

# PSY 196H1-F Critical Periods, Brain Plasticity, and Development

Fall 2021

Mondays 12:00 – 2:00 pm,

Sept 13<sup>th</sup> & 20<sup>th</sup>: online & synchronous; zoom link: <https://utoronto.zoom.us/j/89789526377>

Sept 27<sup>th</sup> & on: in person **BL (Claude T. Bissell Building), room 113**

## Contact Information

**Professor Amy Finn**

Office Location: zoom

Email: [amysuefinn@gmail.com](mailto:amysuefinn@gmail.com)

**Office Hours:** *Mondays 2:00-3:00*, **online & synchronous** same zoom link as for the course:

<https://utoronto.zoom.us/j/89789526377>

## Description

When you reach a certain age, it's thought that you are no longer able to learn certain things. This can be referred to as a critical, sensitive, or optimal period. We seek to better understand these critical periods by exploring instances in which infants or children are able to learn or perform better than adults. We will investigate these cases and discuss the roles of brain plasticity and various aspects of brain and cognitive development. Students will learn about mechanisms of brain plasticity and explore original research on critical periods and age-related limits on learning.

## Goals and Learning objectives

By the end of this course you will be able to:

- Understand how learning changes with development through the lens of critical periods and brain plasticity
- Gain familiarity with brain anatomy
- Comprehend and critique original research articles
- Write about scientific papers
- Critically discuss scientific papers

## Marking Scheme

% of Grade	Assignment/Task
25%	Class participation
5%	In class figure discussion

5%	Coloring
30%	Weekly reaction papers (7, 2 points each + 16 points for in-depth feedback)
35%	Handout and in-class summary

### Class participation (25%), up to 25 points total

This small seminar is a fairly unique opportunity for first-years at U of T. You will get the most out of it if you come to class and come prepared. Every week your participation in the class will be scored. Your score will be based on the (1) quality (relevance, insight added), (2) quantity (not too much, not too little), and (3) conciseness (making good use of everybody's time) of your contributions. Listening carefully to your classmates' contributions is essential. Questions that spark a class discussion or that help us clarify understanding can be significant contributions, too. In making this assessment, I am answering the question "how different would the class have been if that student would not have been present?" Your score will be 0 (absent, silent, non-relevant), 1 (ok), 2 (good), or 3 (outstanding) points. No more than 25 points can be earned over the course of the term. Missed class periods cannot be made up. (Note that good participation for all 12 class periods = 24 points). As detailed below, students will have ample opportunities to participate by presenting a figure/table and their brain coloring and we will do various break out sessions on each day during which participation will also be assessed.

### In Class Figure/Table Discussion (5%)

Each class member will be responsible for facilitating the discussion by explaining one figure or table from the assigned readings, with 2-3 figure/table presenters per day. You will choose which figure/table you are presenting on the first day of class and/or be assigned to an open figure/table if you are added after the first day. You will have about 5 minutes of class time to go through the figure. Make sure to clearly explain to the class **the purpose of the figure, what it represents and why it is important.** (Authors only get to have so many figures – why did they choose this one?). If the figure represents data, make sure to clearly explain the axes and **everything that is visualized.** Each student's figure presentation day will be determined *on the first day they attend class.* You will be permitted to switch days only if you arrange this on your own. If you miss your presentation day due to illness or for any reason, this part of your grade will be added to your Handout and in-class summary.

### Coloring

A goal of this course is to become familiar with brain anatomy. To achieve this, students will be asked to complete coloring exercises from the following book (these will be posted on Quercus):

Diamond, M. C., Scheibel, A. B., & Elson, L. M. (1985). *The Human Brain Coloring Book*: HarperCollins Publishers Inc.

