

**SPRING 2018
MARKETING 350 & 850
SPECIAL TOPICS:
CONSUMER NEUROSCIENCE**



Course Logistics

Course Location: JMHH 260

Course Times: T/R 1:30pm - 2:50pm and 3:00pm - 4:20pm

Course Web Site: canvas.upenn.edu

Professor: John Clithero

Office: JMHH 755

Phone: (215) 573-7074

Email: clithero@wharton.upenn.edu

Office Hours: W 3:00 - 5:00pm, R 4:30pm - 6:00pm, or by appointment

TA: Victoria (Tori) Westerhoff

Email: westv@wharton.upenn.edu

Course Description and Objectives

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 a dizzying 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 algorithms, and neural predictors of market response. The course will also discuss applications in branding and product development, including wearable physiological devices and apps, sensory branding for foods and fragrances, pharmaceuticals and medical devices, and neuroscience-based products designed to enhance cognitive functions. These applications stem from many subfields of cognitive neuroscience, including attention, emotion, memory, and decision making. 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 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 a number of 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. Students are always encouraged to share connections they discover with the class.

This course has several objectives. By the end of this course, students should be familiar with:

1. Techniques available to consumer neuroscience and their connection(s) to various aspects of consumer research.
2. Key scientific discoveries in cognitive neuroscience that can guide future work in research and industry.
3. Existing 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 and test an original research question.

Materials

The required textbook for this course is *Consumer Neuroscience*, edited by Moran Cerf and Manuel Garcia-Garcia (hereafter the book will be referred to as *CN*):

- Moran Cerf and Manuel Garcia-Garcia, editors. *Consumer Neuroscience*. MIT Press, 2017

Additional required readings, such as journal articles, will be posted on Canvas and/or distributed in class. Our course site will also be used for posting lecture notes, assignments, and any other course materials.

Optional Reading

Students may find the following books useful, although none of them are required for class.

- Paul W. Glimcher and Ernst Fehr, editors. *Neuroeconomics: Decision Making and the Brain, 2nd Edition*. Academic Press, 2013
- Thomas Zoëga Ramsøy. *Introduction to Neuromarketing & Consumer Neuroscience*. Neurons Inc., 2015
- Dale Purves, Roberto Cabeza, Scott A. Huettel, Kevin S. LaBar, Michael L. Platt, and Marty Woldorff. *Principles of Cognitive Neuroscience, 2nd Edition*. Sinauer Associates, 2012
- Darren Bridger. *Decoding the Irrational Consumer*. Kogan Page, 2015
- Kenneth Holmqvist, Marcus Nyström, Richard Andersson, Richard Dewhurst, Hal-szka Jarodzka, and Joost Van de Weijer. *Eye Tracking: A Comprehensive Guide to Methods and Measures*. Oxford University Press, 2011

Timeline

One of the wonderful things about consumer neuroscience and neuroeconomics is the range of phenomena and topics. The brief timeline for this course, though, means we will not have the time to cover all of them. Most of the class sessions are focused on foundational topics. However, the plan outlined below is *tentative* and has some *flexibility*, so it may be adjusted as time and interest permit.

March 13: Introductions

- *CN* Chapters 1, 2
- Hilke Plassmann, Vinod Venkatraman, Scott Huettel, and Carolyn Yoon. Consumer Neuroscience: Applications, Challenges, and Possible Solutions. *Journal of Marketing Research*, 52(4):427–435, 2015

March 15: Methods

- *CN* Chapter 4
- Joseph W. Kable. The Cognitive Neuroscience Toolkit for the Neuroeconomist: A Functional Overview. *Journal of Neuroscience, Psychology, and Economics*, 4(2):63–84, 2011

March 20: Attention, Eye-Tracking

- *CN* Chapter 5
- A. Selin Atalay, H. Onur Bodur, and Dina Rasolofiarison. Shining in the Center: Central Gaze Cascade Effect on Product Choice. *Journal of Consumer Research*, 39(4):848–866, 2012

March 22: Reverse Inference, Neurobollocks

- Russel A. Poldrack. Inferring Mental States from Neuroimaging Data: From Reverse Inference to Large-Scale Decoding. *Neuron*, 72(5):692–697, 2011
- Dan Ariely and Gregory S. Berns. Neuromarketing: the Hope and Hype of Neuroimaging in Business. *Nature Reviews Neuroscience*, 11(4):284–292, 2010

