminders, a literature review on reminders would be the perfect choice).

4. Research Proposal for a Novel Behavior Change Intervention

1. Present your idea for a novel behavior change intervention in class on **10/28**. You will receive written feedback on your idea from your peers and from us. You will have 2 to 3 minutes. We encourage you to prepare one PowerPoint slide to make it easier to follow

along given the short time frame. PowerPoint slides and/or handouts are entirely optional.

2. Give a final in-class **presentation** of an original research proposal for a field study of a specific behavior change technique on **12/9** (final day of class) -- either of your own invention or derivative of an already-studied technique. This (brief) presentation should include all of the aspects of the research proposal described below.
3. Your **final paper** is due **at 5:00pm on 12/16** and will take the form of an 8-page, double-spaced research proposal that includes the following sections:
 - a. Motivation for this behavior change intervention, including 10 to 12 references to the scientific literature
 - i. What real-world problem does this intervention address and why is it important?
 - ii. What contribution will the proposed study make to the scientific literature? In other words, what will we learn about behavior change from this study? (Note that this will constitute an improved literature review based on the one you turn in 10/14, reflecting our feedback to you.)
 - b. Hypothesis
 - c. Study design
 - i. Study sample (e.g., college undergraduates; nursing home patients)
 - ii. Procedure
 - d. Anticipated results and, if the data do not fit this pattern, how you will interpret null findings
 - e. Optionally, in the Appendix, scripts or other text constituting the behavior change intervention itself

The final paper will be graded based on the following criteria:

- Does it motivate the problem with a practical contribution?
- Does it motivate the problem scientifically? That is, is it offering a new/compelling idea? Does it add to the research literature?
- Does it cover relevant, key findings from the literature? Does it do so thoroughly and accurately?
- Does it have a well-developed hypothesis that is clearly articulated, compelling, and novel?
- Does it include a compelling study design for testing the hypothesis using field data? The control group should be thoughtful and the strengths and limitations of the study design should be well-articulated.
- Is it well-written and clear?

Grading

- 15% Class Participation
- 15% In-Class Presentation (in Pairs) on Assigned Readings
- 15% Literature Review
- 15% Behavior Change Experience Paper
- 40% Final Paper and Presentation (15% for in-class presentation and 25% for final paper)

Late submission policy: Late assignments will be penalized one point for every 24 hours late.

Course Schedule

Date	Topic	Lead	Student Presenter	Guest (11-11:45 am unless noted)	Deadlines
9/2	Introduction: Nudges and Boosts	Katy & Angela	N/A		
9/9	Pre-Commitment Strategies	Katy	Shaila Lothe & Rachel Chu	Todd Rogers (9-9:45am)	
9/16	Make It Fun	Katy	Karthik Macherla & Madison Jaffe	Ayelet Fishbach	Propose your choice of Behavior Change Program
9/23	Goal Setting and Planning	Angela	Shalva Gozland & Amanda Nerenberg	Neil Lewis	Begin Behavior Change Program by This Date
9/30	Beliefs and Appraisal	Angela	Isaac Spear & Jean Chapiro	Seth Gillihan	
10/7	Social Motives to Change	Katy	Kevin Babitz & Tiffany Schell	Robert Cialdini	
10/14	Salience	Angela	Bethany Hsiao & Diana Sieh	Piyush Tantia	Literature Review Due
10/21	Situation Modification	Angela	Maayan Waldman & Uri Federman	Richard Thaler	
10/28	Defaults, Active Choice and Information Leakage	Katy	Andrew Zheng & Gabrielle Hemlick	N/A	In-Class Presentation on Research Proposal Paper
11/4	Prosocial Nudges	Angela	Nicholas Plante & Daisy Angeles	Maya Shankar	
11/11	Behaviorally-Informed Incentives	Katy	Mira Potter-Schwartz & Austin Smith	Steven Levitt	
11/18	Habits	Angela	Zachary Drapkin & Karen Herrera	Wendy Wood	In-Class Presentation on Behavior Change Experience
12/2	When Are We Ready for Behavior Change?	Katy	Aaron Kahane & Grace Seeley	Mitesh Patel	Behavior Change

