LGCS 175: Seminar in Cognitive Science
Time, Emotion, and the Brain
Spring 2015
Tuesday & Thursday 2:45-4:00pm
Edmunds 217

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OVERVIEW

Have you ever wondered why time flies when you're having fun, but everything seems to move in slow motion when you fear for your life? Have you ever looked up at clock and momentarily thought it was stopped? Why does time seem to go by so much faster now that you're an adult than when you were a kid?

This seminar course will address these questions and many more from a psychological perspective. Many topics related to the perception of time will be covered in class, although the emphasis will be on the effects of emotion, as well as the relevant neural mechanisms. You will also have the opportunity to independently investigate your own topic of interest that relates to these general issues. This will involve writing a literature review and presenting your ideas to the class.

READINGS

Rather than using a textbook, this course will make use of readings from a variety of sources that will be available for download on Sakai. This will include a mixture of experimental papers, review articles, and the occasional article intended for a more general audience. Please make sure to complete the readings before class on the date for which they are assigned. A large proportion of our class time will be spent discussing the readings, so in order for you to get the most out of this class, it is important that you arrive prepared to contribute.

Other course materials will also be available on Sakai, including presentation slides, handouts, and links to relevant webpages.

COURSE REQUIREMENTS

All written assignments will be submitted to your individual drop box on Sakai, so no paper copies are necessary. I will also be grading and providing feedback on your work using Sakai.

With the exception of the in-class presentations, note that all assignments are due on days when we do not meet for class! This is intended to prevent the assignments from interfering with your ability to complete the readings for each class. Most of the written assignments are due on Fridays by 5pm, and the online discussion questions are due on Wednesdays by 9pm.

Discussion Facilitation (2 x 10%): Individually or in pairs, you will be responsible for leading the discussion of the assigned readings during two of our class meetings. Your job will be to facilitate the discussion in an interactive manner, directing the conversation toward the important issues addressed in the readings. Keep in mind that your goal should not be to lecture to the class, but to involve everyone in an interesting and informative discussion. You will sign up for two discussion topics during the first week of class. All student-led discussions will be on Thursdays.

Discussion Questions (10 x 1%): In order to get you thinking critically about the material and to help the discussion leaders prepare, you will be asked to write two discussion questions related to the readings assigned on Thursdays. These questions should be posted to the discussion forum on Sakai by Wednesday evening at 9pm. You will not need to write questions for the weeks when you are leading the discussion.

Response Papers (5 x 5%): You will be asked to complete five short writing assignments in response to the readings. These should be approximately two pages long (double-spaced). You'll receive a question or writing prompt on the Monday before each paper is due.

Final Project: For the final project, you will do an independent investigation into a topic of your choice that relates to time perception and cognitive science. You will not have to run an experiment, but you will be doing some fairly extensive research using the existing literature on your topic.

There will be three assignments related to the final project:

1. ***Proposal (5%):*** Early on, you will write a short description of the topic you will be pursuing for your project, providing at least one relevant background citation. This will allow me to give you some feedback on your topic choice, as well as help you with your literature search.
2. ***Presentation (5%):*** During the last full week of class, you will present your research to the class. It will also be a great opportunity to get some last-minute feedback.
3. ***Final Paper (25%):*** The final paper will be a literature review that should be around 8-10 pages long. In this review, you will describe and evaluate at least five research articles. Importantly, you should attempt to organize this background research in a meaningful way, using it to make a point or support a hypothesis. You will receive more detailed guidelines later in the semester.

Participation (10%): Because this is a discussion-based course, your daily participation is extremely important. A large proportion of our class time will be spent discussing the readings, so it is essential that you arrive on time and prepared to contribute.

GRADING

Grade Breakdown:

Discussion Facilitation:	20%
Discussion Questions:	10%
Response Papers:	25%
Final Project:	
Proposal:	5%
Presentation:	5%
Paper:	25%
Participation:	10%

Grading Scale:

By default, the following scale will be used to assign letter grades. If necessary, grades will be curved up, but they will not be curved down. Scores will not be rounded (e.g., according to the default scale, 89.99% is a B+, not an A-).

