MKTG 350 / 850
Special Topics: Consumer Neuroscience
Spring 2022
Professor Gideon Nave

1. Course Team

For any questions regarding the assignments and class materials, please use Piazza.

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2. Overview

How can studying the brain improve our understanding of consumer behavior?
While neuroscience made tremendous strides throughout the past few decades, rarely were meaningful applications developed outside of medicine. Recently, however, breakthroughs in measurement and computation have accelerated brain science, and created an array of opportunities in business and technology. Currently, applications to marketing research and product development are experiencing explosive growth that has been met with both excitement and skepticism. This mini-course provides an overview of the neuroscience behind and the potential for these applications. Topics range from well-known and widely used methods and measures such as eye-tracking, response times and skin conductance, to emerging technologies such as face-reading, EEG and fMRI.

The course is self-contained and has no prerequisites. However, students with some background in business, economics, psychology, and/or neuroscience are likely to find some of the material covered in this course complementary to their existing knowledge. Much of the foundational work

in consumer neuroscience and neuroeconomics involves laboratory experiments. Accordingly, we will read and discuss several experimental papers and the craft of designing an experiment will occasionally be discussed. However, we will not dedicate significant time to the methodology of experimental design and analysis. As will become clear as the course progresses, “consumer neuroscience" can be used to study almost any aspect of consumer behavior.

3. Objectives

By the end of this course, students will be familiar with:

- Fundamental facts and misconceptions about the brain and the tools for studying it.
- Key theoretical concepts, scientific discoveries and measurement techniques that can guide future work in research and industry.
- Applications of neuroscience to consumer research.

Students will be asked to apply their knowledge in several ways:

- Think critically about existing uses of neuroscience in industry.
- Identify insights and applications from the existing scientific literature.
- Construct an original research question.

4. Grades and Assignments (further details below)

- Online quizzes: 10%, graded for completion
- Assay: 10%
- Online Tutorials: 15%
- Group Project: 25%
- Final Exam: 40%
- Up to 5% Bonus: Discussion Participation

Grade Cut-offs

There is no curve. I am happy to award an A to anyone who has earned it.
The tentative cut-offs for determining your final letter grade are:

A	93%
A-	90%
B+	87%
B	83%
B-	80%

C+ 77%

C 73%

C- 70%

D 60%

These are the lowest possible scores to achieve each letter grade. A+ will be awarded at my discretion only. In the past, A+ was given for achieving a high total score (>97%), together with actively attending and participating in class.

5. Textbook

The required textbook is Consumer Neuroscience (hereafter referred to as CN), edited by Cerf and Garcia-Garcia (MIT Press, 2017). You can rent a digital copy of this book ($37.50 for a 4-months period) here: https://mitpress.ublish.com/book/consumer-neuroscience#purchase
Additional required and recommended readings are listed below and will be made available via study.net.

6. Modules

The core of the course is eleven modules, each of which is dedicated to a different set of theoretical concepts and research tools.

Each module includes a combination of the following components:

1. **In-person lectures.** Some lectures will include real-time demonstrations of data collection and others will involve or a short guest lecture (the speakers may be joining us remotely).
2. **Discussions.** Each module has an associated discussion board. After the lecture's date in the course schedule, we will post several questions for discussion. Students are encouraged to respond to these questions, post new discussion questions and further interact with one another and the course team. Participating in discussions is voluntary. At the end of the course, we will reward active participation with up to 5% bonus points.
3. **Quizzes.** The quizzes are brief exercises based on the assigned readings and class lectures. They will be posted on Canvas after most lectures, and are to be completed outside of class and are due one week after the lecture. Quizzes are graded for completion, but please make sure to "check the box" to confirm that you have completed the quiz. You can miss up to two quizzes without penalty.
4. **Readings.** There are three types of readings.

- **Mandatory readings:** Material that is an integral part of the course and is not fully covered by the lectures. There is only one such reading assignment, in module 11.
- **Recommended readings:** Material that is mostly covered by the lectures. Reading it can be useful for review and deeper understanding of the material.
- **Optional readings:** Material that goes beyond the lectures, typically academic publications (available on study.net). The optional readings are intended to those who would like to learn more about specific topics.
- There will not be questions in the final exam about materials that only appear in 'recommended' and 'optional' readings.

5. **A TED talk** (about 5-15 minutes): Strongly recommended (but not mandatory). Think of them as 'guest lectures' by high profile speakers. There will not be questions in the final exam about them.
6. **Screencasts** (10-20 minutes each): As supporting material, I will make pre-recorded mini lectures available to watch. These screencasts mostly cover the same material taught in class. There will not be questions in the final exam about any material that appears in the screencasts and not in the lecture.
7. Some modules include additional Assignments — see further below.

