NACS 645: Introduction to Cognitive Science (Fall, 2025)

Meeting time: Tuesday, Thursday 10-11:45am
Location: PLS 1162
Instructor: Valentin Guigon (he/him)
Office hours: By appointment (BioPsyc 3150C / Zoom)
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Course Description

This course provides a high-level introduction to the study of mental representations and computations, along with issues surrounding concepts, modularity, brain and cognitive architecture, methods and paradigms, learning, cognitive functions and social cognition, innateness, embodiment, reductionism and neuroAI. For each class, we will set the stage with a brief introduction to the next topic and then read and discuss two papers that take (at least somewhat) opposing positions on one of these issues. Each student will present and lead the discussion for a couple of these topics, but everyone will read the papers and write a short discussion post on the reading for the day (see details below). At the start of each session, we will take a vote as to which theoretical side you think "wins" the debate – be ready to justify your position. The idea behind this format is to understand different viewpoints about the mind, focus on how empirical findings can address theoretical questions, and consider additional data that may resolve key issues. Come ready to understand the issues, make your best case, actively listen, and change your mind.

The course website is hosted on CANVAS (https://elms.umd.edu), where all readings, course documents, and announcements will be posted. Assignments should also be submitted through CANVAS.

Evaluation

Your performance in this course will be assessed in five parts:

1. Participation in Class (15%). Our primary goal is to have an active and illuminating discussion of the readings, so you will be graded on participation. More is not always better, but engagement is necessary. Your grade will be based on whether you *come prepared to discuss the reading* as well as *the relevance of your comments* to ongoing discussion and your ability to integrate readings and comments by other seminar participants. These in-class contributions will count for half of your participation grade.
2. Participation in Board posts (10%). To help prepare yourself for active participation, please jot down: (1) any clarification questions you might have or notes about material that you found confusing or worth reviewing or (2) any substantive questions about the interpretation of the data, theoretical claims being made, or how the findings can be reconciled with other data. Please post these on the Discussion Board on CANVAS (in 200 words or less) by **9AM on the Tuesday/Thursday before we meet.** This will help the discussion leader prepare. (Note that you need not post on the days when you are leading discussion.)
3. Presentations (35%). Presentations for each session will be assigned across the group. You won't be "teaching" the course, as all members of the group will be expected to participate. Instead, your role will be to direct the discussion to pertinent and interesting issues. Ideally, you should begin with an opening vote (or votes – see above) followed by a brief review of the papers and issues raised during the vote discussion. You are encouraged to review your peers' comments on the Discussion Board to help structure your discussion. *Powerpoint (and the like) are admissible*, and you can consider printing your outline/notes. But keep it simple – we'll have the papers already. To help facilitate future discussions, you will get constructive feedback on what went well and what can be improved after your presentations. Your grade will be based on your efforts during the presentations.

   To prepare, you are required to submit a **Pre-Debate memo by 9PM on the evening before class**. This memo will be shared with the group and should provide a short summary of each paper, an account of how

the two papers connect or diverge, an identification of the paradigms they rely on, a critical assessment of their strengths and weaknesses, the introduction of at least one outside paper that either supports or challenges the debate, and a defense strategy summarizing the argument you will put forward and how you plan to defend it.

Presentation topics will be assigned by auction: By enrolling in this course, you have been given 100 *Cognitive Science Bucks* (100 CSB; actual value = $0), which you can use to bid on topics. The auction link will be posted on CANVAS, and bids are due by **9AM on Thursday, September 4.**

4. Synthesis (15%). For each class session, one student will serve as rapporteur and write a short synthesis memo (minimum 1000 words). The purpose of the synthesis is to capture the trajectory of the class discussion rather than simply restating the readings. A strong synthesis will briefly present the main arguments of the assigned papers, reconstruct the central claims advanced by the presenter, integrate the key points raised by the audience during the debate, and conclude with the wrap-up or summary delivered in class. It should also place the discussion in a broader context by tying it to current debates in the wider cognitive science community. Each synthesis memo is **due by 9PM on the week following your assigned session**. Your grade will be based on your efforts to synthetize the discussions.

