

PSYC50: Higher-Level Cognition

0.5 credits



University of Toronto, Scarborough

Winter Term, 2024

LEC 01 (in-person)

Instructor: Prof. Michael Souza (he/him) (note: my surname is pronounced “SUES-uh”)

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Office Hours: *This information can be found under Quercus Announcements*

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I. Your instructor



Dr. Souza is an Associate Professor (Teaching Stream) of Psychology and Neuroscience at UTSC. He received his Ph.D. in Psychology from the University of California, Berkeley in 2010. His teaching interests include cognitive neuroimaging, higher-order cognitive functions, and cognitive impairments and neurorehabilitation.

II. Course description, pre-requisites and learning goals

Executive functions are a set of mental functions that enable goal-directed behavior. These functions strengthen during typical development and may be affected by numerous factors, including positive (e.g., education) or destructive aspects of nurture (e.g., exposure to teratogens), psychological illness, neurological injury, and more. From a content standpoint, this course will provide you with an opportunity to better understand executive functions from theoretical, experimental and applied standpoints. From a process standpoint, you will have an opportunity to strengthen your ability to consume and critique primary research, to plan and execute a collaborative research project on an appropriate topic of your choosing, and to gain confidence in ability to speak in a scientific context.

Prerequisites: [([PSYB01H3](#)) or ([PSYB04H3](#)) or [PSYB70H3](#)] and
[PSYB07H3](#) or [STAB22H3](#) or [STAB23H3](#)] and
[PSYB55H3](#) or [PSYB57H3](#)

After successful completion of this course, you will have demonstrated an improved ability to:

1. **Describe** the core components and operations of key theoretical frameworks of executive control;
2. **Understand, analyze, and evaluate** neurocognitive research in the key domains of executive functioning;
3. **Apply** theory and relevant research in executive functioning to a multitude of important, relatable real-world challenges and scenarios (e.g., vulnerability to addiction);
4. **Understand** and **describe** the central elements of primary research articles in the executive function literature, with an eye towards strengthening the ability to **evaluate** this work;
5. **Co-construct** a thoughtful, appropriately-researched project pitch, proposal, and revised proposal on a topic pertinent to executive functioning;
6. **Co-construct** and **co-present** a scientific poster for an academic audience;
7. **Identify** and **articulate** the value and contribution of this course to your broader program of study (i.e., Psychology and/or Mental Health Studies, as appropriate).

III. Course readings

This course will **not** use a textbook. This course will prioritize strengthening your ability to become competent in consuming and evaluating primary literature and as such, will wholly rely on such articles.

IV. Course webpage

Please visit Quercus (<https://q.utoronto.ca/>) and sign in with your UTORid credentials to access our course webpage. This webpage will house all course-related materials, including announcements, discussion boards, lecture and related learning materials, assessments, and marks. You should expect to visit this webpage a few times per week to ensure you are up-to-date on any new happenings in the course throughout the term.

V. Course requirements and grading

Reading checks (RC1: 4%; RC2: 4.5% RC3: 5%; RC4: 5.5%; RC5: 6% = 25% of the course grade)

(Learning outcomes 1-4, 7)

To help build your ability to consume primary research, we will have five relatively low stakes reading checks on the assigned readings. They will increase modestly in value (by 0.5% each time) from as little as 4% to as much as 6% of the course grade.

The reading checks are intended to provide you with an opportunity to strengthen your ability to consume primary research, which will be helpful for not only your project, but for the rest of your life. **Please don't infer that the small course mark value reflects small learning value here; rather, the low stakes approach is provided here to give you a safer space to strengthen this skill.** Consistent with the high value placed on this learning, reading checks will occur in lieu of a Midterm.

The reading checks will only occur five (5) times and will occur at the start of each appropriate class (see class schedule). You will have 30 minutes to complete 2-4 questions about the assigned reading. These questions will tap your understanding of the rationale for the research, core features of the methods, and understanding and interpreting the results. They will also progressively load on your ability to critique the work.

To facilitate your ability to respond to constructive feedback, we will briefly review the quiz answers after taking the quiz and will then move on to the day's topic. Because of this structure, **please note that there will be absolutely NO makeups for the reading checks under any circumstances.** Any accommodation provided will result in the value of the Reading Check being added to the Final. Students who miss more than two reading checks will have that portion of the mark reassigned to a paper assignment.