All coloring needs to be uploaded to Quercus by **September 27<sup>th</sup>**. (A picture from an iPhone works as well) and completing the coloring digitally through these resources is also great:

- [https://smallpdf.com/blog/draw-on-pdf?fbclid=IwAR1Dw8VSex\\_QjkXCp9UCRpX1Yr-x9lIE0RwlboShzKR2YJot0axAsoCeHrE](https://smallpdf.com/blog/draw-on-pdf?fbclid=IwAR1Dw8VSex_QjkXCp9UCRpX1Yr-x9lIE0RwlboShzKR2YJot0axAsoCeHrE)
- <https://inkscape.org/?fbclid=IwAR0iNdiTNEX0omBApp1CNSkUhrhKP5nSY5nEwpGF31tycn2NDJ6lzxdfMZA>

Full points will be given if a clear effort has been made to complete the work thoroughly. **No make ups will be given nor late work accepted.**

## Weekly reaction papers (31%)

Over the course of this semester, 8 original empirical articles will be assigned reading (see course schedule below, **these are always #2 for the listed readings**). For **7 of these 8** reading assignments, you will complete a **weekly reaction paper** and submit this to Quercus by **11 am on Monday, an hour before class starts**. **Late responses will not be accepted**. These short weekly reaction papers should be 500 to 750 words each, never being longer than 750 words and should include 2 parts.

**Part 1 will be an executive summary** for the assigned empirical reading. This needs to be BRIEF (not more than 3-4 sentences) and should convey the take-home message of the article. When writing this, imagine that you are sharing a short elevator ride with a professor who asked you to describe the study. Imagine that she or he has some familiarity with the field in general, but not this subject in particular. *Providing a concise, accurate, and efficient summary of the work demonstrates that you understand the material. It also shows that you are able to convey a complicated idea succinctly.*

**Part 2 will be a short paragraph summarizing your thoughts on the reading.** *What did you learn that you did not know before? What new questions does this reading raise for you? What did you like or find lacking?* This is your opportunity to reflect about what the readings mean, to be critical and creative. While it can be easy (and important) to highlight a study's limitations, it is also helpful to identify its strengths and contributions and think of improvements for future work.

You will earn 2 points for each of 7 submitted writing pieces. Three times this term, your writing will be randomly selected for detailed grading based on these aspects:

1. written with an authentic and clear voice (4 points)
2. accurate reflection of the reading, part 1 (2 points)
3. thoughtfulness, part 2 (2 points)

## Paper Handout and in class presentation (35%)

Every student will give a two-minute in-class summary about an assigned paper in week 11 or 12 of this term, and prepare a handout summarizing key aspects of this paper. We will discuss the structure of papers, how to approach them, as well as how to prepare a handout and a summary in class. I will provide you with a handout template. *A list of possible papers will be available on Quercus.* **Please submit three preferences by week 2 (September 27<sup>th</sup>).** Papers **will be assigned in week 3 (October 4<sup>th</sup>).**

You will be asked to submit two intermittent drafts of your handout in weeks 6 (**October 25<sup>th</sup>**) and 8 (**November 1<sup>st</sup>**; 3 points each, grading based on effort). **The final version of your handout is due on November 22<sup>nd</sup>.**

Handout (25points) and presentation (4 points) are judged based on:

1. accurately conveying the idea and content of the paper
2. explaining the relevance of the paper's insights for understanding how children learn, critical periods or plasticity
3. making good use of space/ time
4. satisfying the format requirements and being of professional quality

Points	Step/Due date
3	First page draft of handout, <b>October 25<sup>th</sup> by midnight</b>
3	Complete draft of handout, <b>November 1<sup>st</sup> by midnight</b>

25	Final version of handout, <b>November 22<sup>nd</sup> by midnight</b>
4	In-class presentation of the handout, <b>November 29<sup>th</sup> or December 6<sup>th</sup></b>

## Course Webpage/Quercus

The website associated with this course is accessible via <http://q.utoronto.ca>

## Missed Deadlines

A **Verification of Illness (also known as a “doctor’s note”)** is temporarily not required. Students who are absent from academic participation for **any reason** (e.g., COVID, cold, flu and other illness or injury, family situation) and who require consideration for missed academic work should report their absence through the online absence declaration. The declaration is available on **ACORN under the Profile and Settings menu**. Students should also **advise me of their absence as soon as possible**. Visit [COVID-19 Information for University of Toronto Students](#) page on the Vice-Provost, Students website for information on this and other frequently asked questions.