7. Assignments

Interactive tutorials. Modules 2, 4 and 5 include interactive online tutorials that take about 30 minutes to complete each. They are due two weeks after the time of the lecture in the course calendar, though I recommend completing them soon after attending (or watching) the lectures. The tutorials are designated for understanding basic concepts in the analysis of biometric data:

(1) Brain imaging (module 2), due: 3/31/2022
(2) Eye-tracking (module 4), due: 4/7/2022
(3) Skin conductance (module 5), due: 4/12/2022

Assay. Each student will write a short assay (3-6 paragraphs, up to 600 words) on 'reverse inference' — a topic covered in Module 3. Instructions are available on Canvas; submissions are also via Canvas. Due 4/5/2022.

Project. Groups of 4 to 6 students will complete a project addressing a question(s) in consumer behavior that can be addressed using neuroscience data. One of the projects' deliverables is a five-minute video summary, submitted in the final week. Instructions will be available on Canvas.

NOTE: Late assignments will not be accepted.

There will be no make-up or extra credit assignments given.

8. Final Exam

The final exam be taken online, and it will be available between 8 AM EST on 5/4/2022 and 11:59 PM EST on 5/6/2022. It will cover concepts presented in lectures and the mandatory assigned readings. This is an open-book, open notes exam, but it must be done individually. The exam has about 25 questions (multiple choice, sometimes with more than one correct answer), and it takes 1 hour and 15 minutes. Please make sure that the SDS contact me if you need additional accommodation. The exam's instructions will be posted online in advance, so you have a chance to ask questions before starting it.

9. Office hours

I am available for office hours (in person or online; by appointment) every Thursday afternoon, after 4:30 PM. If Thursday doesn't work, I will likely be available on Friday as well, just email me to schedule.

10. Class Schedule

Module 1 March 15	**Class Introduction** Overview of Consumer Neuroscience <u>Optional readings:</u> Ariely, D., & Berns, G. S. (2010). Neuromarketing: the hope and hype of neuroimaging in business. *Nature reviews neuroscience*, *11*(4), 284-292 Plassmann, H., Venkatraman, V., Huettel, S., & Yoon, C. (2015). Consumer neuroscience: applications, challenges, and possible solutions. *Journal of Marketing Research*, *52*(4), 427-435. <u>Watch**:**</u> Laurie Santos — A monkey economy as irrational as ours
Module 2 March 17	**Brain Structure and Function; The Neuromarketing Toolkit Part I** Brain Structure and Function The Neuron, Neurotransmitters Lateralization, The Four Lobes, Subcortical Structures

	EEG, fMRI, MEG, NURS, TMS Brain Imaging Tutorial, (due 3/31/2022) <u>Watch:</u> Moran Cerf — What if we could look inside human brains? <u>Recommended readings:</u> CN Chapters 2, 4
Module 3 March 22	**The Neuromarketing Toolkit Part II; Neuroscience Gone Wrong** Response Times, Mouse Tracking Reverse Inference, Multiple Hypothesis Testing Neuroscience Hype – The Case of Oxytocin Reverse Inference Assay (due 4/5/2022) <u>Watch:</u> Molly Crockett — Beware of Neuro-Bunk <u>Optional readings:</u> Bennet, C., Baird, A., Miller, M., & Wolford, G. (2010). Neural correlates of interspecies perspective taking in the post-mortem Atlantic salmon: An argument for proper multiple comparisons correction. Journal of Serendipitous and Unexpected Results, 1(1), 1-5. Poldrack, Russell A. "Inferring mental states from neuroimaging data: from reverse inference to large-scale decoding." Neuron 72.5 (2011): 692-697.
Module 4 March 24	**Attention and Eye Tracking** Visual Perception and The Visual System Two Types of Attention Measuring Attention using Eye Tracking Saliency