5. Opinion project (30%). You will write/present four assignments that engage with a current debate in cognitive science. While you are encouraged to connect with themes from the course, your project does not have to be limited to the debates we cover in class. You may instead focus on another live issue in the field that intersects with your own research interests. The goal is to develop and defend a well-argued position on a debate, using evidence from the literature. The final product will be an opinion paper of 2000-3000 words that takes a clear stance and situates your argument within ongoing discussions.

    a) Pre-proposal (2%). Describe TWO debate questions you are interested in writing about. Each description is limited to 250 words and should directly address 3 points: 1) What we know about the issue, 2) What remains contested or unknown, and 3) Why is it important to resolve or clarify this debate. Please submit your pre- proposal by **9PM on Monday, September 22nd.**

    b) Proposal (3%). Based on feedback from your pre-proposal, you will select ONE debate question and write a short proposal that synthetizes at least five recent primary references (~since 2010). Your proposal should clarify the contours of the debate, summarize the key positions, and outline the personal argument you intend to make. This assignment should be ~1000 words (excluding references). Please submit your proposal by **9PM on Monday, October 20th.**

    c) Proposal blitz (5%). As you finalize your argument, you will prepare a short (~5 min; 3-5 slides) presentation of your proposal. This provides an opportunity to test your reasoning in front of your peers, receive real-time feedback, and refine your argument before completing the final paper. Please submit your slides by **9AM on Monday, November 12th**.

    d) Final opinion paper (15%). Your final submission will be an opinion paper of 2000-3000 words. The paper should take a clear position on a current debate in cognitive science, provide a critical synthesis of relevant literature, evaluate competing perspectives, and defend your stance. Please submit your paper by **9PM on Tuesday, December 16th**.

    e) Peer-review (5%). Each review should be approximately 250-500 words and should include: (1) a brief summary of the paper's question and argument, (2) strengths of the paper, (3) areas for improvement, and (4) constructive suggestions for revision. Please submit your paper by **9PM on Thursday, December 18th**.

Policies and Resources

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include issues of academic integrity, student and instructor conduct, accessibility and accommodations, attendance and excused absences, grades and appeals, and copyright and intellectual property. Please see the University's website for graduate course-related policies: https://gradschool.umd.edu/course-related-policies

In addition, some policies and resources specific to this course:

- Attendance: Attendance and preparation are essential for this type of class – everyone is expected to come prepared to discuss the readings for the week. Of course, you should not attend if you are ill, but do let me know as early as possible if you cannot attend a session so we can work something out.
- Inclusive Learning Environment: Diverse opinions are welcome and often lead to more interesting discussions. However, respectful communication is expected, even when expressing differing perspectives.
- Late assignments: If there is a documented emergency which prevents you from turning in an assignment on time, please notify me as soon as you're aware of this emergency. In addition, you may request up to four extra days to complete your pre-proposal, proposal, and/or final paper in order to improve the quality of these assignments. This request must be submitted *before* the deadlines.
- Students with disabilities or special needs: If you have special needs with regards to this class, please contact me as soon as possible so that appropriate accommodations can be arranged.
- Academic honesty: All students are expected to adhere to campus policy on academic integrity. Cheating on academic work (including reliance on AI generated content) will not be tolerated and will be subject to strong penalties in this class and the university system. If you cheat on a paper or assignment, you risk failing the class, as well as suspension or expulsion from the University as a whole. Academic dishonesty includes, but is not limited to, misrepresenting someone else's work as your own, falsifying any information in a citation or academic exercise, using unauthorized materials in any academic exercise, or helping another to commit academic dishonesty. You are expected to work independently on your papers.
- Grades: Final letter grades will be assigned based on the percentage of total assessment points earned with cutoffs as indicted in the following table. Assignment points will be posted on CANVAS as promptly as possible. Any formal grade disputes must be submitted in writing within one week of receiving the grade.