Cumulative Final Examination (33% of course grade)

(Learning outcomes 1-4, 7)

The goal of the Final is to test your ability to think about executive functions in conceptual, experimental and applied manners. The Final exam will include material from all content lectures and the several readings associated with Week 11 (see the course schedule). The Final will consist of both multiple-choice (MC) questions and short-answer (SA) questions, and the point distribution will be skewed towards the SA questions.

Each MC question will have five (5) options and these questions may come in various formats, including (but not limited to) questions with diagrams and "all of the above" or "none of the above" options. MC questions will be drawn from both lecture and the textbook.

SA questions will consist of multi-part questions that are broken down to help you structure your thinking. Each question will require a several sentence response and may also require the creation or analysis of a visual (e.g., diagram). SA questions will be drawn from lecture only. SA questions will be weighted based on relative difficulty (i.e., the challenge/complexity of thought), as opposed to how many things you need to say (i.e., we will not employ a system of five points requiring five "things" to say).

Rote memorization of lectures and the readings will not guarantee you a high mark; rather, I expect you to not only learn what things are, but also why they are relevant, how/why they are and might be used, etc. To acclimate you to my question style and to help keep you on task with the lecture materials, sample questions will be posted after each content lecture. I advise you to navigate this material while it is fresh in your mind and to seek assistance from Prof. Souza for any issues that would benefit from clarification or a discussion.

Importantly, the date of the Final is not announced by the University until the middle of the term. You should NOT make travel plans until you learn the date of your final exams. You CANNOT take the Final at a different date/time unless you have a verifiable medical reason.

Literature Review Group Project (multiple parts that constitute a total of 42% of the course grade)

(Learning outcomes 1-7)

Together with two partners of your choosing¹, you will engage in research to learn more about a topic related to executive functioning. Your group will research a minimum of nine (9) peer-reviewed, scholarly articles and will detail what you've learned into both a scientific poster presentation for a scientific audience. Full details will be posted on Quercus - and are an official extension of this syllabus - but the major pieces are noted below.

Forming your group of three (PASS/PENALTY scoring)

You are responsible for forming groups prior to the stated deadline. Please use class time and/or the discussion board in Quercus to connect with fellow classmates so that you may share pertinent information for forming a group. You will submit documentation clarifying that you understand what is expected of you in this project, and that you will work in good faith as a team to accomplish this portion of the course.

Topic Pitch (02% of course grade)

Prior to fleshing out your topic proposal, you will need to submit a one paragraph pitch to Quercus to clarify what your proposed research will examine, and why it is crucial for others to know about the topic. You will be evaluated on the extent to which your pitch is feasible in the context of this assignment, clearly articulated, and engaging for the reader and proposed audience.

Topic proposal (7% of course grade)

After receiving an approved topic pitch, you will then co-develop a **one (1) page document**, single-spaced and in 11pt Times New Roman font, that offers: (1) your project's working title, taking care to represent the breadth of your focus in a concise, engaging way; (2) a paragraph introducing your topic, taking care to contextualize and substantiate your research focus/goal; (3) a paragraph articulating your proposed division of labor to ensure all group members are contributing fairly and equally; and (4) learning outcomes to specify what your audience should expect to learn from your work. The proposal must include at least three (3) peer-reviewed, empirical articles as references, and the reference information for those articles must be included on a second page. You will be evaluated on the quality and clarity of the items listed above.

Revised proposal + annotated bibliography (11% of course grade)

After your group has received and carefully reviewed detailed feedback on your topic proposal, you will then carefully revise and refine your proposal. This will involve: (1) a systematic review of the feedback you received and a thoughtful, productive response to each element in a peer-review like format; (2) the revision of your topic proposal informed by this feedback, still honoring the one-page limit; and (3) producing an annotated bibliography, which should first include a full list of properly cited references (APA format), and starting on the following page, a brief paragraph summarizing each article and how you plan to use it in your research. You will be evaluated on the quality and clarity of the items listed above.

¹ Final course enrolment may not be divisible by 3, hence there may be 1-2 groups with two members. Such groups will be held to the same standard as their other peers.

Scientific Poster Presentation (20% of course grade)

Scientific posters are a critically important medium for conveying scientific knowledge, and this course offers you an ability to practice this process. After carefully reviewing your revised proposal and annotated bibliography, your group will assemble a scientific poster to disseminate your findings to others. Half of the groups will present live in class on the last day of class and the other half will present virtually via Zoom. Your group will deliver a 12-minute presentation with time equally split across presenters. A detailed marking rubric prior to your presentation so that you understand exactly how you will be marked for this assignment.

