

Current Topics in Perception: Multisensory Integration

I) Course information

Course number: PSYD51H3

Thursdays, 3-5pm
Place: MW223

Prerequisites: PSYB51

II) Instructor:

Dr. Matthias Niemeier
1265 Military Trail S572
phone: 416-287-7466
e-mail: niemeier@utsc.utoronto.ca I will respond within two working days.
Office Hours: Fri, 3-4 pm and by appointment. If that doesn't work for you please contact me by e-mail or during the our seminar to set up a time. Also, I will have special office hours for students having their presentation in class. Please approach me about this at least one week before your presentation.

III) Course coverage and goals

The world around us is multimodal. How do we join our senses (vision, audition, touch, olfaction, balance etc.) together to obtain a coherent percept of the world? In the past few years, multisensory integration has become a topic of major research interest. The course provides a survey of the recent developments. Selected readings will cover neurophysiological results, psychological and neuropsychological findings, synaesthesia, and an introduction to the Bayesian mechanisms of multisensory integration.

IV) Web pages

Course Web Site: intranet page

Here you will find the syllabus, instructions for the papers, the most up-to-date version of the lecture schedule, and announcements.

Please check on a regular basis for announcements.

V) Evaluation

One aim of this course is to be closer to the real world of science than that is possible in your normal course. That is, there won't be exams nor a textbook (there are none on multisensory integration anyway). There won't even be a regular lecture. Instead, your active participation in the course is requested. We will have a reading list of original research papers, and every week there will be presentations and discussions on them. Also, we will have assignments; every week a short thought paper on one of the research papers from the reading list, and at the end of the course there will be a research proposal on a topic of multisensory integration.

30% Presentation. On one day you are asked to present one of the research papers for the respective day and then lead a group discussion on that paper. The presentation (including discussion) will be 25-35 min. It needs to be a free presentation. You can use notes, but reading from a manuscript just doesn't work,

not for you and not for your audience. The exact structure of the presentations will vary from article to article. But it should have the following two parts:

- (a) a brief introduction to the topic (~5 min)
- (b) a summary of the methods, results and conclusions of the paper. (~25 min)
- (c) a summary of the discussion of the article (2-3 min)

A group discussion will follow your presentation.

To choose a topic, please refer to the Schedule and the reading list. Topics will be assigned on a first-come-first-serve basis. So, please email me your first 3 choices.

20% Participation in the sessions and in the group discussions on research papers. This component of your grade highlights that I expect you to attend the seminar every week. For more than two missed sessions I will start deduct grades unless I receive medical certificates from you. However, to earn the full 20% you need to do more than just simply be present. Science lives from discussions. Here is your chance to contribute your own thoughts. Do you agree with the authors? Do you have concerns about confounds or gaps in the study? Or maybe, were you impressed with something about the study? Do you have ideas about how to extend the research? – Note that discussions can be many things. I don't expect each contribution to be the thought of a genius (though that wouldn't hurt either). Even if there was something in the paper that you didn't understand that could be worth talking about. There is a good chance that others had the same problem. Last thing: in order to score on the participation scale it will be necessary to actually to be there ...

25% Thought papers. Every week you are expected to read the respective literature (2 papers) and to write about one of them 1-2 pages of your own thoughts. These thought papers serve three main purposes. (a) They should make you read the literature in the first place and help you prepare for the course. (b) They should train you to write scientifically. (c) They should encourage you to develop your own thoughts on the particular topic. Please note that I have relatively detailed expectations as to how a thought paper should look like in terms of structure. Therefore, please make sure that you check out the instructions provided on the Intranet (“**How to write a thought paper**”). This information sheet also contains the instructions about how you should write and the grading system that I will be using. Each thought paper is due for the respective seminar, 3pm. The 25% will be calculated as follows: I will score each of your papers with a point system. Maximum score will be 10 points. Then I will select your 5 best thought papers, and each of them will be worth 5% of the total grade. Since the purpose of the paper is to be prepared for class I have to deduct 1 scoring point (out of 10) per day for late submissions. **Also: I expect you to submit a paper on average every second week. At most there shall be only two weeks between papers. Longer gaps will be considered as late submissions.**

25% Research proposal. The proposal is due on the last day of class. Please go to the Intranet for tips and instructions on “**How to write a research proposal**”.

VI) Schedule

The schedule is subject to changes as we go along. The most up-to-date version will be on the Intranet.

Day	Topic	Literature
10 Jan	Introduction	--
17 Jan	Neural mechanisms of multisensory integration	Lakatos et al. (2007), Bremmer et al. (2001)
		Spence & Driver (1997)

24 Jan	Crossmodal cueing of attention	Ward et al. (2000)
31 Jan	Multisensory object perception: behaviour	Newell et al. (2001), Lacey et al. (2007)
7 Feb	Multisensory object perception: fMRI	Amedi et al. (2001) Amedi et al. (2007)
14 Feb	Optimal multisensory integration	--- <i>Introduction to Maximum Likelihood Estimation</i> --- Ernst et al. (2002) Avillac et al. (2005).
21 Feb	Reading week	
28 Feb	Optimization and eye movements	Niemeier et al. (2003), Haarmeier et al. (2001)
7 Mar	Vision and sound in space	Alais & Burr (2004), Fujisaki et al. (2004)
14 Mar	Vision and sound / touch in space	Zwiers et al. (2003), Macaluso et al. (2002)
21 Mar	Body schema	Blanke et al. (2005) Baas et al. (2011)
28 Mar	Plasticity & development	Wallace et al. (2004), Gori et al. (2008)
4 Apr	Plus and minus syndromes of multisensory perception: Synaesthesia vs. split brain	Mattingley et al. (2001), Spence et al. (2001)

VII) References

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- Fujisaki W, Shimojo S, Kashino M, Nishida S (2004). Recalibration of audiovisual simultaneity. *Nat Neurosci* 7:773-778.
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- Lakatos P, Chen, CM, O'Connell MN, Mills A, Schroeder CE (2007). Neuronal oscillations and multisensory interaction in primary auditory cortex. *Neuron* 53:279-292.
- Macaluso E, Frith CD, Driver J (2002). Crossmodal spatial influences of touch on extrastriate visual areas take current gaze direction into account. *Neuron* 34:647-658.
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- Ward LM, McDonald JA, Lin D (2000). On asymmetries in cross-modal spatial attention orienting. *Perception & Psychophysics* 62:1258-1264. (no pdf)
- Zwiers MP, Van Opstal AJ, Paige GD (2003). Plasticity in human sound localization induced by compressed spatial vision. *Nat Neurosci* 6:175-181.

VIII) Course Policies

For academic regulations (such as UTSC's official grading practices policy, petitions, code of behaviour on academic matters etc.) please refer to the UTSC calendar.