Letter grade breakdown (lower cutoff scores)											
A+	**A**	**A-**	**B+**	**B**	**B-**	**C+**	**C**	**C-**	**D+**	**D**	**D-**
97.0%	93.0%	90.0%	87.0%	83.0%	80.0%	77.0%	73.0%	70.0%	67.0%	63.0%	60.0%

- Notice of Mandatory Reporting: Faculty members are designated as "Responsible University Employees," meaning that they must report all disclosures of sexual assault, sexual harassment, interpersonal violence, and stalking to UMD's Title IX Coordinator per University Policy on Sexual Harassment and Other Sexual Misconduct. For further information and resources, please see https://ocrsm.umd.edu/.
- Feedback: This is a highly interactive class so any feedback you might have will be greatly appreciated. Perhaps you will find some readings particularly engaging (or boring), some topics notably clear (or confusing), and/or some assignments particularly effective (or tedious). Please feel free to make your opinions known throughout the semester – I will thank you and future participants in this course will thank you. Please also consider submitting a confidential course evaluation through Student Feedback on Course Experiences, which helps faculty and administrators improve teaching and learning at Maryland.

Tentative Course Schedule after bidding (emphasis on *tentative* – please monitor the course webpage.)

(NB: discussion posts due 9PM on Monday/Wednesday before we meet)

Week	Class day	Topic
1	9/2	Organization, topics validation
1	9/4	Auction, Intro, WHAT IS COGNITIVE SCIENCE
2	9/9	MODULARITY 1
2	9/11	MODULARITY 3
3	9/16	BRAIN ARCHITECTURE 1
3	9/18	BRAIN ARCHITECTURE 3
4	9/23	COGNITIVE ARCHITECTURE 2 **Pre-proposal due by 9/22 9PM**
4	9/25	INNATENESS 1
5	9/30	**No class** (Valentin at CISE)
5	10/2	**No class** (Valentin at SNE)
6	10/7	INNATENESS 2
6	10/9	METHOD 1
7	**Fall break**	**No class**
7	10/16	METHOD 2
8	10/21	EVOLUTION OF COGNITION **Proposal due by 10/20 9PM**
8	10/23	TBD
9	10/28	SOCIAL COGNITION 1
9	10/30	SOCIAL COGNITION 2
10	11/4	SOCIAL COGNITION 3
10	11/6	SOCIAL COGNITION 4
11	11/11	SOCIAL NETWORKS
11	11/13	COGNITIVE SYSTEMS 1 **Proposal blitz #1 (4/11) (slides due 11/12 9AM)**
12	11/18	**No class** (SFN break)
12	11/20	COGNITIVE SYSTEMS 2 **Proposal blitz #2 (3/11)**
13	11/25	THINKING 1, final paper auction **Proposal blitz #3 (4/11)**
13	**Thanksgiving**	**No class**
14	12/2	THINKING 2
14	12/4	THINKING 3
15	12/9	NEUROAI 1
15	12/11	NEUROAI 3
16	12/16 (Exams)	**No class - Final paper (due 9PM)**
16	12/18 (Exams)	**No class - Final paper peer-review (9PM)**

Bidding rules

Each student will receive 100 points to distribute across potential debate themes, and all points must be spent. Students are required to allocate points to at least 15 different themes, though they may bid on more. No more than 15 points may be placed on any single theme. After all bids are submitted, the 22 themes with the highest total points will be selected for the class. In the event of a tie for the final slots, the theme with bids from more distinct students will be chosen; if a tie still remains, the selection will be made randomly.

For each winning theme, the student who placed the highest bid will serve as the presenter (ties resolved randomly). The second-highest bidder will serve as the rapporteur, responsible for writing the synthesis memo for that session. The third- and fourth-highest bidders will serve as peer reviewers of the rapporteur's memo. To ensure balance across the semester, each student may present at most two themes, act as rapporteur at most twice, and complete at most four peer reviews. If a student exceeds one of these quotas, the role will pass to the next highest bidder.

Finally, for a theme to qualify for selection, it must receive bids from at least four different students. Themes that do not meet this threshold will be skipped and replaced by the next highest-ranked theme.

The link to the bid will be posted in a timely manner.

Topics for bidding (stars indicate newly introduced topics or papers)

- 01. WHAT IS COGNITIVE SCIENCE?
    - 1. Turing, A.M. (1950). Computing machinery and intelligence. Mind, 59, 433-460.
    - 2. Marr, D. (2000). Vision. In R. Cummins & D. D. Cummins (Eds.), Minds, Brains, and Computers: The Foundations of Cognitive Science (pp. 69–83). Blackwell Publishers.