A	93-100%	B	83-86%	C	73-76%	D	63-66%
A-	90-92%	B-	80-82%	C-	70-72%	D-	60-62%
B+	87-89%	C+	77-79%	D+	67-69%	F	<60%

Late Policy:

Late written assignments will be accepted, but 10% will be deducted from the total score for each day they are late. Late discussion questions will not be accepted, since they will not be useful to the discussion leaders for that day. Extensions will be granted only in emergency situations, and documentation will be required (e.g., doctor's note, etc.).

SCHEDULE (* indicates student discussion leaders)

Week	Date	Topic
1	T 1/20	Introduction
	R 1/22	Internal Clock Models
2	T 1/27	Subjective Time
	R 1/29*	Effects of Danger
3	T 2/03	Overestimation of Durations of Emotional Stimuli
	R 2/05*	Underestimation of Durations of Emotional Stimuli
	Response Paper #1 due by 5pm on Friday 2/06	
4	T 2/10	Effects of Mood
	R 2/12*	Expectancy Effects
5	T 2/17	Attentional Models
	R 2/19*	Expertise
	Response Paper #2 due by 5pm on Friday 2/20	
6	T 2/24	Memory Models
	R 2/26*	Retrospective Timing
7	T 3/03	Time and the Brain
	R 3/05*	Intrinsic Models
	Response Paper #3 due by 5pm on Friday 3/06	
8	T 3/10	Role of the Cerebellum
	R 3/12*	Role of the Insula
--	T 3/17	NO CLASS – SPRING BREAK
	R 3/19	NO CLASS – SPRING BREAK
9	T 3/24	Neuropharmacological Approaches
	R 3/26*	Disorders of the Motor System
10	T 3/31	Illusions: Chronostasis
	R 4/02*	Illusions: Oddball Effect
	Response Paper #4 due by 5pm on Friday 4/03	
11	T 4/07	Time Perception Across the Lifespan
	R 4/09*	Time and Aging
	Final Project Proposal due by 5pm on Friday 4/10	
12	T 4/14	Role of Perceived Causation
	R 4/16*	Numerical Magnitude Effects
	Response Paper #5 due by 5pm on Friday 4/17	
13	T 4/21	Cultural Influences
	R 4/23*	Time Perception in Other Species
14	T 4/28	*Final Project Presentations*
	R 4/30	*Final Project Presentations*
15	T 5/05	Philosophy of Time
	R 5/07	NO CLASS – READING DAYS
	Final Paper due by 5pm on Wednesday 5/06	

READING LIST

1/20 Introduction

1/22 Internal Clock Models

- Zakay, D., & Block, R. A. (1997). Temporal cognition. *Current Directions in Psychological Science*, *6*(1), 12–16.

1/27 Subjective Time

- Hammond, C. (2013). Introduction. In *Time warped,* New York, NY: Harper Perennial.
- Hammond, C. (2013). Chapter 1: The time illusion. In *Time warped,* New York, NY: Harper Perennial.

1/29 Effects of Danger*

- Campbell, L. A., & Bryant, R. A. (2007). How time flies: A study of novice skydivers. *Behaviour Research and Therapy*, *45*, 1389–1392.
- Langer, J., Wapner, S., & Werner, H. (1961). The effect of danger upon the experience of time. *The American Journal of Psychology*, *74*(1), 94–97.
- Stetson, C., Fiesta, M. P., & Eagleman, D. M. (2007). Does time really slow down during a frightening event? *PloS ONE*, *2*(12), e1295.

2/03 Overestimation of Durations of Emotional Stimuli

- Droit-Volet, S., & Gil, S. (2009). The time-emotion paradox. *Philosophical Transactions of the Royal Society B: Biological Sciences*.
- Angrilli, A., Cherubini, P., Pavese, A., & Mantredini, S. (1997). The influence of affective factors on time perception. *Perception & Psychophysics*, *59*(6), 972–982.