					Experience Paper Due
12/9	Conclusion	Katy & Angela	N/A	N/A	Final In-Class Presentation on Research Proposal Paper
12/16	No Class Meeting				Final Research Proposal Paper Due

Detailed Course Reading List

9/2: Introduction

Thaler, R., & Sunstein, C. (2008). *Nudge: improving decisions about health, wealth and happiness*. Yale University Press: New Haven, CT. *Introduction, Chapter 4: When Do We Need a Nudge?, Chapter 5: Choice Architecture, & Chapter 17: Objections.*

Benartzi, S., Beshears, J., Milkman, K. L., Sunstein, C. R., Thaler, R. H., Shankar, M., Tucker, W., Congdon, W. J., & Galing, S. (2017). Should governments invest more in nudging?. *Psychological Science*, 28(8), 1041-1055. doi: 10.1177/0956797617702501
 [NOTE: Instead of reading the very dense results section, simply read the tables and figure.]

Economics behaving badly. (2010, July 14). *The New York Times*. Retrieved from <https://www.nytimes.com/2010/07/15/opinion/15loewenstein.html>

9/9: Pre-Commitment Strategies (Guest: *Todd Rogers*)

Student Presenter: TBD

Ariely, D., & Wertenbroch, K. (2002). Procrastination, deadlines, and performance: Self-control by precommitment. *Psychological Science*, 13(3), 219-224. doi: 10.1111/1467-9280.00441

Schwartz, J., Mochon, D., Wyper, L., Maroba, J., Patel, D., & Ariely, D. (2014). Healthier by precommitment. *Psychological Science*, 25(2), 538–546.
<https://doi.org/10.1177/0956797613510950>

Thaler, R. H., & Benartzi, S. (2004). Save more tomorrow™: Using behavioral economics to increase employee saving. *Journal of Political Economy*, 112(S1), S164-S187. doi: 10.1086/380085

9/16: Make It Fun (Guest: *Ayelet Fishbach*)

Student Presenter: TBD

Milkman, K. L., Minson, J. A., & Volpp, K. G. (2014). Holding the Hunger Games hostage at the gym: An evaluation of temptation bundling. *Management Science*, 60(2), 283-299. doi: 10.1287/mnsc.2013.1784

Patel, M. S., Benjamin, E. J., Volpp, K. G., Fox, C. S., Small, D. S., Massaro, J. M., ... & Manders, E. S. (2017). Effect of a game-based intervention designed to enhance social

incentives to increase physical activity among families: the BE FIT randomized clinical trial. *JAMA Internal Medicine*, 177(11), 1586-1593.

Woolley, K., & Fishbach, A. (2016). For the fun of it: Harnessing immediate rewards to increase persistence in long-term goals. *Journal of Consumer Research*, 42(6), 952–966.
<https://doi.org/10.1093/jcr/ucv098>

9/23: Goal Setting and Planning (Guest: Neil Lewis)

Student Presenter: TBD

Rogers, T., Milkman, K. L., John, L. K., & Norton, M. I. (2015). Beyond good intentions: Prompting people to make plans improves follow-through on important tasks. *Behavioral Science & Policy*, 1(2), 33-41.

Duckworth, A. L., Kirby, T. A., Gollwitzer, A., & Oettingen, G. (2013). From fantasy to action: Mental contrasting with implementation intentions (MCII) improves academic performance in children. *Social Psychological and Personality Science*, 4(6), 745-753.
 doi: 10.1177/1948550613476307

Hershfield, H. E., Shu, S., & Benartzi, S. (2020). Temporal Reframing and Participation in a Savings Program: A Field Experiment. *Marketing Science*. doi: 10.1287/mksc.2019.1177

9/30: Beliefs & Appraisal (Guest: Seth Gillihan)

Student Presenter: TBD

Yeager, D. S., et al. (2019). A national experiment reveals where a growth mindset improves achievement. *Nature*, 573(7774), 364-369. <https://doi.org/10.1038/s41586-019-1466-y>