- 02. WHAT/WHO IS COGSCI FOR?
    - 1. Mook, D. G. (1983). In defense of external invalidity. American Psychologist, 38(4), 379-387.
    - 2. Thomas, A. K., McKinney de Royston, M., & Powell, S. (2023). Color-evasive cognition: the unavoidable impact of scientific racism in the founding of a field. Current Directions in Psychological Science, 32(2), 137-144.

- 03. CONCEPTS 1: WHAT ARE CONCEPTS?
    - 1. Mervis, C. B., & Rosch, E. (1981). Categorization of natural objects. Annual Review of Psychology, 32, 89–115.
    - 2. Armstrong, S. L., Gleitman, L. R., & Gleitman, H. (1983). What some concepts might not be. Cognition, 13,263-308.

- 04. CONCEPTS 2: ARE CONCEPTS EMBODIED?
    - 1. Barsalou, L. W. (2016). On staying grounded and avoiding quixotic dead ends. Psychonomic Bulletin & Review, 23(4), 1122-1142.
    - 2. Leshinskaya, A., & Caramazza, A. (2016). For a cognitive neuroscience of concepts: Moving beyond the grounding issue. Psychonomic Bulletin & Review, 23(4), 991-1001.

- 05. CONCEPTS 3: NUMBERS
    - 1. Sarnecka, B. W., & Wright, C. E. (2013). The idea of an exact number: Children's understanding of cardinalityand equinumerosity. Cognitive Science, 37(8), 1493-1506.
    - 2. Jara-Ettinger, J., Piantadosi, S., Spelke, E. S., Levy, R., & Gibson, E. (2017). Mastery of the logic of natural numbers is not the result of mastery of counting: Evidence from late counters. Developmental Science, 20, e12459.

- 06. MODULARITY 1: WHAT'S THE STRUCTURE OF MENTAL PROCESSES?
    - 1. Fodor, J. A. (1983). The modularity of mind (part 3, input systems as modules). MIT press, pp. 47-101.
    - 2. Prinz, J. (2006). Is the mind really modular? Contemporary Debates in Cognitive Science. Ed. RJ Stainton, 22-36.

- 07. MODULARITY 2: IS VISUAL PROCESSING MODULAR?
    - 1. Pylyshyn, Z. (1999). Is vision continuous with cognition? The case for cognitive impenetrability of visual perception. Behavioral and Brain Sciences, 22, 341-365.
    - 2. Lupyan, G. (2015). Cognitive penetrability of perception in the age of prediction: Predictive systems are penetrable systems. Review of Philosophy and Psychology, 6, 547-569.

- 08. MODULARITY 3: IS FACE PROCESSING MODULAR?
    - 1. Schalk, G., Kapeller, C., Guger, C., Ogawa, H., Hiroshima, S., Lafer-Sousa, R., ... & Kanwisher, N. (2017). Facephenes and rainbows: Causal evidence for functional and anatomical specificity of face and color processing in the human brain. Proceedings of the National Academy of Sciences, 114(46), 12285-12290.
    - 2. Gomez, J., Barnett, M., & Grill-Spector, K. (2019). Extensive childhood experience with Pokémon suggests eccentricity drives organization of visual cortex. Nature Human Behaviour, 3(6), 611-624.

- 09. BODILY COGNITION: 4E (EMBODIED, EMBEDDED, EXTENDED, ENACTED) **
    - 1. Varela, F. J. (1997). Patterns of life: Intertwining identity and cognition. Brain and cognition, 34(1), 72-87.
    - 2. Cappuccio, M. L. (2017). Mind-upload. The ultimate challenge to the embodied mind theory. Phenomenology and the Cognitive Sciences, 16(3), 425-448.

- 10. BRAIN ARCHITECTURE 1: CONNECTIONS **
    - 1. Bullmore, E., & Sporns, O. (2012). The economy of brain network organization. Nature reviews neuroscience, 13(5), 336-349.
    - 2. Reimann, M. W., Nolte, M., Scolamiero, M., Turner, K., Perin, R., Chindemi, G., ... & Markram, H. (2017). Cliques of neurons bound into cavities provide a missing link between structure and function. Frontiers in computational neuroscience, 11, 266051.