2/05 Underestimation of Durations of Emotional Stimuli*

- Tipples, J. (2010). Time flies when we read taboo words. *Psychonomic Bulletin & Review*, *17*(4), 563–568.
- Gable, P. A., & Poole, B. D. (2012). Time flies when you're having approach-motivated fun: Effects of motivational intensity on time perception. *Psychological Science*, *23*(8), 879-886.

2/10 Effects of Mood

- Bar-Haim, Y., Kerem, A., Lamy, D., & Zakay, D. (2010). When time slows down: The influence of threat on time perception in anxiety. *Cognition & Emotion*, *24*(2), 255–263.
- Gil, S., & Droit-Volet, S. (2009). Time perception, depression and sadness. *Behavioural Processes*, *80*, 169–176.

2/12 Expectancy Effects*

- Block, R. A., George, E. J., & Reed, M. A. (1980). A watched pot sometimes boils: A study of duration experience. *Acta Psychologica*, *46*(2), 81-94.
- Cahoon, D., & Edmonds, E. M. (1980). The watched pot still won't boil: Expectancy as a variable in estimating the passage of time. *Bulletin of the Psychonomic Society*, *16*(2), 115-116.

2/17 Attentional Models

- Brown, S. W. (2008). Time and attention: Review of the literature. In S. Grondin (Ed.), *Psychology of time* (pp. 295-320). Bingley, UK: Emerald Group Publishing Limited.

2/19 Expertise*

- Rhodes, M. G., & McCabe, D. P. (2009). Expertise makes the world slow down: Judgments of duration are influenced by domain knowledge. *Quarterly Journal of Experimental Psychology*, *62*(12), 2313-2319.
- Reber, R., Zimmermann, T. D., & Wurtz, P. (2004). Judgments of duration, figure-ground contrast, and size for words and nonwords. *Perception & Psychophysics*, *66*(7), 1105-1114.

2/24 Memory Models

- Block, R. A. (2003). Psychological timing without a timer: The roles of attention and memory. In H. Helfrich (Ed.), *Time and mind II: Information processing perspectives* (pp. 41-59). Göttingen, Germany: Hogrefe & Huber.

2/26 Retrospective Timing*

- Block, R. A., & Zakay, D. (2008). Timing and remembering the past, the present, and the future. In S. Grondin (Ed.), *Psychology of time* (pp. 367-394). Bingley, UK: Emerald Group Publishing Limited.

3/03 Time and the Brain

- Hammond, C. (2013). Chapter 2: Mind clocks. In *Time warped,* New York, NY: Harper Perennial.
- Buonomano, D. V. (2007). The biology of time across different scales. *Nature Chemical Biology*, *3*(10), 594–597.

3/05 Intrinsic Models*

- Buhusi, C. V, & Meck, W. H. (2005). What makes us tick? Functional and neural mechanisms of interval timing. *Nature Reviews Neuroscience*, *6*(10), 755–765.
- Karmarkar, U. R., & Buonomano, D. V. (2007). Timing in the absence of clocks: Encoding time in neural network states. *Neuron*, *53*(3), 427-438.

3/10 Role of the Cerebellum

- Lee, K. H., Egleston, P. N., Brown, W. H., Gregory, A. N., Barker, A. T., & Woodruff, P. W. (2007). The role of the cerebellum in subsecond time perception: Evidence from repetitive transcranial magnetic stimulation. *Journal of Cognitive Neuroscience*, *19*(1), 147-157.
- Ivry, R. B. (1996). The representation of temporal information in perception and motor control. *Current Opinion in Neurobiology*, *6*(6), 851-857.

3/12 Role of the Insula*

- Craig, A. D. (2009). Emotional moments across time: A possible neural basis for time perception in the anterior insula. *Philosophical Transactions of The Royal Society B*, *364*(1525), 1933-1942.
- Dirnberger, G., Hesselmann, G., Roiser, J. P., Preminger, S., Jahanshahi, M., & Paz, R. (2012). Give it time: Neural evidence for distorted time perception and enhanced memory encoding in emotional situations. *Neuroimage*, *63*(1), 591-599.

