

Psychology 733: Topics in Perception - Part 2

Top-Down Effects in Perception

Spring 2012

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Meetings W 9:30-12:00 Psych (Brogden) 634
Office Hours By appt. Rm 419
Class Website <http://sapir.psych.wisc.edu/wiki/index.php/Psych733>

Course Description

This graduate seminar will give students an overview of top-down effects on perception. Among the topics to be discussed will be: modularity of perception, its (im)penetrability by cognitive factors, interactive information processing in perception, and effects of “high-level” factors on “low-level” processes. Although the readings primarily focus on visual perception, I will introduce examples from other modalities such as audition, olfaction, and proprioception during the discussions. The subject matter we will cover is relevant not only for understanding perception, but comprises an ideal test-bed for contrasting fundamentally different ways of understanding the relationship between brain, world, and behavior.

Readings

Students are expected to read all the assigned papers for each class. We will set up a rotating schedule for several students to organize a presentation for each class. Long papers will be presented by several students. I will do the presentation for the first class as a demonstration, but I encourage each presenter to be innovative and entertaining. It may appear that there is a lot of reading. I will give you strategies at the start of the term for how to quickly read these papers. Readings are available for download on the course site. For copyright reasons, they are password-protected. If you do not know the password, contact me by email.

Expectations

Each student is expected to do all the readings for each week, to participate actively in the discussions, and to write a research paper due March 13th. Many of the readings are filled with jargon and use methods you may not be familiar with. That’s ok. I do not expect you to understand the readings from beginning to end. What is most important is that you understand the big picture. We’ll sort out the details in class.

Evaluation

Participation:	20%
Presentation and leading discussions:	30%
Research paper (2000-3000 words not including refs.):	50%

Here’s how to get yourself an A:

- (1) Question everything and everyone and do it out loud. It doesn’t matter if your question or comment is half-baked. Just say it.

- (2) During your presentations, focus on the big picture and don't sweat the small stuff.
- (3) In your paper, try to draw original connections between the different topics we are covering. Many of the authors we will be reading are not aware of each other's work, so there is plenty of room to draw such new connections.
- (4) Clear your paper topic with me by week 6. I am happy to guide you and provide topic suggestions.

Philosophical Foundations (week 1)

- Fodor, J. A. (1984). Observation Reconsidered. *Philosophy of Science*, 51(March), 23–43.
- Churchland, P. M. (1988). Perceptual Plasticity and Theoretical Neutrality: A Reply to Jerry Fodor. *Philosophy of Science*, 55(June), 167–87.
- Fodor, J. A. (1988). A Reply to Churchland's 'Perceptual Plasticity and Theoretical Neutrality'. *Philosophy of Science*, 55(June), 188–98.

Empirical/Neural Foundations (week 2):

- Pylyshyn, Z. (1999). Is vision continuous with cognition? The case for cognitive impenetrability of visual perception. *Behavioral and Brain Sciences*, 22(3), 341–365.
- Gilbert, C. D., & Sigman, M. (2007). Brain states: Top-down influences in sensory processing. *Neuron*, 54(5), 677–696.
- Lamme, V. A. F., & Roelfsema, P. R. (2000). The distinct modes of vision offered by feedforward and recurrent processing. *Trends in Neurosciences*, 23(11), 571–579.

Further Reading:

- Barlow, H. B. (1997). The knowledge used in vision and where it comes from. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 352(1358), 1141–1147.
- Gregory, R. L. (1997). Knowledge in perception and illusion. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 352(1358), 1121–1127.
- Churchland, P. S., Ramachandran, V., & Sejnowski, T. J. (1994). A Critique of Pure Vision. In C. Koch & J. L. Davis (Eds.), *Large-scale neuronal theories of the brain* (pp. 23–60). Cambridge, MA: The MIT Press.

Object Recognition (week 3)

- Bar, M., Kassam, K. S., Ghuman, A. S., Boshyan, J., Schmidt, A. M., Dale, A. M., Hämäläinen, M. S., et al. (2006). Top-down facilitation of visual recognition. *Proceedings of the National Academy of Sciences of the United States of America*, 103(2), 449–54. doi:0507062103
- Oliva, A., & Torralba, A. (2007). The role of context in object recognition. *Trends in Cognitive Sciences*, 11(12), 520–527. doi:10.1016/j.tics.2007.09.009

Cox, D., Meyers, E., & Sinha, P. (2004). Contextually evoked object-specific responses in human visual cortex. *Science (New York, N.Y.)*, 304(5667), 115–117. doi:10.1126/science.1093110

Lupyan, G., & Spivey, M. J. (2008). Perceptual processing is facilitated by ascribing meaning to novel stimuli. *Current Biology*, 18(10), R410–R412.

