

PSYC 215, Winter 2014

EXPERIMENTAL PSYCHOLOGY: PERCEPTION

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(check occasionally for newer versions)

Contact Information

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Office hours:	Fri 10:00 – 11:00
Lectures:	Tue 10:00 – 11:30 and Thu 8:30 – 10:00
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Calender Description

The course introduces sensory information processing and perception as well as the methods required to study the complex relations between the physical world of light and sound, and the subjective experience of objects and events. Topics include a short history of the field and a summary of the methodology of psychophysics, which is then followed by a thorough discussion of the mechanisms underlying touch, somatosensation, the chemical senses, hearing, and vision.

Course Objectives

This course is an introduction to how we make sense of sensory input – our only source of information about the world. We will

- explore how sensation differs from perception,
- investigate different theoretical traditions that have attempted to account for perceptual phenomena,
- survey the methods that are used to study sensation and perception,

- trace the functional and anatomical organization of the different sensory modalities, from sensory transduction and signal transmission, through stages of information processing, to perception.

We will cover the basic principles involved in seeing and hearing, in touch, taste and smell. Many principles are common to more than one sensory modality, and commonalities will be emphasized whenever possible. Throughout, we assume that the goal of perception is behaviour. Perception is our only means of extracting information from the environment, allowing us to experience the discrete objects, people and events “out in the world” that drive our behaviour.

I hope that you will appreciate at the end of the course the fascination of a field that has puzzled philosophers and scientists alike over the centuries, as it is at the centre of one of the most important questions humans can possibly ask: Who are we and what can we possibly know about ourselves and the rest of the world?

Textbook

We will be using a text book by George Mather from the University of Sussex in the UK: Foundations of Sensation and Perception. The book is shorter than many other texts, but very concise and well written. It doesn't come with many bells and whistles, but it's got everything that is important. Also, it comes at a very competitive price. Some of the other books I have used in the past cost more than twice as much.

We will cover chapters 1 through 12, one chapter each week. Contents from the last two chapters may appear here and there, but we don't cover them systematically.

Every chapter consists of a main text section and a supplementary tutorial. Please read the main text BEFORE class. That way you will benefit much more from the lectures, and you will also do well on the quizzes. An in-depth understanding of the main text is required to go into the final exam, too.

The tutorials are worth reading as well. They help you consolidating the contents of the main text and often make interesting connections and add interesting twists to the material.

You need your own copy of the text book. You have to buy it new or used. The campus book store also rents out copies of the book. There is no way you can master the course without your own copy of the text.

I also suggest to make use of the additional online material the publisher of the text provides to us:

<http://www.routledge.com/cw/mather-9781841696997/>

You find summaries of the chapters, a glossary of keywords, and other study material if you click on “Resources”. If you click on “Questions” you are taken to multiple choice test quizzes. They are worth studying as I will use them as a resource for our in-class quizzes and also for the final exam.

Questions

After you have read the assigned text book chapter carefully you may have questions. The more careful you have read the material, the more interesting questions you will have. Ask them! The class is too big to have an interactive discussion, but you can post your questions online at

<http://www.biomotionlab.ca/psyc215/questions/>

I will then try to address them in class. Before you post your own question, though, please read through the list of already posted ones. Someone else might have asked your question already. If that is the case you can indicate your interest in the question by tagging it with your “Vote”. The system will count all votes and will use the count to rank the questions with respect to interest and relevance.

The earlier you post your question the more likely it is that it will be read and voted for by others in the course. Also, if you find a questions already posted that is close to what you wanted to ask, it might be wise to tag that question rather than formulating your own, because that will increase the total count rather than distributing it over two different questions.

For each week (and each chapter) you can post your questions at any time until Wednesday at noon. The earlier you post them the more time I have to prepare responses and address them in class. You have to supply your student number when you post questions or vote for existing ones.

News and Discussion group

You will find two different forums on our Moodle site. The “News” forum I will use to distribute information to the whole class. Everyone is subscribed and every post gets forwarded to your Queen's email address, too.

I will also set up a “Discussion” group on our Moodle site which you may use to communicate between participants of the course. Use it to ask questions that others might be able to answer or to post remarks, links, etc. that others might be interested in. This group you have to actively check. You can also configure it such that post are forwarded to your email account. By default, however, that is not the case.