Peer-review of posters (02% of course grade)

Receiving positive and constructive feedback is a crucial component to continued self-improvement. As such, you will have an opportunity to not only give such feedback to your colleagues on their presentations, but you will also receive their feedback your presentation. This portion of the mark will be evaluated based on the degree of detail, clarity, and reasonableness of the feedback.

VI. Course policies

Classroom conduct and participation

I work to create an interactive dynamic during my lectures that engages you to think and reflect. I challenge you to use this time to actively engage with the content we are covering, as active learning and immersion in the material will facilitate your ability to think critically about these concepts. I challenge you to structure your time in such a way that you can reasonably space out your learning, as effective skill development in particular requires time, practice, and reflection.

Lecture slides

Lecture materials will be posted on a weekly basis to control the flow of learning and engagement in the course. Lecture slides will be posted in PDF format in two version only (2 slide and 6 slides per page).

You must know that these lecture slides are not a suitable substitute for watching lectures and engaging the materials. Lecture slides alone are not themselves exhaustive, as we will regularly cover important material that extends beyond them during lecture. Know that you are responsible for this material.

Instructional materials are only for the purpose of learning in this course and must not be distributed or used for any other reason whatsoever.

E-mail policy

In most cases, e-mails will be answered within 48 hours of receipt (not including weekends). The email subject should include our course name and nature of the inquiry (i.e., "PSYC50: Why are EFs so awesome?"). The start of your email should include your full name and student ID number so that I know who you are. Emails that you send should contain no more than one question and you should try to explain your current understanding of the concept in the email (which will be affirmed or corrected).

If you are not used to writing emails in an academic context, I encourage you to review this online resource so that you adopt proper email etiquette now and in the future: <https://tinyurl.com/kysxwtx>

Office hours

Office hours are a valuable resource for you to learn more about the class and/or important things related to (but outside of) the class. You should consider visiting Prof. Souza's office hours if you would like to (1) discuss course content or course requirements, (2) if you have an issue with your course progress, or (3) you would like to discuss the field of psychology/neuroscience and how to get more involved. Your Head TA is also an incredibly valuable resource not just for staying on top of course content/requirements, but also learning more about graduate studies in Psychology. I strongly encourage you to consult with them as needed.

Syllabus changes

There may be minor changes to the syllabus during the term. You will be notified of these changes ASAP and no changes will be instituted that dramatically affect your ability to properly prepare for an examination (e.g., reading an extra chapter the week before the Midterm).

Department of Psychology Missed Term Work Policy

For missed term work (assignments and term tests) due to illness, emergency, or other mitigating circumstances, please follow the procedure outlined below.

Procedure:

1. Complete the [Request for Missed Term Work Accommodations Form](#) ("MTW Form").
2. Email **BOTH** your MTW Form and Supporting Documentation to michael.souza@utoronto.ca according to the instructions specified below.

Supporting Documentation Requirements and Deadlines:

Reason for Missed Work	Documentation required for a first absence in the term	Documentation required for subsequent absences in the term	Deadline for submitting MTW form and supporting documentation
Illness or Injury	ACORN Absence Declaration	UofT Verification of Illness Form	<u>WITHIN 2 BUSINESS DAYS</u> of the missed work
Bereavement	ACORN Absence Declaration	A death certificate or funeral announcement	<u>WITHIN 2 BUSINESS DAYS</u> of the missed work
University-sponsored athletic or artistic obligation at the varsity/provincial/national level	ACORN Absence Declaration	A note from a university staff member (advisor, coach, residence staff, etc.) who can substantiate the obligation, sent directly to the course email	<u>10 BUSINESS DAYS IN ADVANCE</u> of the missed deadline
Disability-related reasons for students registered with AccessAbility Services	<p>For missed TERM TESTS,</p> <ul style="list-style-type: none"> - Contact your AccessAbility consultant and have them write to the course email detailing the accommodations needed. <p>For missed ASSIGNMENTS,</p> <ul style="list-style-type: none"> - If your desired accommodation is within the scope of your Accommodation Letter (e.g. your letter includes "extensions of up to 7 days" and you need 3 days), send your Accommodation Letter to the course email and specify how many days extension you are requesting. - If your desired accommodation is outside the scope of your Accommodation Letter (e.g. your letter includes "extensions of up to 7 days" but you need more time than that), contact your 		<u>PREFERABLY IN ADVANCE OF THE MISSED WORK, OR AS SOON AS POSSIBLE</u>

