Social Sciences 14200 **Winter 2021**

MIND II: Mechanisms of Mind
Explaining Mind and Behavior at Different Levels of Description

Course Overview

This quarter of *Mind* focuses on how we can explain the causes of mental phenomena that are at once manifest in biological materials and determined by social and cultural forces. We examine theoretical explanations for a wide range of mental and behavioral phenomena based on mechanisms that operate at different levels of scientific analysis, including genetic, hormonal, neural, psychological, social, and cultural. The goal is to illustrate how explaining phenomena at different levels of analysis not only provides a richer, more detailed understanding of mental states and processes but can constrain causal models and lead to theoretical advances. Lectures cross-cut topics such as function and mechanism, reductionism and emergence, dynamic processes, genetics and epigenetics, distributed vs. localized neural representation, neuroendocrine systems, cognitive process models, modularity of processing, and socio-cultural interactions.

COURSE REQUIREMENTS

1. Lecture, Readings and Discussions. You are required to remotely attend and actively participate in weekly discussions. In order to get the most out of the readings and discussion it is essential that you view the lecture and complete ALL the assigned readings prior to discussion. The readings come from a wide variety of primary source materials rather than a textbook. Thus, lectures are necessary to provide a coherent framework in which to understand the readings and situate them within the broader context of issues we address. The reading load is relatively light, giving you time to reflect on the week's material in preparation for writing the weekly paper.

2. Weekly Discussion Papers. Each week students should submit a short discussion paper (not to exceed 300 words) based on the lecture and readings. The purpose of the paper is to stimulate careful consideration of the week's topic in a manner that is informed by the readings and lecture. Papers should raise issues or questions that are central to the material presented that week and that can serve as the basis for our weekly discussions. Your paper can take any number of different approaches to the material—you may contrast various readings' perspectives on an issue, question an author's basic assumptions, raise questions about the implications of an empirical finding for a particular theory, extend a theoretical argument to a different set of issues, etc. Although this allows you to focus on a broad range of potential topics, your paper must represent a well-reasoned and coherent presentation of your argument. ***Section leaders will confirm due date & time as well as any additional paper specifications for their sections.***

3. Research participation. You are required to participate in studies that fulfill **2 hours** of course credit or to complete an alternative assignment. You will need to register online with Sona (https://uchicago.sona-systems.com) which lists studies that are currently seeking participants and allows you to sign up to participate for course credit. We have added this requirement because one of the best ways to understand behavioral research is through the firsthand experience of participating in a study. DO NOT POSTPONE registering with Sona and participating; you may not be able to find an appropriate study if you wait until the last few weeks of class. Alternatively, if you prefer not to be a research participant, you may fulfill this requirement by writing 2 brief papers (each approximately 1 page) summarizing the hypotheses, methods, and findings of an original research article published in a journal that reports

psychological science (you must contact your instructor for article assignment). Each paper is worth one credit hour of research participation

4. Final Paper. Instructions for a short, final paper (5 pg.) will be handed out before the final class. The final will require that you integrate material presented in the lectures and readings across the quarter. Papers are ***due Tuesday, March 16 by noon***.

5. Course Grade. Your grade will be based on your weekly discussion papers (40%), contribution to class discussion and lecture (30%), the final paper (30%), An additional requirement for a passing grade is completion of the research participation requirement or alternative assignment.

6. Getting the Readings. All readings for the course are available on our Canvas website.

Mind II: Lectures and Reading List

Jan. 8 **Lecture 1: Explanatory Models of Mind** (Nusbaum)
Jan. 14 Discussion

Braitenberg, V. (1984). Vehicles: Experiments in Synthetic Psychology. MIT Press, Cambridge. **Read the Introduction through Vehicle 4, pp 1-19**.

Dennett, D. C. (1998). Cognitive Science as Reverse Engineering: Several Meanings of "Top-Down" and "Bottom-Up". Chapter 16. In D. C. Dennett, Brain Children: Essays on designing minds. MIT Press, 249-259.

Gross, C. G. (2002). Genealogy of the "Grandmother Cell". *The Neuroscientist, 8*, 512-518.