Further Reading:

Malcolm, G. L., & Henderson, J. M. (2010). Combining top-down processes to guide eye movements during real-world scene search. *Journal of Vision*, 10(2). doi:10.1167/10.2.4

Ramachandran, V. S., Armel, C., Foster, C., & Stoddard, R. (1998). Object recognition can drive motion perception. *Nature*, 395(6705), 852–853. doi:10.1038/27573

Bulthoff, I., Bulthoff, H., & Sinha, P. (1998). Top-down influences on stereoscopic depth-perception. *Nature Neuroscience*, 1(3), 254–257.

Vecera, S. P., & Farah, M. J. (1997). Is visual image segmentation a bottom-up or an interactive process? *Perception & Psychophysics*, 59(8), 1280–1296.

Adaptation and category-level effects (week 4)

Goldstone, R. L. (1995). Effects of Categorization on Color-Perception. *Psychological Science*, 6(5), 298–304.

Webster, M. A., Kaping, D., Mizokami, Y., & Duhamel, P. (2004). Adaptation to natural facial categories. *Nature*, 428(6982), 557–561. doi:10.1038/nature02420

Levin, D. T., & Banaji, M. R. (2006). Distortions in the perceived lightness of faces: the role of race categories. *Journal of experimental psychology. General*, 135(4), 501–512. doi:10.1037/0096-3445.135.4.501

Further Reading:

Hansen, T., Olkkonen, M., Walter, S., & Gegenfurtner, K. R. (2006). Memory modulates color appearance. *Nature Neuroscience*, 9(11), 1367–1368. doi:10.1038/nn1794

Webster, M. A. (2011). Adaptation and visual coding. *Journal of Vision*, 11(5). doi:10.1167/11.5.3

Information flow and Reverse Hierarchy Theory (week 5)

Ahissar, M., & Hochstein, S. (2004). The reverse hierarchy theory of visual perceptual learning. *Trends in Cognitive Sciences*, 8(10), 457–464.

Juan, C. H., & Walsh, V. (2003). Feedback to V1: a reverse hierarchy in vision. *Experimental Brain Research*, 150(2), 259–263.

Foxe, J. J., & Simpson, G. V. (2002). Flow of activation from V1 to frontal cortex in humans - A framework for defining “early” visual processing. *Experimental Brain Research*, 142(1), 139–150.

Speech (week 6)

Norris, D., McQueen, J. M., & Cutler, A. (2000). Merging information in speech recognition: feedback is never necessary. *The Behavioral and Brain Sciences*, 23(3), 299–325; discussion 325–370.

Noppeney, U., Josephs, O., Hocking, J., Price, C. J., & Friston, K. J. (2008). The effect of prior visual information on recognition of speech and sounds. *Cerebral Cortex*, 18(3), 598–609. doi:10.1093/cercor/bhm091

McClelland, J. L., Mirman, D., & Holt, L. L. (2006). Are there interactive processes in speech perception? *Trends in Cognitive Sciences*, 10(8), 363–369.

Further Reading:

Kraljic, T., Samuel, A. G., & Brennan, S. E. (2008). First impressions and last resorts: how listeners adjust to speaker variability. *Psychological science*, 19(4), 332–338. doi:10.1111/j.1467-9280.2008.02090.x

Language and Vision (week 7)

Meteyard, L., Bahrami, B., & Vigliocco, G. (2007). Motion detection and motion verbs - Language affects low-level visual perception. *Psychological Science*, 18(11), 1007–1013.

