The Wharton School	MKTG 350/ 850
University of Pennsylvania	Special Topics: Consumer Neuroscience
	Professor Gideon Nave

Overview

How can studying the brain improve our understanding of consumer behavior?

While neuroscience made tremendous strides throughout the 20th century, 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 developments. Topics will range from well-known and widely used applications, such as eye-tracking measures in the lab and the field, to emerging methods and measures, such as mobile technologies, face-reading, and neural predictors of market response.

This 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. So, 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.

Objectives

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

1. Fundamental facts and misconceptions about the brain and the tools for studying it.
2. Key scientific discoveries that can guide future work in research and industry.
3. Applications of neuroscience to consumer research.

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

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

Materials

The required textbook for this course is Consumer Neuroscience (hereafter referred to as CN): Moran Cerf and Manuel Garcia-Garcia, editors. Consumer Neuroscience. MIT Press, 2017. You can rent a digital copy of this book ($30 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.

Lectures

Lecture 1	**Class Introduction** **The 5 P's of Consumer Neuroscience** Optional readings: 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.
Lecture 2	**Brain Structure and Function** **The Neuromarketing Toolkit Part I** CN Chapters 2, 4 **Watch:** Moran Cerf – What if we could look inside human brains? https://ed.ted.com/lessons/what-if-we-could-look-inside-human-brains-moran-cerf
Lecture 3	**The Neuromarketing Toolkit Part II** **Neuroscience Gone Wrong** **Watch:** Molly Crockett - Beware of Neuro-Bunk https://www.youtube.com/watch?v=b64qvG2Jgro Optional readings: 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.
Lecture 4	**Attention**

	Eye Tracking 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 **Watch:** Ray Burke - How stores track your shopping behavior https://www.youtube.com/watch?v=jeQ7C4JLpug
Lecture 5	**Emotion** **Skin Conductance** **Face Reading** CN Chapter 7 Watch: Roz Picard – Technology and Emotions https://www.youtube.com/watch?v=ujxriwApPP4 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.
Lecture 6	**Reward and Conditioning** 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. x Watch: Brian Knutson – Neuro-forecasting internet market success https://www.youtube.com/watch?v=IfGLZeEWYR0
Lecture 7	**Expectations, Valuation, Decisions** 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. **Watch:** Antonio Rangel - The Neuroeconomics of simple choice https://www.youtube.com/watch?v=D6CQjaP98Ew&t=563s
Lecture 8	**Memory and Brands** 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. **Watch:** Daniel Kahneman - The Riddle of Experience vs. Memory https://www.youtube.com/watch?v=XgRlrBl-7Yg
Lecture 9	**Individual Differences: Personality, Genetics** Optional readings: Turkheimer, Eric. "Three laws of behavior genetics and what they mean." Current directions in psychological science 9.5 (2000): 160-164. 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.
Lecture 10	**Ethics** CN Chapter 15 **Course wrap-up** Optional readings: Farah, Martha J. "Neuroethics: the practical and the philosophical." Trends in cognitive sciences 9.1 (2005): 34-40. **Watch:** John Dylan Haynes – Mind Reading with Brain Scanners https://www.youtube.com/watch?v=XgRlrBl-7Yg
Lecture 11	**Projects Presentations**

Grades and Assignments

Quizzes: 10%

Assay: 10%
Tutorials: 20%
Group Project: 20%
Final Exam: 40%

NOTE: Late assignments will not be accepted.
There will be no make-up or extra credit assignments given.

Additional details for each item will be discussed in class and posted on Canvas.

Quizzes. There are ten scheduled quizzes. The quizzes are brief exercises based on the assigned readings and class lectures. They will be posted on Canvas and are to be completed outside of class, and are due at 11:59 PM on the April 28th. Quizzes are graded for completion (make sure to "check the box" to confirm that you have completed the quiz). You can miss up to two quizzes without penalty.

Assay. Each student will write a short assay (up to 800 words) on 'reverse inference', to be submitted via Canvas.

Tutorials. Each student will complete several short online tutorials, designated for understanding basic concepts in the analysis of biometric data (e.g., eye tracking).

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, to be presented on the final lecture.

Final Exam. The online final exam will cover concepts presented in lectures and the assigned readings. This is an open-book, open notes exam, but it must be done individually.