Lectures

The book is well written and you are all experienced, mature students. I expect you to have a good look at the assigned reading (see table at the end of the syllabus) BEFORE you come to class. Eventually you have to read the text anyway, but you'll benefit from both the text and my lectures much more if you do that before class. It will also help you to do well on the quizzes.

In class, I will NOT simply replicate the contents of the book! I will concentrate on certain topics which I pick because

- I consider them particularly important or interesting
- they are hard to understand without further explanation
- the text book is not presenting them at all or does not present them well enough
- you asked me questions about it

Some of the material is just explaining contents of the main sections from the book, other material might refer to the tutorial parts of the book, and yet other material may not be covered at all.

You have to come to class and you have to take notes. Your text book will be a great resource. I will also provide you with the slides that I am using. But neither can replace your own notes.

Tutorials, TA hours

We have booked Room 326 in Humphrey Hall for the TA hours during two slots:

- Mon 10:00 – 11:30
- Thu 12:30 – 2:00

At least one of our two TAs, Seamas and Sophie, will be present. We plan a number of different activities during these times, including short tutorials on selected topics (see section on bonus marks, below). Other than that they are there for you to ask questions and discuss course material. I follow up with more info soon.

Evaluation

Two Group Projects (16% of final mark each; total 32%)

At the end of week 2, you will be assigned into groups of three or four students together with whom you will be working on your first group project. Assignment to a group is random, so don't expect to be with your good old friends. Rather expect to make new ones. Once the first assignment is completed, we'll re-shuffle and you will then work on a second group assignment with another group.

For both projects, you will be presented with a perceptual phenomenon in class. You will then be asked to write a report (maximum 8 pages, double spaced, not including references and figures) about it. The report should:

- a) identify and describe the demonstrated phenomenon and the problem/question that it represents,
- b) come up with a reasonable hypothesis to explain the phenomenon, and
- c) suggest an experiment to have the potential to test this hypothesis.

Please look at more detailed instructions in the section Group Projects below.

Key dates for group projects:

- Tue, Jan 21 Demonstration for Project 1
- Tue, Feb 4 Project 1 and assessment forms due
- Tue, Feb 25 Demonstration for Project 2
- Tue, Mar 11 Project 2 and assessment forms due

Each of the two group projects contributes 16% to your final mark for a total of 32% for the group projects. Most of your mark on each assignment comes from the group mark on the assignment, but peer-assessment of your participation in the group may also be considered.

Quizzes (18% of final mark)

We will have short quizzes in every class. We don't want to spend too much time on them and therefore, they all have a multiple-choice format so that we can use the iClicker system.

Quizzes are always at the beginning of the class. They refer directly to the assigned reading for the current lecture, but they may also cover material presented in the previous lecture. Questions are at the level of the study questions provided in the online materials that accompany your text book. Some questions are taken directly from there.

Each individual quiz contributes 1% to your final mark. If you miss a quiz you cannot make up for it,

even if you had good reason for missing it. However, only the 18 best ones will count, the rest you can miss or you can mess them up with no consequences for your final mark. Quizzes will be short (typically 5 to 7 questions). The whole quiz doesn't take us more than 5 min. It is important that you arrive at class on time.

Make sure to bring your iClicker to class.

Final Exam (50% of final mark)

The final exam will cover all 12 weeks of the course. It will comprise:

- 50 multiple-choice, true/false, and fill-in-the-blank questions
- five short answer questions (which you can pick out of 6)
- two essay questions (which you can pick out of 3)

Bonus marks

I will provide you with little tasks and competitions here and there which allow you to earn a few extra marks if you are up for it. I will also appreciate your involvement with the Moodle Discussion group and the Questions site (see above) by giving extra marks to the ones who contribute regularly. Finally, I will acknowledge your participation in the tutorial groups offered by our TAs.

Note, that these bonus marks are not subject to fixed rules. They are up to my discretion.

Marking Scheme

The two group projects and the essay questions in the final exam will be marked using letter grades. Everything else initially gets a numerical percentage mark. For purposes of calculating your course average the letter grades of the parts will be translated into numerical equivalents using the Arts & Science Letter Grade Input Scheme:

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F+	F	F-
93	87	82	78	75	72	68	65	62	58	55	52	48	24	0

The final course average will then be converted back to a final letter grade according to Queen's Official Grade Conversion Scale:

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
≥ 90	85-89	80-84	77-79	73-76	70-72	67-69	63-66	60-62	57-59	53-56	50-52	≤ 49

Group Projects

These projects encourage you to really think about perception – mostly your own perception. Essentially, you will be analyzing 'magic tricks' that your perceptual apparatus plays on you, that normally you might take for granted, and not even notice. There are two such projects.