	Eye Tracking Tutorial (due 4/7/2022) **Guest mini-lecture:** Robert Botto, The Wharton School Watch: Ray Burke — How stores track your shopping behavior Recommended readings: CN Chapter 5 Optional readings: Milosavljevic, Milica, et al. "Relative visual saliency differences induce sizable bias in consumer choice." *Journal of Consumer Psychology* 22.1 (2012): 67-74. A. Selin Atalay, H. Onur Bodur, and Dina Rasolofoarison. Shining in the Center: Central Gaze Cascade Effect on Product Choice. Journal of Consumer Research, 39(4):848-866, 2012
Module 5 March 29	**Emotion, Skin Conductance and Face Reading** Emotions vs. Feelings Theoretical Frameworks for Studying Emotions Consequences of Emotions Neural Substrates of Emotion Measuring Emotion **Guest mini-lecture:** Alex Genevsky, Rotterdam School of Management. Skin Conductance Tutorial (due: 4/12/2022) Watch: Roz Picard — Technology and Emotions David Anderson — Your brain is more than a bag of chemicals Recommended readings: CN Chapter 7

	Optional readings: Brian Knutson, Scott Rick, Elliott Wimmer, Drazen Prelec, George Loewenstein. Neural Predictors of Purchases. Neuron, 53(1): 147-156, 2007 Teixeira, Thales, Rosalind Picard, and Rana El Kaliouby. "Why, when, and how much to entertain consumers in advertisements? A web-based facial tracking field study." Marketing Science 33.6 (2014): 809-827.
Module 6 March 31	**Reward and Conditioning** Reward, Liking and Wanting Neuro-forecasting Pavlovian Conditioning Learning about Actions Watch: Brian Knutson — Neuro-forecasting internet market success Recommended readings: CN Chapter 9 Optional readings: Bushong, Benjamin, et al. “Pavlovian processes in consumer choice: The physical presence of a good increases willingness-to-pay.” *American Economic Review* 100.4 (2010): 1556-71. Genevsky, Alexander, and Brian Knutson. “Neural affective mechanisms predict market-level microlending.” Psychological science 26.9 (2015): 1411-1422.
Module 7 April 5	**Expectations, Valuation, Decisions** Marketing Placebo Effects (MPEs) Value in the Brain The Drift Diffusion Model (DDM) – Part I The Drift Diffusion Model (DDM) – Part II

	Guest mini-lecture: John Clithero, University of Oregon Watch: Antonio Rangel — The Neuroeconomics of simple choice Optional readings: Plassmann, Hilke, et al. "Marketing actions can modulate neural representations of experienced pleasantness." Proceedings of the National Academy of Sciences 105.3 (2008): 1050-1054. Krajbich, Ian, Carrie Armel, and Antonio Rangel. "Visual fixations and the computation and comparison of value in simple choice." *Nature neuroscience* 13.10 (2010): 1292.
Module 8 April 7	**Memory and Brands** Introduction to Memory Taxonomy of Memory Systems Forming Long Lasting Memories Remembering Experiences Measuring Memory **Guest mini-lecture:** Michael Platt, University of Pennsylvania. Watch Daniel Kahneman — The Riddle of Experience vs. Memory Recommended readings: CN Chapter 6,10 Optional readings: McClure, Samuel M., et al. "Neural correlates of behavioral preference for culturally familiar drinks." Neuron 44.2 (2004): 379-387. Chen, Yu-Ping, Leif D. Nelson, and Ming Hsu. "From “where” to “what”: distributed representations of brand associations in the human brain." *Journal of Marketing Research* 52.4 (2015): 453-466.

Module 9 April 12	**Individual Differences: Personality** Introduction to Personality: The Big Five Predicting Personality from Digital Footprints Personality Targeting Watch: Sam Gosling — Personality of Place Optional reading: Matz, S. C., Kosinski, M., Nave, G., & Stillwell, D. J. (2017). Psychological targeting as an effective approach to digital mass persuasion. Proceedings of the national academy of sciences, 114(48), 12714-12719.
Module 10 April 14	**Individual Differences: Genetics** The Three Laws of Behavioral Genetics The Human Genome, Genome-Wide Association Studies Ethics and Regulation of Genetic Data **Guest mini-lecture:** Nikki Sullivan, London School of Economics. Watch: Three Identical Strangers Trailer Recommended reading: Daviet, R., Nave G., and Wind J., "Genetic Data: Potential Uses and Misuses in Marketing." Journal of Marketing (2020): 0022242920980767.
Module 11 April 19	**Ethical Conduct of Research** **Guest mini-lecture**: Martha Farah, University of Pennsylvania. Watch: Martha Farah — Introduction to Neruo-ethics

	Mandatory Reading: CN Chapter 15 Optional reading: Farah, Martha J. "Neuroethics: the practical and the philosophical." Trends in cognitive sciences 9.1 (2005): 34-40.
Final week April 21	Course Wrap up **Guest mini-lecture:** Bruce Doreé, McGill University