Research in Perceptual and Cognitive Processes
Psychology 394
Winter 2006

Instructor:	Chris Blais	**e-mail:**	cblais@watarts.uwaterloo.ca
Office:	PAS 4042	**Office Hours:**	by appointment only (feel free to drop by anytime)
Class Location:	PAS 4288	**Time:**	10:30-12:20, Tues. & Thurs.

Course Objective

Current topics in the study of cognitive and perceptual processes including research methods and procedures will be covered. Activities will include class projects (e.g., 'hands on' lab experience and data collection), research reports, and individual presentations.

Course Content

Research in cognition and perception is fuelled by "big" ideas. The present course will survey a few big ideas in the areas of visual perception, reading, and attention. Along the way we will explore a number of different methods used to test ideas in cognition and perception.

(1) **Visual perception is not an exact representation of the external world.** Rather, visual perception is an active construction made up of a complex interaction between external stimulation of the senses (e.g., the eyes), our experience, and our goals.

(2) **Reading a word is accomplished via two qualitatively different procedures**. One procedure consists of computing the words phonology from spelling-to-sound rules (e.g., sounding it out) and the other consists of retrieving the word's representations from a form of "word" memory akin to a mental dictionary. The existence of these two procedures can be inferred from the reading of individuals with brain damage (i.e., acquired dyslexics) or developmental deficits (i.e., developmental dyslexics) and in "intact" readers by how fast and accurate they can read single words and how long they look at certain types of words while reading.

(3) **Selective attention is dynamic**. Our world is full of things to attend to, however, successful goal-oriented behaviour is dependent on our ability to attend to some things and ignore others. In cognitive psychology this capability is referred to as selective attention. A classic debate in the cognition and perception literature attempts to address the level at which unattended stimuli are processed. Early-selection theories hold that unattended stimuli are analyzed at a very low-level (e.g., orientation, colour) while late-selection theories hold that unattended stimuli are analyzed at a high-level (e.g., semantics). A recent theory holds that the degree to which unattended stimuli are processed depends on the difficulty of processing the attended stimulus. In addition, the type of unattended stimulus can also affect the efficiency of attentional selection.

Grading Scheme

Tests = 25%

There will be two tests (Feb. 16th and Mar. 30th) worth 12.5% each. All material covered in class or in the assigned readings will be fair game for the test.

Data Collection, Analysis and Research Reports = 26%

Visual Illusions: Research Report #1 due Jan. 26th worth 6%

Understanding why we experience visual illusions can provide important clues as to how visual perception operates. In this assignment you will be assigned a visual illusion and your task will be to explain (1) What the viewer should subjectively experience (2) What the viewer should experience if visual perception provided a exact representation of the external world (3) Why the viewer experiences the illusion and (4) How is this illusion an example of the idea that visual perception is not an exact representation of the external world. Please include an example of the illusion and limit your explanation to 1 page double spaced.

Are Words Special? Data Collection and Research Report #2 due Mar. 30th worth 20%

There will be two formal (Jan. 26th & Mar. 2nd) and numerous informal (i.e., during class) instances of data collection during the term in order to give students a feel for the collection, analysis, and interpretation of data. After the first formal data collection we will go over the data analysis and interpretation as a class. After the second formal data collection we will again go over the analysis in class and this time I will write a method and results section and your assignment will be to write an introduction, discussion, and create a figure for the data. Please include a reference section for any work you cite in the introduction and discussion. The word limit including introduction, methods, results, discussion, and references is 4000 words.

Summaries = 24% (3% each)

For a select number of assigned readings you will write a very brief summary (submitted online through ACE ***BEFORE*** the class in which that paper is presented) of the data and theory presented in the paper (see below "How to Write Summaries"). In addition, you will be asked to pose one question about the paper. This question can be in regards to anything in the paper (e.g., methods, data, theory etc.). The readings for which you will do a summary (eight of them) have three asterisks (***) beside them in the schedule.

Presentation & Participation = 25%

Each student will present two papers to the class. This activity will provide you with experience communicating research orally. I encourage you to talk to me about your presentation BEFORE your presentation. Also, if you are not presenting you are expected to contribute to class discussion by asking questions and making comments. You will be marked on the quality of your presentation and on the quality and quantity of your questions/comments during your classmate's presentations.

How to Write Summaries

An important distinction to be made in the critical consumption of psychological research is the difference between DATA and THEORY. DATA is a collection of facts from which conclusions may be drawn and a THEORY is a set of statements or principles devised to explain a group of facts. For the summaries you should review the paper according to this data/theory distinction. In addition, please include a brief question.