You will be assigned to a group in the second week of class. You are responsible for arranging meetings as a group. **I strongly encourage you to meet regularly at scheduled times** in order to work on the two projects. Almost no classes or labs run between 5:30 and 6:30 at night, or after 9:30 at night

– these may therefore be good times to meet. I would also encourage you to use the groups as a place to raise questions, identify challenging problems, explore the course material, and prepare for the final exam. Our Moodle page provides a means to communicate within the groups. Initially, this is the only means to identify who your group members are. Later, you may switch to other communication means, but you might as well just use the Moodle system.

Eventually you have to submit a paper as a group. Each paper should have three parts:

- d) identify and describe the demonstrated phenomenon and the problem/question that it represents,
- e) come up with a reasonable hypothesis to explain the phenomenon, and
- f) suggest an experiment to have the potential to test this hypothesis.

1. Describe the phenomenon.

An essential ingredient to the study of Sensation and Perception is the ability to accurately identify an interesting observation. Most interesting phenomena provide some kind of conflict, something that is odd. What is it? Describe it and include the necessary details while omitting irrelevant information, so that the essence of the phenomenon is accurately presented. Try to describe the perceptual phenomenon in such a way that someone who has not witnessed it understands what you are talking about and why it is interesting.

2. Develop a testable hypothesis to ‘explain’ what you observe.

You might want to do research on the phenomenon itself and then critically discuss what people have found. However, that is not necessary. I am more interested in YOUR thoughts and hypotheses. Your hypothesis doesn’t have to be correct. However, it should make sense in terms of the knowledge and the theories you have learned about in this course, that is, it should be plausible. Your hypothesis should also be testable.

3. Design an experiment that can test your proposed hypothesis.

A good hypothesis should be falsifiable. That means, at least in principle, there should be a way to design an experiment that would demonstrate that the hypothesis is wrong – if it turns out to be wrong. Try to come up with such a critical experiment.

Don't worry too much about technical details like number of participants, number of trials, statistically methods, etc. Rather concentrate on the logic of your design. How can it discriminate between your hypothesis and the “null-hypothesis”, that is, the hypothesis that your hypothesis is wrong.

Do not write more than 8 double-spaced pages (not counting references and figures). Eight double-spaced typed pages is not a lot of space, so it is important to be concise, and only convey the most important information. Sorting out the important stuff from the details is part of the challenge!

Please format your paper into three distinct sections as indicated above. On the other hand, make sure you turn in a coherent paper rather than independent sections that individual members of your group wrote independently. You have to work on this as a group. Your final product will clearly show whether you did, or whether you subdivided work and then pasted everything together.

Example: Let's say we show you a demonstration of the Zöllner Illusion (e.g. <http://www.psy.ritsumeai.ac.jp/~akitaoka/zollnere.html>).

In the first part of your paper you would describe the drawing (horizontal, parallel lines superimposed with oblique shorter lines which intersect the long ones), and you would clearly identify the perceptual conflict apparent in this illusion: While you can verify with a ruler that the horizontal lines are clearly parallel they don't look parallel at all! Your visual system sees something different than what you measure with your ruler.

In the second part you would reason about why this might be the case. You might connect it to contrast enhancement phenomena we talked about in class: Maybe the difference in orientation between the long and the short lines appears to be larger than it really is? You might have learned already about orientation tuning of V1 cells and about the phenomenon of lateral inhibition and you may be able to connect the two into your hypothesis: The Zöllner is a result of overestimating the angle between the short and long lines due to lateral inhibition on the level of orientation specific V1 cells.

What kind of predictions does this hypothesis make and how could you test these predictions (and potentially falsify the hypothesis)? One prediction would be that lateral inhibition should not only affect the orientation of the long lines, but also the orientation of the short lines. The observer would not realize it, though, because she has no expectations (like them being parallel) that can be violated. It shouldn't be too hard to think up an experiment that sets up conditions in which the hypothesized change in the orientation of the short lines would become apparent. If your hypothesis is right then this should happen. If it doesn't, then you falsified your hypothesis.