- 11. BRAIN ARCHITECTURE 2: POPULATIONS **
    - 1. Behrens, T. E., Muller, T. H., Whittington, J. C., Mark, S., Baram, A. B., Stachenfeld, K. L., & Kurth-Nelson, Z. (2018). What is a cognitive map? Organizing knowledge for flexible behavior. Neuron, 100(2), 490-509.
    - 2. Saxena, S., & Cunningham, J. P. (2019). Towards the neural population doctrine. Current opinion in neurobiology, 55, 103-111.

- 12. BRAIN ARCHITECTURE 3: REPRESENTATIONS **
    - 1. Brette, R. (2019). Is coding a relevant metaphor for the brain?. Behavioral and Brain Sciences, 42, e215.
    - 2. Kriegeskorte, N., & Diedrichsen, J. (2019). Peeling the onion of brain representations. Annual review of neuroscience, 42(1), 407-432.

- 13. COGNITIVE ARCHITECTURE 1: PREDICTIONS EVERYWHERE **
    - 1. Rao, R. P., & Ballard, D. H. (1999). Predictive coding in the visual cortex: a functional interpretation of some extra-classical receptive-field effects. Nature neuroscience, 2(1), 79-87.
    - 2. Litwin, P., & Miłkowski, M. (2020). Unification by fiat: Arrested development of predictive processing. Cognitive Science, 44(7), e12867.

- 14. COGNITIVE ARCHITECTURE 2: BAYESIAN MODELS
    - 1. Tenenbaum, J. B., Kemp, C., Griffiths, T. L., & Goodman, N. D. (2011). How to grow a mind: Statistics, structure, and abstraction. Science, 331, 1279-1285.
    - 2. Marcus, G. F., & Davis, E. (2013). How robust are probabilistic models of higher-level cognition? Psychological Science, 24, 2351-2360.

- 15. COGNITIVE ARCHITECTURE 3: REINFORCEMENT LEARNING **
    - 1. Schultz, W., Dayan, P., & Montague, P. R. (1997). A neural substrate of prediction and reward. Science, 275(5306), 1593-1599.
    - 2. Eckstein, M. K., Wilbrecht, L., & Collins, A. G. (2021). What do reinforcement learning models measure? Interpreting model parameters in cognition and neuroscience. Current opinion in behavioral sciences, 41, 128-137.

- 16. COGNITIVE ARCHITECTURE 4: UNIFICATIONS **
    - 1. Gershman, S. J. (2015). A unifying probabilistic view of associative learning. PLoS computational biology, 11(11), e1004567.
    - 2. Kriegeskorte, N., & Douglas, P. K. (2018). Cognitive computational neuroscience. Nature neuroscience, 21(9), 1148-1160.

- 17. INNATENESS 1: ARE OBJECT CONCEPTS INNATE?
    - 1. Spelke, E. S. (1998). Nativism, empiricism, and the origins of knowledge. Infant Behavior and Development, 21, 181-200.
    - 2. Johnson, S. P. (2010). How infants learn about the visual world. Cognitive Science, 34, 1158-1184.

- 18. INNATENESS 2: LANGUAGE
    - 1. Dautriche, I., Goupil, L, Smith K. & Rabagliati, H (2021), Knowing how you know: Toddlers re-evaluate words learnt from an unreliable speaker Open Mind, 5, 1-19
    - 2. Pearl, L. (2022). Poverty of the stimulus without tears. Language Learning and Development, 18(4), 415-454.

- 19. METHOD 1: QUANTITATIVE PERSPECTIVES **
    - 1. Meehl, P. E. (1967). Theory-testing in psychology and physics: A methodological paradox. *Philosophy of science*, *34*(2), 103-115.
    - 2. Poldrack, R. A. (2006). Can cognitive processes be inferred from neuroimaging data?. *Trends in cognitive sciences*, *10*(2), 59-63.