As an example, imagine the following experiment. Participants are presented with coloured colour words (e.g., the word BLUE displayed in red) and asked to name aloud the display colour of the word but ignore the word itself. On some trials the word and its display colour will be CONGRUENT (e.g., the word BLUE in blue) and on some trials the word and its display colour will be INCONGRUENT (e.g., the word BLUE in red). In addition, the majority of trials are CONGRUENT. The participant's response time and accuracy in naming the display colours of the words as a function of these two conditions serve as the dependent measure. The following result is typical:

	CONGRUENT	INCONGRUENT
RESPONSE TIME	600 ms	700 ms
ACCURACY	98%	94%

The DATA indicate that subjects were slower and less accurate to respond in the INCONGRUENT condition than in the CONGRUENT condition. My THEORY is that subjects are slower and less accurate in the INCONGRUENT condition relative to the CONGRUENT condition because subjects CANNOT stop themselves from reading the word. Reading the word hurts performance on INCONGRUENT trials but benefits performance on CONGRUENT trials.

Another researcher should be able to run the same experiment in their lab and end up with the same pattern of DATA. However, the other researcher does not have to propose the same THEORY. For example, this other researcher may think that subjects CAN stop themselves from reading the word but that in my experiment they did not stop themselves from reading the word because the majority of the trials were CONGRUENT and, therefore, provided a clue to the correct response. If the current experiment cannot distinguish between these two theories another experiment or experiments needs to be run to test these competing theories. The important lesson here is that one can have numerous theories to explain a given data set. For the above experiment the summary could be as follows. BE BRIEF.

DATA: Subjects were slower to respond and made more errors in the INCONGRUENT condition than in the CONGRUENT condition.

THEORY: The authors claimed that subjects were slower and less accurate in the INCONGRUENT condition relative to the CONGRUENT condition because subjects CANNOT stop themselves from processing the word. Reading the word hurts performance on INCONGRUENT trials but benefits performance on CONGRUENT trials.

QUESTION: What would happen if they asked subjects to name the word and ignore the colour it was displayed in?

Miscellaneous

Computer Stuff

All undergraduate students in the Faculty of Arts may obtain a free computer account on Waterloo Polaris. The account gives students free access to applications such as word processing, statistical and graphics packages, spreadsheets, and electronic mail, as well as the Internet. Students are charged for printing and can put money for printing on to their Arts Computing Resources Account at PAS 1080 using their WATCARD. Instructions for obtaining a Polaris account are available from the Arts Computing Office. Course materials will be available on ACE. If there is a discrepancy between the hard copy outline and the outline posted on ACE, the outline on ACE will be deemed the official version. All work to be handed in will be submitted through ACE.

Students with Disabilities

"Note for students with disabilities: The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term."

Academic Offences

"*Note on avoidance of academic offenses: All students registered in the courses of the Faculty of Arts are expected to know what constitutes an academic offense, to avoid committing academic offenses, and to take responsibility for their academic actions. When the commission of an offense is established, disciplinary penalties will be imposed in accord with Policy #71 (Student Academic Discipline). For information on categories of offenses and types of penalties, students are directed to consult the summary of Policy #71 (Student Academic Discipline) which is supplied in the Undergraduate Calendar (p.1:11). If you need help in learning how to avoid offenses such as plagiarism, cheating, and double submission, or if you need clarification of aspects of the discipline policy, ask your course instructor for guidance. Other resources regarding the discipline policy are your academic advisor and the Undergraduate Associate Dean."*
*In addition, I would like to direct your attention to the following link to the Arts Faculty Web page, "**How to Avoid Plagiarism and Other Written Offences: A Guide for Students and Instructors" (http://watarts.uwaterloo.ca/~sager/plagiarism.html**)*

It is very important that you carefully read through this as many forms of carelessness are considered plagiarism by the university and I am required to report them (e.g., I've lost some/all of my research notes for the paper, so I can't say where everything comes from; but I haven't committed plagiarism because all the stuff was there in my research notes.).

TENTATIVE Schedule and Assigned Readings

The course has no textbook. Our readings consist of source materials (e.g., chapters, journal articles). While most of the papers are short, the information contained in them can be dense so please feel free to ask questions via email or in person.