(If this doesn't make sense to you, then it is because you haven't spent two weeks discussing the Zöllner illusion, and because I haven't had a chance to talk to you about hypotheses and theories yet).

In addition to the final paper which submit as a group, everyone of you will also be asked to individually evaluate your own work in the group, as well as that of your peers. These group and self assessments are kept **confidential!** The aim is to ensure that everyone participates in the group activities, and also to help you think about your own part in the team. The assessment forms will be available on the course site. These forms are due on the same day as the assignments but we encourage you to hand them in individually (ie, separate from the group assignment), so that confidentiality is guaranteed.

Other information

iClicker

For the weekly quizzes and for occasional polls and short experiments in class, you need an iClicker. If you don't have one yet, you either have to purchase one from the campus computer store (about \$40), or you may be able to borrow one from the Department of Psychology. Bring a \$30 cash deposit and ask for Amanda Miller or Marie Tooley in the General Office. Make sure you bring your iClicker to class or otherwise you cannot participate in the quizzes.

All iClickers have to be registered to their student before we can use them. Once you have your iClicker, registration can be easily done online at <http://iclicker.com/registration>. It's a quick and easy process whereby you must enter your Queen's student number and the iClicker's serial number, which is found on the rear of the remote.

DO NOT USE iclicker registration through Moodle. Use the above URL instead.

Missed or late assignments

Missed quizzes will not be repeated. If you bring valid documentation from a health professional, funeral home, coach of sports team, etc. we can add the percentage of a missed quiz to the remaining ones. Note, that we evaluate only the 18 best ones out of a total of 22 quizzes anyway.

Please see the professor or a teaching assistant AS SOON AS POSSIBLE if you are unable to complete work so that we can talk about it. In general, work that is not handed in on time will receive a mark of zero.

Request for academic accommodation

If you need academic accommodation for the final exam or special class room arrangements please visit Queen's Disability Service at <http://www.queensu.ca/hc/ds/students/accommodations.html>

Important dates

- Jan 7: First class
- Jan 17: Last date to add or drop class without financial penalty
- Feb 17 – 21: Reading week
- Feb 28: Last date to drop class without academic penalty
- April 3: Last class

Academic integrity

Academic integrity is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility (see <http://www.academicintegrity.org>). These values are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University (see the Senate Report on Principles and Priorities at <http://www.queensu.ca/secretariat/policies/senateandtrustees/principlespriorities.html>).

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments conform to the principles of academic integrity. Information on academic integrity is available in the Arts and Science Calendar (see Academic Regulation 1 <http://www.queensu.ca/artsci/academic-calendars/2011-2012-calendar/academic-regulations/regulation-1>), on the Arts and Science website (see <http://www.queensu.ca/artsci/academics/undergraduate/academic-integrity>), and from the instructor of this course. Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.

Copyright of Course Materials

This material is copyrighted and is for the sole use of students registered in PSYC 215. This material shall not be distributed or disseminated to anyone other than students registered in this course. Failure

to abide by these conditions is a breach of copyright, and may also constitute a breach of academic integrity under the University Senate's Academic Integrity Policy Statement.

Class Schedule

Date	Chapter	Reading	Assignments
Tue Jan 7	1: General principles		
Thu Jan 9			
Tue Jan 14	2: Chemical senses		
Thu Jan 16			
Tue Jan 21	3: Body senses		Project 1 demo
Thu Jan 23			
Tue Jan 28	4: Physics and biology of audition		
Thu Jan 30			
Tue Feb 4	5: Perception of sound		Project 1 due
Thu Feb 6			
Tue Feb 11	6: Physics of vision – light and eye		
Thu Feb 13			

Reading week: Feb 17 – 21

Date	Chapter	Reading	Assignments
Tue Feb 25	7: Visual physiology		Project 2 demo
Thu Feb 27			
Tue Mar 4	8: Spatial vision		
Thu Mar 6			
Tue Mar 11	9: Shape and object perception		Project 2 due
Thu Mar 13			
Tue Mar 18	10: Depth perception		
Thu Mar 20			
Tue Mar 27	11: Motion perception		
Thu Mar 29			
Tue Apr 1	12: Colour vision		
Thu Apr 3			