- 20. METHOD 2: THE NEED FOR PARADIGMS **
    - 1. Jolly, E., & Chang, L. J. (2019). The flatland fallacy: Moving beyond low–dimensional thinking. *Topics in cognitive science*, *11*(2), 433-454.
    - 2. Krakauer, J. W., Ghazanfar, A. A., Gomez-Marin, A., MacIver, M. A., & Poeppel, D. (2017). Neuroscience needs behavior: correcting a reductionist bias. *Neuron*, *93*(3), 480-490.

- 21. EVOLUTION OF COGNITION: DID LANGUAGE COME BEFORE OR AFTER? **
    - 1. Fitch, W. T. (2011). The evolution of syntax: an exaptationist perspective. *Frontiers in evolutionary neuroscience*, *3*, 9.
    - 2. Putt, S. S., Wijeakumar, S., Franciscus, R. G., & Spencer, J. P. (2017). The functional brain networks that underlie Early Stone Age tool manufacture. *Nature Human Behaviour*, *1*(6), 0102.

- 22. SOCIAL COGNITION 1: WHY DO WE COOPERATE?
    - 1. Rand, D. & Nowak, M. A. (2013). Human cooperation. Trends in Cognitive Sciences, 17, 413–425. 6
    - 2. Tan, J., Ariely, D., & Hare, B. (2017). Bonobos respond prosocially toward members of other groups. Scientific Reports, 7(1), 1-11.

- 23. SOCIAL COGNITION 2: THE ORIGINS OF SOCIAL COGNITION
    - 1. Bettle, R. & Rosati, A.G. (2021). The primate origins of human social cognition. Language Learning and Development, 17: 96-127.
    - 2. de Villiers, J. G., & de Villiers, P. A. (2014). The role of language in theory of mind development. Topics in Language Disorders, 34, 313-328

- 24. SOCIAL COGNITION 3: MORAL TECHNOLOGIES **
    - Context: Hardin, G. (1968). The tragedy of the commons. *Science, 162*(3859), 1243–1248.
    - 1. Curry, O. S., Mullins, D. A., & Whitehouse, H. (2019). Is it good to cooperate? Testing the theory of morality-as-cooperation in 60 societies. Current anthropology, 60(1), 47-69.
    - 2. Gächter, S., Molleman, L., & Nosenzo, D. (2025). Why people follow rules. Nature Human Behaviour, 1-13.

- 25. SOCIAL COGNITION 4: THE NEURAL NEED TO INFER OTHERS **
    - 1. Koster-Hale, J., & Saxe, R. (2013). Theory of mind: a neural prediction problem. *Neuron*, *79*(5), 836-848.
    - 2. Joiner, J., Piva, M., Turrin, C., & Chang, S. W. (2017). Social learning through prediction error in the brain. *NPJ science of learning*, *2*(1), 8.

- 26. SOCIAL NETWORKS: BELIEFS IN CROWDS **
    - 1. Guilbeault, D., Becker, J., & Centola, D. (2018). Complex contagions: A decade in review. *Complex spreading phenomena in social systems: Influence and contagion in real-world social networks*, 3-25.
    - 2. Wheatley, T., Thornton, M. A., Stolk, A., & Chang, L. J. (2024). The emerging science of interacting minds. *Perspectives on Psychological Science*, *19*(2), 355-373.

- 27. CULTURAL PSYCHOLOGY: EAST, WEST AND IN BETWEEN **
    - 1. Inglehart, R., & Baker, W. E. (2000). Modernization, cultural change, and the persistence of traditional values. *American sociological review*, *65*(1), 19-51.
    - 2. Oyserman, D., Coon, H. M., & Kemmelmeier, M. (2002). Rethinking individualism and collectivism: evaluation of theoretical assumptions and meta-analyses. *Psychological bulletin*, *128*(1), 3.

- 28. CULTURAL NEUROSCIENCE: EAST, WEST AND THE BRAIN **
    - 1. Kitayama, S., & Uskul, A. K. (2011). Culture, mind, and the brain: Current evidence and future directions. *Annual review of psychology*, *62*(1), 419-449.
    - 2. Chiao, J. Y., Cheon, B. K., Pornpattananangkul, N., Mrazek, A. J., & Blizinsky, K. D. (2013). Cultural neuroscience: progress and promise. *Psychological inquiry*, *24*(1), 1-19.