	AccessAbility consultant and have them write to the course email detailing the accommodations needed.	
Academic Conflict (e.g. two midterms at the same time)	Screenshot from Quercus demonstrating the conflict.	<u>10 BUSINESS DAYS IN ADVANCE</u> of the missed work
Religious Conflict	None required	

Notes:

- The following reasons are not considered sufficient for missed term work: social activities, recreational travel, technological issues, avoidance of assessments or deadlines, work commitments
- [Missed Final Exams](#) are handled by the Registrar's Office and should be declared on eService.
- For ACORN absence declarations, the date you declare the absence is required to fall within the seven-day declaration period (i.e.) the absence cannot be submitted proactively or retroactively.
- Instructors cannot accept term work any later than five business days after the last day of class. Beyond this date, accommodations are only possible via the Registrar's Office [petition process](#).
- If you are unable to submit your request within the specified number of business days, you must still email your instructor within that window to explain the nature of the delay. Exceptions to the deadlines are made only under exceptional circumstances.
- Multiple assignments due on the same day are not considered academic conflicts. Students are expected to manage their time effectively to meet assignment deadlines.
- Back-to-back tests/quizzes are not considered academic conflicts. Only overlapping activities are conflicts.
- Students are responsible for keeping their course timetables conflict-free. Students who register in two courses with overlapping lecture/tutorial/lab schedules will not be accommodated.

Next Steps:

After submitting your documentation, you will receive a response from your instructor or TA. The course instructor reserves the right to decide what accommodations will be made. Failure to adhere to any aspect of this policy may result in a denial of your request. **You are responsible for checking your official U of T email and Quercus course announcements daily**, as accommodations may be time-critical.

For missed assignments, **do not wait for the instructor's response to resume work on your assignment**. Extensions may be as short as one business day, depending on the nature of the illness/emergency. Complete your assignment as soon as you're able, and email it to your instructor.

If an accommodation is granted but a continued illness/emergency prevents you from meeting its requirements, you must repeat the missed term work procedure to request additional accommodations. **Please make it clear in your subject line that you are requesting a second accommodation**. Examples: If you were granted an extension for a paper but are still unable to meet the new deadline, or if you miss a make-up term test, you must submit *another* MTW form and supply documentation according to the "subsequent absences" column in the chart above. *Note: In the case of a missed make-up test, an opportunity to write a second make-up test may not necessarily be provided.

Academic Integrity

The University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences.

Potential offences in papers and assignments include using someone else's ideas or words without appropriate acknowledgement, submitting your own work in more than one course without the permission of the instructor, making up sources or facts, obtaining or providing unauthorized assistance on any assignment.

On tests and exams cheating includes using or possessing unauthorized aids, looking at someone else's answers during an exam or test, misrepresenting your identity, or falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

Equity, Diversity and Inclusion

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. U of T does not condone discrimination or harassment against any persons or communities.

The University of Toronto is a richly diverse community and as such is committed to providing an environment free of any form of harassment, misconduct, or discrimination. In this course, I seek to foster a civil, respectful, and open-minded climate in which we can all work together to develop a better understanding of key questions and debates through meaningful dialogue. As such, I expect all involved with this course to refrain from actions or behaviours that intimidate, humiliate, or demean persons or groups or that undermine their security or self-esteem based on traits related to race, religion, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, gender identity, gender expression, age, marital status, family status, disability, receipt of public assistance or record of offences.

University Land Acknowledgement

I wish to acknowledge this land on which the University of Toronto operates. For thousands of years, it has been the traditional land of the Huron-Wendat, the Seneca, and the Mississaugas of the Credit. Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.