3/17—3/19 SPRING BREAK

3/24 Neuropharmacological Approaches

- Rammsayer, T. H. (2008). Neuropharmacological approaches to human timing. In S. Grondin (Ed.), *Psychology of time* (pp. 295-320). Bingley, UK: Emerald Group Publishing Limited.
- Noreika, V., Falter, C. M., & Wagner, T. M. (2014). Variability of duration perception: From natural and induced alterations to psychiatric disorders. In V. Arstila & D. Lloyd (Eds.), *Subjective time: The philosophy, psychology, and neuroscience of temporality* (pp. 529-556). Cambridge, MA: MIT Press.

3/26 Disorders of the Motor System*

- Sacks, O. (2004, August 23). Speed: Aberrations of time and movement. *The New Yorker*.
- Wearden, H., Smith-Spark, H., Cousins, R., Edelstyn, M. J., Cody, W. J., & O'Boyle, J. (2008). Stimulus timing by people with Parkinson's disease. *Brain and Cognition*, *67*(3), 264-279.

3/31 Illusions: Chronostasis

- Eagleman, D. M. (2008). Human time perception and its illusions. *Current Opinion in Neurobiology, 18*(2), 131-136.
- Hodinott-Hill, I., Thilo, K. V., Cowey, A., & Walsh, V. (2002). Auditory chronostasis: Hanging on the telephone. *Current Biology*, *12*(20), 1779-1781.

4/02 Illusions: Oddball Effect*

- Tse, P. U., Intriligator, J., Rivest, J., & Cavanagh, P. (2004). Attention and the subjective expansion of time. *Perception & Psychophysics*, *66*(7), 1171-1189.

4/07 Time Perception Across the Lifespan

- Hammond, C. (2013). Chapter 4: Why time speeds up as you get older. In *Time warped,* New York, NY: Harper Perennial.

4/09 Time and Aging*

- Crawley, S. E., & Pring, L. (2000). When did Mrs. Thatcher resign? The effects of ageing on the dating of public events. *Memory, 8*(2), 111-121.
- Friedman, W. J., & Janssen, S. M. J. (2010). Aging and the speed of time. *Acta Psychologica, 134,* 130-141.

4/14 Role of Perceived Causation

- Eagleman, D. M., & Holcombe, A. O. (2002). Causality and the perception of time. *Trends in Cognitive Science, 6*(8), 323-325.
- Faro, D., McGill, A. L., & Hastie, R. (2013). The influence of perceived causation on judgments of time: An integrative review and implications for decision-making. *Frontiers in Psychology*, *4*, 217.

4/16 Numerical Magnitude Effects*

- Chang, A. Y., Tzeng, O. J., Hung, D. L., & Wu, D. H. (2011). Big time is not always long: Numerical magnitude automatically affects time reproduction. *Psychological Science*, *22*(12), 1567-1573.
- Oliveri, M., Vicario, C. M., Salerno, S., Koch, G., Turriziani, P., Mangano, R., . . . Caltagirone, C. (2008). Perceiving numbers alters time perception. *Neuroscience Letters*, *438*(3), 308-311.

4/21 Cultural Influences

- Levine, R. (1998). Chapter 6: Where is Life Fastest? In *A Geography of time: The temporal misadventures of a social psychologist,* New York, NY: Basic Books.

4/23 Time Perception in Other Species*

- Time passes more slowly for flies, study finds (2013, September 16). *The Guardian.*
- Healy, K., McNally, L., Ruxton, G. D., Cooper, N., & Jackson, A. L. (2013). Metabolic rate and body size are linked with perception of temporal information. *Animal Behaviour*, *86*(4), 685-696.

4/28—4/30 Final Project Presentations

5/05 Philosophy of Time

- Excerpts from: Callender, C., & Edney, R. (2001). *Introducing time: A graphic guide,* London, UK: Icon Books.