**Late work for weekly reaction papers will not be accepted (but note that students can miss one for any reason at all)**. Contact me if COVID requires that more of these be missed in advance of the deadlines. Work that is turned in late without contacting me and documentation on ACRON will incur a 3% penalty for every 24-hour period or portion thereof. **Assignments will not be accepted 5 days after the due date**. If lateness is due to COVID or related, points will be redistributed elsewhere.

## Other course policies

### Email

Please check the syllabus and the class materials posted on Quercus before sending an email. You will find answers to most of your questions there. I am available to answer questions about course material during the break, right after class and during office hours. If you cannot make it to office hours, you may send me an email to request an appointment.

Please do not send email to tell me that you have to miss class, to inquire about your grade (it’s on Quercus), to ask questions about class material (come to class or office hours) or any question answered in the syllabus or on Quercus. You may send a polite follow-up email if you haven’t received a response within 48 hours.

Finally, please consider email as professional correspondence. Send email only to the email address listed in the syllabus. Use a meaningful subject line, start it with “PSY 196”. Use a proper greeting (I am Dr. Finn, Professor Finn or Amy, not Ms. Finn) and sign with your name. State your concern clearly and succinctly. Proof read your email for spelling and grammar. Do not use short-hands and abbreviations – I am not a Facebook/Snapchat/WhatsApp buddy. Remember, emails last forever and cannot be un-sent.

### Religious Accommodation

As a student at the University of Toronto, you are part of a diverse community that welcomes and includes students and faculty from a wide range of backgrounds, cultural traditions, and spiritual beliefs. For my part, I will make every reasonable effort to avoid scheduling compulsory activities on religious holy days not captured by statutory holidays. Further to University Policy, if you anticipate being absent from class or missing a major course activity (like an in-class assignment) due to a religious observance, please let me know as early in the course as possible, and with sufficient notice (at least two to three weeks), so that we can work together to make alternate arrangements.

## Writing Help

Book an appointment online with the Writing Centres on St. George Campus:

<http://www.writing.utoronto.ca/writing-centres/arts-and-science>

Attend a free group workshop this winter with Writing Plus:

<http://www.writing.utoronto.ca/writing-plus/winter-workshops>

English is not your first language? Take a look at these resources:

<http://www.writing.utoronto.ca/faqs/english-as-second-language>

<http://www.artsci.utoronto.ca/current/advising/ell>

## Plagiarism

Plagiarism is using another writer's words or ideas without the proper acknowledgement.

Know what plagiarism is so you can avoid it: <http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize> If you have any questions about whether what you are doing constitutes plagiarism, contact the instructor.

## Academic Integrity

The University of Toronto takes cases of academic misconduct seriously. The UofT Code of Behaviour on Academic Matters (<http://www.artsci.utoronto.ca/osai/code/the-code-ofbehaviour-on-academic-matters>) is a detailed document describing policies regarding misconduct, which includes:

- quoting another person's ideas in your work without clear acknowledgement
- using or possessing an unauthorized aid or obtaining unauthorized assistance in taking an exam or writing a paper
- submitting forged or altered documentation for excuses for missed exams

Any of these offenses will result in referral to the central academic integrity office and consequences that the University deems appropriate after investigation.

## Accessibility

University of Toronto is committed to accessibility. If you require accommodations for a disability or have an accessibility concern about this course, please contact Accessibility Services as soon as possible: <http://www.studentlife.utoronto.ca/as>

## That Other Kind of Psychology

These years can be challenging (especially now), both in and out of the classroom. University of Toronto offers services to assist students facing a wide range of emotional and psychological challenges:

<http://www.studentlife.utoronto.ca/hwc>

## Outline & Readings

Date	Topic, Reading & Assignments
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Sept. 13 week 1	<p><b><u>Online, synchronous</u></b></p> <p><b>Introduction, coloring overview, figure presentation sign up &amp; examples</b></p> <p>No reading, welcome!</p>
Sept. 20 week 2	<p><b><u>Online, synchronous</u></b></p> <p><b>When younger children learn (language) better than adults</b></p> <p><b>Read:</b></p> <ol style="list-style-type: none"> <li>1. Gualtieri, S., &amp; Finn, A.S. (in press) <i>The sweet spot: When children's developing abilities, brains, and knowledge make them better learners</i>, <b>pages 5-8: When children hear and learn what adults cannot: The case of language.</b></li> <li>2. Singleton, J. L., &amp; Newport, E. L. (2004). When learners surpass their models: The acquisition of American Sign Language from inconsistent input. <i>Cognitive Psychology</i>, 49(4), 370-407.</li> </ol> <p><b>Figure presentations</b></p> <p>_____</p> <p><i>Figure 1 Gualtieri &amp; Finn</i>      <i>Figure 1: Singleton &amp; Newport</i>      <i>Figures 5&amp;6: Singleton &amp; Newport</i></p>
Sept. 27 week 3	<p><b><u>In Person, from here on unless otherwise indicated</u></b></p> <p><b>When infants see better than adults</b></p> <p><b>Read:</b></p> <ol style="list-style-type: none"> <li>1. Gualtieri, S., &amp; Finn, A.S. (in press) <i>The sweet spot: When children's developing abilities, brains, and knowledge make them better learners</i>, <b>pages 8-9: When children see what adults cannot</b></li> <li>2. Kelly, D. J., Liu, S., Lee, K., Quinn, P. C., Pascalis, O., Slater, A. M., et al. (2009). Development of the other-race effect during infancy: Evidence toward universality? <i>Journal of Experimental Child Psychology</i>, 104(1), 105-114.</li> </ol> <p><b>Figure presentations</b></p> <p>_____</p> <p><i>Figure 1 Kelly et al.</i>      <i>Table 1 Kelly et al.</i></p> <p><b>Coloring due, Paper preferences for handout &amp; presentation due</b></p>
Oct. 4 week 4	<p><b>When children make better predictions from probabilistic data</b></p> <p><b>Read:</b></p> <ol style="list-style-type: none"> <li>1. Gualtieri, S., &amp; Finn, A.S. (in press) <i>The sweet spot: When children's developing abilities, brains, and knowledge make them better learners</i>, <b>pages 9-11: When children make better predictions from probabilistic data</b></li> <li>2. Decker, J. H., Lourenco, F. S., Doll, B. B., &amp; Hartley, C. A. (2015). Experiential reward learning outweighs instruction prior to adulthood. <i>Cognitive, Affective, &amp; Behavioral Neuroscience</i>, 15(2), 310-320.</li> </ol> <p><b>Figure presentations</b></p> <p>_____</p> <p><i>Figure 1 Decker et al.</i>      <i>Figure 2 Decker et al.</i>      <i>Figure 3 Decker et al.</i></p> <p><b>Paper for handout &amp; presentation assigned</b></p>
Oct 11 week 5	<p><b>no class, holiday</b></p>