Assigned readings

- Adam, K. C., Doss, M. K., Pabon, E., Vogel, E. K., & de Wit, H. (2020). Δ 9-Tetrahydrocannabinol (THC) impairs visual working memory performance: a randomized crossover trial. *Neuropsychopharmacology*, 45(11), 1807-1816. <https://doi.org/10.1038/s41386-020-0690-3>
- Adams, R. C., Button, K. S., Hickey, L., Morrison, S., Smith, A., Bolus, W., ... & Lawrence, N. S. (2021). Food-related inhibitory control training reduces food liking but not snacking frequency or weight in a large healthy adult sample. *Appetite*, 167, 105601. <https://doi.org/10.1016/j.appet.2021.105601>
- Cohen, K., Mama, Y., Rosca, P., Pinhasov, A., & Weinstein, A. (2020). Chronic use of synthetic cannabinoids is associated with impairment in working memory and mental flexibility. *Frontiers in Psychiatry*, 11, 602. <https://doi.org/10.3389/fpsy.2020.00602>
- Gilbert, S. J., & Burgess, P. W. (2008). Executive function. *Current Biology*, 18(3), R110-R114. <https://doi.org/10.1016/j.cub.2007.12.014>
- Goverover, Y., Toglia, J., & DeLuca, J. (2020). The weekly calendar planning activity in multiple sclerosis: a top-down assessment of executive functions. *Neuropsychological Rehabilitation*, 30(7), 1372-1387. <https://doi.org/10.1080/09602011.2019.1584573>
- Lantian, A., Bagneux, V., Delouvé, S., & Gauvrit, N. (2021). Maybe a free thinker but not a critical one: High conspiracy belief is associated with low critical thinking ability. *Applied Cognitive Psychology*, 35(3), 674-684. <https://doi.org/10.1002/acp.3790>
- Medina, M. S., Castleberry, A. N., & Persky, A. M. (2017). Strategies for improving learner metacognition in health professional education. *American Journal of Pharmaceutical Education*, 81(4), 78. <https://doi.org/10.5688/ajpe81478>
- Pennycook, G., & Rand, D. G. (2021). The psychology of fake news. *Trends in Cognitive Sciences*, 25(5), 388-402. <https://doi.org/10.1016/j.tics.2021.02.007>
- Ripp, I., Emch, M., Wu, Q., Lizarraga, A., Udale, R., von Bastian, C. C., ... & Yakushev, I. (2022). Adaptive working memory training does not produce transfer effects in cognition and neuroimaging. *Translational Psychiatry*, 12(1), 512. <https://doi.org/10.1038/s41398-022-02272-7>
- Roediger, H. L., & Gallo, D. A. (2001). Reading journal articles in cognitive psychology. *Visual perception: Key Readings in Cognition*, 405-415.
- Wallace, A. L., Maple, K. E., Barr, A. T., & Lisdahl, K. M. (2020). BOLD responses to inhibition in cannabis-using adolescents and emerging adults after 2 weeks of monitored cannabis abstinence. *Psychopharmacology*, 237, 3259-3268. <https://doi.org/10.1007/s00213-020-05608-7>

PSYC50: Lecture and reading schedule

May be subject to minor revisions with advance notice from the instructor

<u>Week</u>	<u>Date</u>	<u>Topics of the day</u>	<u>Readings and associated deadlines</u>
1	5-Sep	Goal-directed cognition; course overview Identifying executive functions	Roediger & Gallo (2001) Raff blog entry
2	12-Sep	Theories of executive functions (EFs) <i>Skills: Making the most out of Reading Checks</i>	Gilbert & Burgess (2008) -
3	19-Sep	Theories of EFs (con't) <i>Skills: Working effectively as a team</i>	Medina et al. (2017) (<i>Prac RC</i>) Finalize project groups this week
4	26-Sep	Working Memory (WM) <i>Skills: Designing a strong topic proposal</i>	Adam et al. (2020) & RC #01 Topic Pitch due this week
5	3-Oct	Inhibitory control (IC)	Adams et al. (2021) & RC #02 Topic proposals due this week
6	10-Oct	Cognitive Flexibility (Cf)	Cohen et al. (2020) & RC #03
7	17-Oct	Planning	Goverover et al. (2020) & RC #04
8	24-Oct	Reasoning and problem-solving	Lantian et al. (2020) & RC #05 Revised proposals due this week
9	31-Oct	NO CLASS - READING WEEK	-
10	7-Nov	<i>Skills: Creating an effective poster</i> <i>Skills: The art of constructive feedback</i>	-
11	14-Nov	Executive functions in "real life"	Pennycook et al. (2021) Ripp et al. (2022) Wallace et al. (2020)
12	21-Nov	Poster Workshop	-
13	28-Nov	Scientific Poster Presentation week!	-
14	TBD	Final Examination	Lectures from weeks 2-8 and 11 only Readings from week 11 <u>only</u>

Please note that deadlines associated with the research project can be found on the Detailed Project Guidelines, posted separately from this syllabus and course schedule.