Jan. 15 **Lecture 2: Gene x Environment and Behavior** (London)
Jan. 21 Discussion

Belsky J. (2009). Vulnerability genes or plasticity genes? Molecular Psychiatry, 14(8): 746–754.

Covault J. (2007). Interactive effects of the serotonin transporter 5 HTTLPR polymorphism and stressful life events on college student drinking and drug use. Biological Psychiatry. 1;61(5):609-16.

Jan. 22 **Lecture 3: Neural Models of Information Representation** (Berman)
Jan. 28 Discussion

Yuste, R. (2015). From the neuron doctrine to neural networks. Nature Reviews Neuroscience, 16, 1-11.

McIntosh, A.R. (2000). Towards a network theory of cognition. Neural Networks, 13, 861-870.

Jan. 29 **Lecture 4: Perceiving Faces, Places, and Things** (Bainbridge**)**
Feb. 4 Discussion

Kanwisher, N., Tong, F., & Nakayama, K. (1998). The effect of face inversion on the human fusiform face area. Cognition, 68 (1), B1-B11.

Epstein, R.A., Parker, W.E., & Feiler, A.M. (2007). Where am I now? Distinct roles for parahippocampal and retrosplenial cortices in place recognition. Journal of Neuroscience, 27(23), 6141-6149.

Feb. 5 **Lecture 5: Speech Perception** (Nusbaum)
Feb. 11 Discussion

Hasson, U., Skipper, J. I., Nusbaum, H. C., & Small, S. L. (2007). Abstract coding of audiovisual speech: Beyond sensory representation, Neuron, 56, 1116-1126.

Alsius, A., Navarra, J., Campbell, R. & Soto-Faraco, S. (2005). Audiovisual speech integration falters under high attention demands, Current Biology, 15, 839-843

Feb. 12 **Lecture 6: Reading: From Print to Meaning** (Ledoux)
Feb. 18 Discussion

Seidenberg, M.S. (2005). Connectionist models of word reading. Current Directions in Psychological Science, 14, 238-242.

Saygin, Z.M., Osher, D.E., Norton, E.S., Youssoufian, D.A., Beach, S.D., Feather, J., Gaab, N., Gabrieli, J.D.E., & Kanwisher, N. (2016). Connectivity precedes function in the development of the visual word form area. Nature Neuroscience, 19(9), 1250-1255.

Feb. 19 **Lecture 7: Developing Fairness** (Shaw)
Feb. 25 Discussion

Shaw, A., & Olson, K. R. (2012). Children discard a resource to avoid inequity. Journal of Experimental Psychology: General, 141, 382.

Li, V., Spitzer, B., & Olson, K. R. (2014). Preschoolers reduce inequality while favoring individuals with more. Child Development, 85, 1123-1133.

Feb. 26 **Lecture 8: Explaining Stress** (Norman)
Mar. 4 Discussion

Sapolsky, R. M. (2015). Stress and the brain: individual variability and the inverted-U. Nature neuroscience, 18(10), 1344.

Gesquiere, L. R., Learn, N. H., Simao, M. C. M., Onyango, P. O., Alberts, S. C., & Altmann, J. (2011). Life at the top: rank and stress in wild male baboons. Science, 333(6040), 357-360.

Mar. 5 **Lecture 9: Social Stratification: Socioeconomic Status, Race, and Ethnicity** (Cardenas-Iniguez)
Mar. 11 Discussion

Brittian, A.S., Umaña-Taylor, A.J., Lee, R.M., Zamboanga, B.L., Kim, S.Y., Weisskirch, R.S., Castillo, L.G., Whitbourne, S.K., Hurley, E.A., Huynh, Q.L., Brown, E.J., & Caraway, S.J. (2013). The moderating role of centrality on associations between ethnic identity affirmation and ethnic minority college students' mental health. Journal of American College Health, 61, 133-40.

Hackman, D. A., Farah, M. J., & Meaney, M. J. (2010). Socioeconomic status and the brain: mechanistic insights from human and animal research. Nature Reviews Neuroscience 11, 651-659.