Finkel, E. J., Slotter, E. B., Luchies, L. B., Walton, G. M., & Gross, J. J. (2013). A brief intervention to promote conflict reappraisal preserves marital quality over time. *Psychological Science*, 24(8), 1595-1601. doi: 10.1177/0956797612474938

Heller, S. B., Shah, A. K., Guryan, J., Ludwig, J., Mullainathan, S., & Pollack, H. A. (2017). Thinking, fast and slow? Some field experiments to reduce crime and dropout in Chicago. *The Quarterly Journal of Economics*, 132(1). <https://doi.org/10.1093/qje/qjw033>

10/7: Social motives to change (Guest: Robert Cialdini)

Student Presenter: TBD

Goldstein, N. J., Cialdini, R. B., & Griskevicius, V. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *Journal of Consumer Research*, 35(3), 472-482. doi: 10.1086/586910

Gerber, A. S., Green, D. P., & Larimer, C. W. (2008). Social pressure and voter turnout: Evidence from a large-scale field experiment. *American Political Science Review*, 102(1), 33-48. doi: 10.1017/S000305540808009X [NOTE: No need to read “The Calculus of Voting” section of this paper]

Yoeli, E., Hoffman, M., Rand, D. G., & Nowak, M. A. (2013). Powering up with indirect reciprocity in a large-scale field experiment. *Proceedings of the National Academy of Sciences*, 110(Supplement 2), 10424-10429.

10/14: Salience (Guest: Piyush Tantia)**Student Presenter: TBD**

- Karlan, D., McConnell, M., Mullainathan, S., & Zinman, J. (2016). Getting to the top of mind: How reminders increase saving. *Management Science*, 62(12), 3393-3411. doi: 10.3386/w16205 [NOTE: skim portions that focus on economic modeling (Section 4)]
- Rogers, T., & Milkman, K. L. (2016). Reminders through association. *Psychological Science*, 27(7), 973-986. doi: 10.1177/0956797616643071
- Tiefenbeck, V., Goette, L., Degen, K., Tasic, V., Fleisch, E., Lalive, R., & Staake, T. (2016). Overcoming salience bias: How real-time feedback fosters resource conservation. *Management Science*, 64(3), 1458-1476. doi: 10.1287/mnsc.2016.2646

10/21: Situation Modification (Guest: Richard Thaler)**Student Presenter: TBD**

- Thorndike, A. N., Riis, J., Sonnenberg, L. M., & Levy, D. E. (2014). Traffic-light labels and choice architecture: promoting healthy food choices. *American Journal of Preventive Medicine*, 46(2), 143-149.
- Duckworth, A.L., White, R.E., Matteucci, A.J., Shearer, A., & Gross, J.J.(2016) A stitch in time: Strategic self-control in high school and college students. *Journal of Educational Psychology*, 108(3), 329-341. doi: 10.1177/1088868315581263
- Bettinger, E. P., Long, B. T., Oreopoulos, P., & Sanbonmatsu, L. (2012). The role of application assistance and information in college decisions: Results from the H&R Block FAFSA experiment. *The Quarterly Journal of Economics*, 127(3), 1205-1242. doi: 10.2307/23251984

10/28: Defaults, Active Choice, and Information Leakage (Guest: N/A, In-Class Presentation on Research Proposal Paper)**Student Presenter: TBD**

- McKenzie, C. R., Liersch, M. J., & Finkelstein, S. R. (2006). Recommendations implicit in policy defaults. *Psychological Science*, 17(5), 414-420.
- Chapman, G. B., Li, M., Colby, H., & Yoon, H. (2010). Opting in vs opting out of influenza vaccination. *Journal of the American Medical Association*, 304(1), 43-44. doi: 10.1001/jama.2010.892
- Beshears, J., Choi, J. J., Laibson, D., & Madrian, B. C. (in press). Active choice, implicit defaults, and the incentive to choose. *Organizational Behavior and Human Decision Processes*.