Date	Topics and Articles
Tuesday January 3	Review the syllabus and assign presentations
Thursday January 5	**Lecture. Chris Blais. Visual Perception.** Hoffman, D. D. (1998). A creative genius for vision. In Visual intelligence: How we create what we see. (pp. 1-17).
Tuesday January 10	**Presentation 1:_____** Sergent, J. (1988). An investigation into perceptual completion in blind areas of the visual field. *Brain, 2*, 347-373. **Presentation 2:_____** Ramachandran, V. S. & Gregory, R. L. (1991). Perceptual filling in of artificially induced scotomas in human vision. *Nature, 350*, 699-702.
Thursday January 12	**Presentation 3:_____** Smith, T. (1973). The susceptibility of Xhosa groups to a perspective illusion. *Journal of Social Psychology, 90*, 331-332. ***Hecht, H. & Proffitt, D. R. (1995). The price of expertise: Effects of experience on the Water-Level Task. *Psychological Science, 6*, 90-95.
Tuesday January 17	**Presentation 4:_____** Chua, H. F., Boland, J. E., & Nisbett, R. E. (2005). Cultural variation in eye movements during scene perception. *Proceedings of the National Academy of Science, 2*, 12629-12633. **Presentation 5:_____** Reingold, E. M., Charness, N., Pomplun, M., and Stampe, D. M. (2001). Visual span in expert chess players: Evidence from eye movements. *Psychological Science, 12*, 48-55.
Thursday January 19	**Presentation 6:_____** Goodale, M. A., Milner, A. D., Jakobson, L. S., & Carey, D. P. (1991). A neurological dissociation between perceiving objects and grasping them. *Nature, 349*, 154-156. **Presentation 7:_____** ***Goodale, M. A., Meenan, J. P., Bulthoff, H. H., Nicolle, D. A., Murphy, K. J., & Racicot, C. I. (1994). Separate neural pathways for the visual analysis of object shape in perception and prehension. *Current Biology, 4*, 604-610.
Tuesday January 24	**Presentation 8:_____** *** Aglioti, S., DeSouza, J. F. X., & Goodale, M. A. (1995). Size-contrast illusions deceive the eye but not the hand. *Current Biology, 5*, 679-685.
Thursday January 26	**DATA COLLECTION** **Assignment 1 Due**
Tuesday January 31	**Lecture Chris Blais.** Reading. Jackson, N. E. & Coltheart, M.. (2001). Dual-Route theories of Reading. In Routes to Reading Success and Failure (pp. 39-70).
Thursday February 2	**Presentation 9:_____** Funnel, E. (1983). Phonological processes in reading: New evidence from acquired dyslexia. *British Journal of Psychology 74*, 159-180.

	Presentation 10:_____ ***Temple, C. M. & Marshall, J. (1983). A case study of developmental phonological dyslexia. *British Journal of Psychology, 74*, 517-533.
Tuesday February 7	**Presentation 11:**_____ *** Coltheart, M., Byng, S., Masterson, J., Prior, M., & Riddoch, M.J. (1983). Surface dyslexia. *Quarterly Journal of Experimental Psychology, 35A*, 469-481. **Presentation 12:**_____ Coltheart, M., Byng, S., Masterson, J., Prior, M., & Riddoch, M.J. (1983). Surface dyslexia. *Quarterly Journal of Experimental Psychology, 35A*, 481-495.
Thursday February 9	**Presentation 1:**_____ ***Waters, G. & Seidenberg, M. S. (1985). Spelling-sound effects in reading: Time course and decision criteria. *Memory & Cognition, 13*, 557-572. **Presentation 2:**_____ Sereno, S. C. & Rayner, K. (2000). Spelling-sound regularity effects on eye fixations in reading. *Perception & Psychophysics, 62*, 402–409.
Tuesday February 14	**Lecture. Chris Blais.** Should We Believe Everything We Read in Emails?
Thursday February 16	**TEST 1**
Tuesday February 21 & 23	**READING WEEK**
Tuesday February 28	**Lecture. Chris Blais.** Selective Attention.
Thursday March 2	**DATA COLLECTION 2**
Tuesday March 7	**Presentation 3:**_____ Cherry, E. C. (1953). Some experiments on the recognition of speech, with one and with two ears. *Journal of the Acoustical Society of America, 25*, 975-979. **Presentation 4:**_____ Moray, N. (1959). Attention in dichotic listening: Affective cues and the influence of instructions. *Quarterly Journal of Experimental Psychology, 11*, 56-60.
Thursday March 9	**Presentation 5:**_____ ***Corteen, R. S. & Wood, B. (1972). Autonomic responses to shock-associated words in an unattended channel. *Journal of Experimental Psychology, 94*, 308-313. **Presentation 6:**_____ Lavie, N. (1995). Perceptual load as a necessary condition for selective attention. *Journal of Experimental Psychology: Human Perception and Performance, 21*, 451- 468.
Tuesday March 14	**Presentation 7:**_____ Rees, G., Frith, C., & Lavie, N. (1997). Modulating irrelevant motion perception by varying attentional load in an unrelated task. *Science, 278*, 1616–1619. **Presentation 8:**_____ *** Lavie, N., Ro, T. & Russell, C. (2003). The role of perceptual load in processing distractor faces. *Psychological Science, 14*, 510-515.
Thursday March 16	**Lecture. Chris Blais.** Are Words Special?

Tuesday March 21	**Presentation 9:**_____ Newby, E. A. & Rock, I. (1998). Inattentional blindness as a function of proximity to the focus of attention. *Perception, 27*, 1025-1040.
Thursday March 23	**Presentation 10:**_____ Rensink, R.A., O'Regan J.K., & Clark, J.J. (1997). To see or not to see: The need for attention to perceive changes in scenes. *Psychological Science, 8*, 368–373. **Presentation 11:**_____ Simons, D. J., & Levin, D. T. (1998). Failure to detect changes to people during a real-world interaction. *Psychonomic Bulletin and Review, 5*, 644-649.
Tuesday March 28	**Presentation 12:**_____ Levin, D. T., & Simons, D. J. (1997). Failure to detect changes to attended objects in motion pictures. *Psychonomic Bulletin and Review, 4*, 501-506.
Thursday March 30th	**TEST 2**