March 27: Memory, Brands

- *CN* Chapters 6, 10
- Yu-Ping Chen, 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):453–466, 2015

March 29: Emotion

- *CN* Chapter 7
- Daniel McDuff, Rana El Kaliouby, Jeffrey F. Cohn, and Rosalind W. Picard. Predicting Ad Liking and Purchase Intent: Large-Scale Analysis of Facial Responses to Ads. *IEEE Transactions on Affective Computing*, 6(3):223–235, 2015

April 3: Guest Speaker

- Manuel Garcia-Garcia (Ipsos)
- Mini-topic 1, **The Aging Consumer**. Gregory R. Samanez-Larkin and Brian Knutson. Decision Making in the Ageing Brain: Changes in Affective and Motivational Circuits. *Nature Reviews Neuroscience*, 16(5):278–289, 2015

April 5: Reward, Value, Decisions

- *CN* Chapters 8, 9
- Antonio Rangel and John A. Clithero. The Computation of Stimulus Values in Simple Choice. In Paul W. Glimcher and Ernst Fehr, editors, *Neuroeconomics: Decision Making and the Brain, 2nd Edition*, pages 125–148. Elsevier, 2013
- Uma R. Karmarkar, Baba Shiv, and Brian Knutson. Cost Conscious? The Neural and Behavioral Impact of Price Primacy on Decision Making. *Journal of Marketing Research*, 52(4):467–481, 2015

April 10: Guest Speaker

- Matthew Killingsworth (Track Your Happiness)
- Mini-topic 2, **TBD**

April 12: Prediction

- *CN* Chapter 13
- Vinod Venkatraman, Angelika Dimoka, Paul A. Pavlou, Khoi Vo, William Hampton, Bryan Bollinger, Hal E. Herschfield, Masakazu Ishihara, and Russell S. Winer. Predicting Advertising Success Beyond Traditional Measures: New Insights from Neurophysiological Methods and Market Response Modeling. *Journal of Marketing Research*, 52(4):436–452, 2015
- Ariel Telpaz, Ryan Webb, and Dino J. Levy. Using EEG to Predict Consumers’ Future Choices. *Journal of Marketing Research*, 52(4):511–529, 2015

April 17: Expectations, Placebo Effects

- Hilke Plassmann and Tor D. Wager. How Expectancies Shape Consumption Experiences. In Stephanie D. Preston, Morten L. Kringelbach, and Brian Knutson, editors, *The Interdisciplinary Science of Consumption*, pages 219–240. MIT Press, 2014
- Hilke Plassmann and Bernd Weber. Individual Differences in Marketing Placebo Effects: Evidence from Brain Imaging and Behavioral Experiments. *Journal of Marketing Research*, 52(4):493–510, 2015

April 19: Social Marketing

- CN Chapter 12
- Emily Falk and Christin Scholz. Persuasion, Influence, and Value: Perspectives from Communication and Social Neuroscience. *Annual Review of Psychology*, 69:329–356, 2018
- Christopher N. Cascio, Matthew Brook O'Donnell, Joseph Bayer, Francis J. Tinney Jr., and Emily B. Falk. Neural Correlates of Susceptibility to Group Opinions in Online Word-of-Mouth Recommendations. *Journal of Marketing Research*, 52(4):559–575, 2015

April 24: Poster Presentations

- In-class group poster conference
- Attendance is required

A Note About the Readings

Many of the assigned readings are from scholarly journals. Academic reading can be quite dense. The papers will sometimes have intimidating statistics, complex brain images and/or mathematical proofs. Do not worry, a comprehensive understanding of those parts is not the purpose of this course. The goal is to understand the motivation for the paper, the key hypotheses, the data that were used, the conclusions, any shortcomings, and potential applications. I will not expect you to recall a list of brain coordinates from a table or the Z-statistic associated with a result! However, I *strongly* encourage students to push through the *entire* paper each time; it will get easier and more rewarding as the course progresses.

Grading

Course Grade

The course grade will be based on the following:

Class Participation	10%
Reverse Inference Essay	10%
Group Quick Quizzes	10%
Group Project	40%
Final Exam	30%

Late assignments will not be accepted. *Additional details for each item will be posted on Canvas.*

Class Participation

All students are expected to come to each class meeting prepared to discuss the current topic and *meaningfully* participate in class exercises. Please keep in mind that *quantity* of “participation” is not equivalent to *quality*. Unexcused absences will also affect the class participation grade. Class participation makes up 10% of the final grade.

