

**Research in Perceptual and Cognitive Processes**  
**Psychology 394**  
**Winter 2006**

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**Office:** PAS 2255      **Office Hours:** 1:00-2:00, Tues. & Thurs  
**Class Location:** PAS 4288      **Time:** 2:30-4:20, 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. 16<sup>th</sup> and Mar. 30<sup>th</sup>) 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 = 25%**

#### *Visual Illusions: Research Report #1 due Jan. 26<sup>th</sup> worth 12.5%*

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 an 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. 30<sup>th</sup> worth 12.5%*

There will be two formal (Jan. 26<sup>th</sup> & Mar. 2<sup>nd</sup>) 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 = 25%**

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 (approximately a third) have three asterisks (\*\*\*) beside them in the schedule.

### **Presentation & Participation = 25%**

Each student will present one paper 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 in 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 your summaries I would like you to summarize the paper according to this data/theory distinction. In addition, please include a brief question.

As an example, imagine the following experiment. I present participants with coloured colour words (e.g., the word BLUE displayed in red) and ask them to name aloud the display colour of the word but ignore the word itself. On some trials the colour word and the colour it's presented in will be CONGRUENT (e.g., the word BLUE in blue) and on some trials the colour word and the colour it's presented in will be INCONGRUENT (e.g., the word BLUE in red). In addition, I made the majority of the trials CONGRUENT. I record participant's response time and accuracy in naming the display colours of the colour words as a function of these two conditions. I get the following result:

	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?

## **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.

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

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

Tuesday March 21	<b>Presented by:</b> _____ Newby & Rock. (1998). Inattention blindness as a function of proximity to the focus of attention. <i>Perception</i> , 27, 1025-1040.
Thursday March 23	<b>Presented by:</b> _____ Rensink, O'Regan, & Clark. (1997). To see or not to see: The need for attention to perceive changes in scenes. <i>Psychological Science</i> , 8, 368-373. <b>Presented by:</b> _____ Simons, & Levin. (1998). Failure to detect changes to people in a real-world interaction. <i>Psychonomic Bulletin &amp; Review</i> , 5, 644-649.
Tuesday March 28	<b>Presented by:</b> _____ Levin, & Simons. (1997). Failure to detect changes to attended objects in motion pictures. <i>Psychonomic Bulletin &amp; Review</i> , 4, 501-506.
Thursday March 30th	<b>TEST 2</b>

### 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>)*