11/4: Prosocial Nudges (Guest: Maya Shankar)**Student Presenter: TBD**

- Grant, A. M., & Hofmann, D. A. (2011). It's not all about me: Motivating hand hygiene among health care professionals by focusing on patients. *Psychological Science*, 22(12), 1494-1499. doi: 10.1177/0956797611419172

Eskreis-Winkler, L., Milkman, K. L., Gromet, D. M., & Duckworth, A. L. (2019). A large-scale field experiment shows giving advice improves academic outcomes for the advisor. *Proceedings of the National Academy of Sciences*, 116(30), 14808–14810. <https://doi.org/10.1073/pnas.1908779116>

Small, D. A., & Loewenstein, G. (2003). Helping a victim or helping the victim: Altruism and identifiability. *Journal of Risk and Uncertainty*, 26(1), 5-16.

11/11: Behaviorally-Informed Incentives (Guest: TBD)

Student Presenter: TBD

Kirgios, E. L., Chang, E. H., Levine, E. E., Milkman, K. L., & Kessler, J. B. (2020). Forgoing earned incentives to signal pure motives. *Proceedings of the National Academy of Sciences*, 117(29), 16891-16897.

Gneezy, U., Kajackaite, A., & Meier, S. (in press). Incentive-based interventions. In M. S. Hagger, L. D. Cameron, K. Hamilton, N. Hankonen, & T. Lintunen (Eds.), *The Handbook of Behavior Change*. Cambridge University Press.

Volpp, K. G., Troxel, A. B., Pauly, M. V., Glick, H. A., Puig, A., Asch, D. A., ... & Corbett, E. (2009). A randomized, controlled trial of financial incentives for smoking cessation. *New England Journal of Medicine*, 360(7), 699-709.

11/18: Habits (Guest: N/A, In-Class Presentation on Behavior Change Experience)

Student Presenter: TBD

Wood, W., & Neal, D. T. (2016). Healthy through habit: Interventions for initiating & maintaining health behavior change. *Behavioral Science & Policy*, 2(1), 71-83.

Charness, G., & Gneezy, U. (2009). Incentives to exercise. *Econometrica*, 77(3), 909-931. <https://doi.org/10.3982/ECTA7416>

Galla, B. M., & Duckworth, A. L. (2015). More than resisting temptation: Beneficial habits mediate the relationship between self-control and positive life outcomes. *Journal of Personality and Social Psychology*, 109(3), 508. <https://doi.org/10.1037/pspp0000026>

Beshears, J., Milkman, K. L., Lee, H. N., & Mislavsky, R. (in press). Creating Exercise Habits Using Incentives: The Tradeoff between Flexibility and Routinization. *Management Science*.

12/2: When Are We Ready for Behavior Change? (Guest: TBD)

Student Presenter: TBD

Chang, E. H., Milkman, K. L., Gromet, D. M., Rebele, R. W., Massey, C., Duckworth, A. L., & Grant, A. M. (2019). The mixed effects of online diversity training. *Proceedings of the National Academy of Sciences*, 116(16), 7778–7783. <https://doi.org/10.1073/pnas.1816076116>

Dai, H., Milkman, K. L., & Riis, J. (2014). The fresh start effect: Temporal landmarks motivate aspirational behavior. *Management Science*, 60(10), 2563-2582. <https://doi.org/10.1287/mnsc.2014.1901>

Norcross, J. C., Krebs, P. M., & Prochaska, J. O. (2011). Stages of change. *Journal of Clinical Psychology*, 67(2), 143-154. <http://doi.org/10.1002/jclp.20758>

Larcom, S., Rauch, F., & Willems, T. (2017). The benefits of forced experimentation: striking evidence from the London underground network. *The Quarterly Journal of Economics*, 132(4), 2019-2055.

12/9: Conclusion (Guest: N/A, Final In-Class Presentation on Research Proposal Paper)

Duckworth, A. L., Milkman, K. L., & Laibson, D. (2018). Beyond Willpower: Strategies for Reducing Failures of Self-Control. *Psychological Science in the Public Interest*, 19(3), 102–129. <https://doi.org/10.1177/1529100618821893>