Reverse Inference Essay

This essay is an individual assignment and will make up 10% of the final grade. The essay will be due March 30.

Group Quick Quizzes

There are four scheduled “quizzes” for the class. These will be brief exercises based on the assigned readings. They will be posted on Canvas and are to be completed outside of class. The “quizzes” can be completed in groups. These assignments will make up 10% of the final grade.

Group Project

Groups of 4 to 6 students will complete a project that identifies consumer insights based on eye tracking or facial coding data. Projects will be presented as posters in class on April 24. *All students are required to attend class on April 24. Please come talk to me as soon as possible if you anticipate any issue with attending class on this date.*

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*. The online exam will take place on May 1.

Communicating with Me

Although I have listed office hours on Wednesdays and Thursdays, I welcome students to reach out to me at other times. I will always do my best to respond quickly to emails (please give me 24 hours, but feel free to send again after a day has passed), including in the evenings. However, my preference and priority for meetings and communication will be Monday through Thursday.

Academic Integrity

We are all part of an academic community, and the success of that community relies on academic integrity. In order to ensure fairness, students suspected of cheating will be referred to the Office of Student Conduct. The Office of Student Conduct will determine if there was cheating and if so, what punishment will be administered. There are no exceptions to this policy under any circumstances. Please familiarize yourselves with the University Code of Academic Integrity: www.upenn.edu/academicintegrity

Important Dates

Here are a few important dates to remember for the course.

Drop Deadline	March 15
Quick Quiz 1	March 19
Quick Quiz 2	March 26
Reverse Inference Essay	March 30
Quick Quiz 3	April 4
Quick Quiz 4	April 16
In-Class Poster Session	April 24
Online Final Poster Submission	April 25
Online Final Exam	May 1

Consumer Neuroscience Textbook Chapters

As a reminder, here is a full list of chapters in *Consumer Neuroscience (CN)*. The chapters required for class are starred and listed in **bold**.

1. **Introduction to Consumer Neuroscience***
2. **Brain Physiology and Anatomy***
3. Sensation and Perception
4. **Methods***
5. **Attention***
6. **Memory***
7. **Emotions***
8. **Decision Making***
9. **Reward System***

10. **Brand Equity***
11. Pricing
12. **Social Marketing***
13. **Using Knowledge from Neuroscience to Make Business Predictions***
14. Applications in Market Research
15. Ethics in Consumer Neuroscience
16. Future of Consumer Neuroscience

Review Articles

Over the years, a number of “survey articles” have been written on neuromarketing and consumer neuroscience. Some of them are listed here for your reference. They are not required reading, but certainly are helpful in providing additional sources and background information.

- Uma R. Karmarkar and Hilke Plassmann. Consumer Neuroscience: Past, Present, and Future. *Organizational Research Methods*, 2017
- Uma R. Karmarkar and Carolyn Yoon. Consumer Neuroscience: Advances in Understanding Consumer Psychology. *Current Opinion in Psychology*, 10:160–165, 2016
- Ming Hsu and Carolyn Yoon. The Neuroscience of Consumer Choice. *Current Opinion in Behavioral Sciences*, 5:116–121, 2015
- Ale Smidts, Ming Hsu, Alan G. Sanfey, Maarten A. S. Boksem, Richard B. Eibstein, Scott A. Huettel, Joe W. Kable, Uma R. Karmarkar, Shinobu Kitayama, Brian Knutson, Israel Liberzon, Terry Lohrenz, Mirre Stallen, and Carolyn Yoon. Advancing Consumer Neuroscience. *Marketing Letters*, 25(3):257–267, 2014
- Vinod Venkatraman, John A. Clithero, Gavan J. Fitzsimons, and Scott A. Huettel. New Scanner Data for Brand Marketers: How Neuroscience Can Help Better Understand Differences in Brand Preferences. *Journal of Consumer Psychology*, 22(1):143–153, 2012
- Hilke Plassmann, Thomas Zoëga Ramsøy, and Milica Milosavljevic. Branding the Brain: A Critical Review and Outlook. *Journal of Consumer Psychology*, 22(1):18–36, 2012