- 29. COGNITIVE SYSTEMS 1: REASONING WITH HEURISTICS AND BIASES *
    - 1. Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. Science, 185, 1124–1131.
    - 2. Gigerenzer, G., & Brighton, H. (2009). Homo heuristicus: Why biased minds make better inferences. Topics in cognitive science, 1(1), 107-143. *

- 30. COGNITIVE SYSTEMS 2: MEMORY
    - 1. Roediger, H.L. III (1990). Implicit memory: retention without remembering. American Psychologist, 45, 1043-1056.
    - 2. Rugg, M.D. & Yonelinas, A.P. (2003). Human recognition memory: A cognitive neuroscience perspective. Trends in Cognitive Sciences, 7, 313-319.

- 31. THINKING 1: TWO SYSTEMS TO DECIDE *
    - 1. Evans, J. St B. T. (2003). In two minds: dual-process accounts of reasoning. Trends in Cognitive Sciences, 7,454-459.
    - 2. Melnikoff, D. E., & Bargh, J. A. (2018). The mythical number two. Trends in cognitive sciences, 22(4), 280-293. *

- 32. THINKING 2: MODEL-FREE VS MODEL-BASED **
    - 1. Daw, N. D., Niv, Y., & Dayan, P. (2005). Uncertainty-based competition between prefrontal and dorsolateral striatal systems for behavioral control. *Nature neuroscience*, *8*(12), 1704-1711.
    - 2. Collins, A. G., & Cockburn, J. (2020). Beyond dichotomies in reinforcement learning. *Nature Reviews Neuroscience*, *21*(10), 576-586.

- 33. THINKING 3: COLLECTIVE KNOWLEDGE
    - 1. Navajas, J., Niella, T., Garbulsky, G., Bahrami, B., & Sigman, M. (2018). Aggregated knowledge from a small number of debates outperforms the wisdom of large crowds. Nature Human Behaviour, 2, 126-132.
    - 2. Rabb, N., Fernbach, P. M., & Sloman, S. A. (2019). Individual representation in a community of knowledge. Trends in Cognitive Sciences, 23, 891-902.

- 34. THINKING 4: THE MOST RATIONAL DEFINITION OF RATIONALITY **
    - 1. Gershman, S. J., Horvitz, E. J., & Tenenbaum, J. B. (2015). Computational rationality: A converging paradigm for intelligence in brains, minds, and machines. *Science*, *349*(6245), 273-278.
    - 2. Gigerenzer, G. (2025). The rationality wars: a personal reflection. *Behavioural Public Policy*, *9*(3), 495-515.

- 35. NEUROAI 1: IS AI PART OF COGNITIVE SCIENCE?
    - 1. Kay, K. N. (2018). Principles for models of neural information processing. NeuroImage, 180, 101-109.
    - 2. Perconti, P., & Plebe, A. (2020). Deep learning and cognitive science. Cognition, 203, 104365.

- 36. NEUROAI 2: FROM THE BRAIN TO AI – AND AI TO THE BRAIN **
    - 1. LeCun, Y., Bengio, Y., & Hinton, G. (2015). Deep learning. *nature*, *521*(7553), 436-444.
    - 2. Doerig, A., Sommers, R. P., Seeliger, K., Richards, B., Ismael, J., Lindsay, G. W., ... & Kietzmann, T. C. (2023). The neuroconnectionist research programme. *Nature Reviews Neuroscience*, *24*(7), 431-450.

- 37. NEUROAI 3: COGNITIVE PROPERTIES OF LLMS **
    - Context: Palminteri, S., & Pistilli, G. (2025). Navigating Inflationary and Deflationary Claims Concerning Large Language Models Avoiding Cognitive Biases.
    - 1. Silver, D., Singh, S., Precup, D., & Sutton, R. S. (2021). Reward is enough. *Artificial intelligence*, *299*, 103535.
    - 2. Fedorenko, E., Piantadosi, S. T., & Gibson, E. A. (2024). Language is primarily a tool for communication rather than thought. *Nature*, *630*(8017), 575-586.