Oct. 18 week 6	<b>When children have better (or more accurate) memory</b>			
	<b>Read:</b> <ol style="list-style-type: none"> <li>Gualtieri, S., &amp; Finn, A.S. (in press) <i>The sweet spot: When children's developing abilities, brains, and knowledge make them better learners</i>, <b>pages 12-14: When children have better (or more accurate) memory</b></li> <li>Brainerd, C. J., Reyna, V. F., &amp; Forrest, T. J. (2002). Are Young Children Susceptible to the False-Memory Illusion? <i>Child Development</i>, 73(5), 1363-1377.</li> </ol>			
	<b>Figure presentations</b>			
	<hr/> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><i>Table 1 Brainerd et al.</i></td> <td style="width: 50%; border: none;"><i>Table 2 Brainerd et al.</i></td> </tr> </table>	<i>Table 1 Brainerd et al.</i>	<i>Table 2 Brainerd et al.</i>	
<i>Table 1 Brainerd et al.</i>	<i>Table 2 Brainerd et al.</i>			
	<a href="#">First page draft of handout</a>			
Oct. 25 week 7	<b>Why are younger children sometimes better? Cognitive abilities</b>			
	<b>Read:</b> <ol style="list-style-type: none"> <li>Gualtieri, S., &amp; Finn, A.S. (in press) <i>The sweet spot: When children's developing abilities, brains, and knowledge make them better learners</i>, <b>pages 15-20: Cognitive abilities</b></li> <li>Vlach, H. A. (2014). The Spacing Effect in Children's Generalization of Knowledge: Allowing Children Time to Forget Promotes Their Ability to Learn. <i>Child Development Perspectives</i>, 8(3), 163-168.</li> </ol>			
	<b>Figure presentations</b>			
	<hr/> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><i>Figure 1 Vlach</i></td> <td style="width: 50%; border: none;"><i>Figure 2 Vlach</i></td> </tr> </table>	<i>Figure 1 Vlach</i>	<i>Figure 2 Vlach</i>	
<i>Figure 1 Vlach</i>	<i>Figure 2 Vlach</i>			
	<a href="#">Peer review 1<sup>st</sup> page draft due</a>			
Nov. 1 week 8	<b>Why are younger children sometimes better? Asynchronous neurocognitive development</b>			
	<b>Read:</b> <ol style="list-style-type: none"> <li>Gualtieri, S., &amp; Finn, A.S. (in press) <i>The sweet spot: When children's developing abilities, brains, and knowledge make them better learners</i>, <b>pages 20-23: Asynchronous neurocognitive development</b></li> <li>Janacsek, K., Fiser, J., &amp; Nemeth, D. (2012). The best time to acquire new skills: age-related differences in implicit sequence learning across the human lifespan. <i>Dev Sci</i>, 15(4), 496-505.</li> </ol>			
	<b>Figure presentations</b>			
	<hr/> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%; border: none;"><i>Figure 1 Janacsek et al.</i></td> <td style="width: 33%; border: none;"><i>Figure 2 Janacsek et al.</i></td> <td style="width: 33%; border: none;"><i>Figure 3 Janacsek et al.</i></td> </tr> </table>	<i>Figure 1 Janacsek et al.</i>	<i>Figure 2 Janacsek et al.</i>	<i>Figure 3 Janacsek et al.</i>
<i>Figure 1 Janacsek et al.</i>	<i>Figure 2 Janacsek et al.</i>	<i>Figure 3 Janacsek et al.</i>		
	<a href="#">Complete draft of handout</a>			
Nov. 8 week 9	<b>no class, fall reading week</b>			
Nov. 15 week 10	<b>Why are younger children sometimes better? Plasticity</b>			
	<b>Read:</b> <ol style="list-style-type: none"> <li>Gualtieri, S., &amp; Finn, A.S. (in press) <i>The sweet spot: When children's developing abilities, brains, and knowledge make them better learners</i>, <b>pages 23-28: Plasticity</b></li> <li>Weikum, W. M., Oberlander, T. F., Hensch, T. K., &amp; Werker, J. F. (2012). Prenatal exposure to antidepressants and depressed maternal mood alter trajectory of infant</li> </ol>			

speech perception. *Proceedings of the National Academy of Sciences*, 109, 17221-17227.

**Figure presentations**

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*Figure 1* Weikum et al.

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*Figure 2* Weikum et al.

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*Figure 3* Weikum et al.

**Peer review full handout due**

Nov. 22  
week 11

**Why are younger children sometimes better? Prior knowledge**

**Read:**

1. Gualtieri, S., & Finn, A.S. (in press) *The sweet spot: When children's developing abilities, brains, and knowledge make them better learners*, **pages 28-31: Prior knowledge**
2. Carneiro, P., Albuquerque, P., Fernandez, A., & Esteves, F. (2007). Analyzing False Memories in Children With Associative Lists Specific for Their Age. *Child Development*, 78(4), 1171-1185.

**Figure presentations**

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*Table 1* Carneiro et al.

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*Figure 1* Carneiro et al.

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*Table 2* Carneiro et al.

**Final draft of handout**

Nov. 29  
week 12

**In-class presentations of handout**

Dec 6.  
week 13

**In-class presentation of handout**