Lupyan, G., & Spivey, M. J. (2010). Making the invisible visible: auditory cues facilitate visual object detection. *PLoS ONE*, 5(7), e11452. doi:10.1371/journal.pone.0011452

Thierry, G., Athanasopoulos, P., Wiggett, A., Dering, B., & Kuipers, J.-R. (2009). Unconscious effects of language-specific terminology on preattentive color perception, 106(11), 4567–4570. doi:10.1073/pnas.0811155106

Further Readings:

Lupyan, G. (2012). Linguistically modulated perception and cognition: the label-feedback hypothesis. *Frontiers in Cognition*, 3(54). doi:10.3389/fpsyg.2012.00054

Anderson, S. E., Chiu, E., Huette, S., & Spivey, M. J. (2011). On the temporal dynamics of language-mediated vision and vision-mediated language. *Acta Psychologica*, 137(2), 181–189. doi:10.1016/j.actpsy.2010.09.008

Consciousness and Hallucinations (week 8)

Dehaene, S., Changeux, J.-P., Naccache, L., Sackur, J., & Sergent, C. (2006). Conscious, preconscious, and subliminal processing: a testable taxonomy. *Trends in Cognitive Sciences*, 10(5), 204–211. doi:10.1016/j.tics.2006.03.007

Santhouse, A. M., Howard, R. J., & Ffytche, D. H. (2000). Visual hallucinatory syndromes and the anatomy of the visual brain. *Brain*, 123(10), 2055–2064. doi:10.1093/brain/123.10.2055

Aleman, A., Böcker, K. B. ., Hijman, R., de Haan, E. H. ., & Kahn, R. S. (2003). Cognitive basis of hallucinations in schizophrenia: role of top-down information processing. *Schizophrenia Research*, 64(2–3), 175–185. doi:10.1016/S0920-9964(03)00060-4

Further Readings:

Crick, F., & Koch, C. (1995). Are we aware of neural activity in primary visual cortex? *Nature*, 375(6527), 121–123. doi:10.1038/375121a0

Lamme, V. A. F., Super, H., Landman, R., Roelfsema, P. R., & Spekreijse, H. (2000). The role of primary visual cortex (V1) in visual awareness. *Vision Research*, 40(10-12), 1507–1521.

Collerton, D., Perry, E., & McKeith, I. (2005). Why people see things that are not there: a novel Perception and Attention Deficit model for recurrent complex visual hallucinations. *The Behavioral and brain sciences*, 28(6), 737–757; discussion 757–794.

Schultz, G., & Meizack, R. (1991). The Charles Bonnet syndrome: “phantom visual images.” *Perception*, 20(6), 809 – 825. doi:10.1068/p200809

Where to take complaints about a Teaching Assistant or Course Instructor:

Occasionally, a student may have a complaint about a Teaching Assistant or course instructor. If that happens, you should feel free to discuss the matter directly with the TA or instructor. If the complaint is about the TA and you do not feel comfortable discussing it with him or her, you should discuss it with the course instructor. If you do not want to approach the instructor, make an appointment to speak to the Department Chair, Professor Patricia Devine: chair@psych.wisc.edu.

If your complaint has to do with sexual harassment, you may also take your complaint to Vicky Lenzlinger, Instructional Program Manager, vlenzlinger@psych.wisc.edu. Her office is located on the second floor of the Psychology building, room 222.

If you believe the TA or course instructor has discriminated against you because of your religion, race, gender, sexual orientation, or ethnic background, you also may take your complaint to the Office of Equity and Diversity, room 179-A Bascom Hall, or go to: <http://www.oed.wisc.edu/>

UW Code of Conduct

The UW Student Code of Conduct, including an explanation of what constitutes plagiarism, can be found at <http://students.wisc.edu/saja/misconduct/UWS14.html>. For your own good, Please do not plagiarize.

Ethics of being a student in the Department of Psychology

The members of the faculty of the Department of Psychology at UW-Madison uphold the highest ethical standards of teaching and research. They expect their students to uphold the same standards of ethical conduct. By registering for this course, you are implicitly agreeing to conduct yourself with the utmost integrity throughout the semester.

In the Department of Psychology, acts of academic misconduct are taken very seriously. Such acts diminish the educational experience for all involved – students who commit the acts, classmates who would never consider engaging in such behaviors, and instructors. Academic misconduct includes, but is not limited to, cheating on assignments and exams, stealing exams, sabotaging the work of classmates, submitting fraudulent data, plagiarizing the work of classmates or published and/or online sources, acquiring previously written papers and submitting them (altered or unaltered) for course assignments, collaborating with classmates when such collaboration is not authorized, and assisting fellow students in acts of misconduct. Students who have knowledge that classmates have engaged in academic misconduct should report this to the instructor. For detailed information on how to avoid plagiarism, please see the following website: <http://writing.wisc.edu/Handbook/QuotingSources.html>

Your instructor will contact you if he has concerns about academic misconduct. You will have an opportunity to explain your work and address your instructor's concerns. Following the meeting, if your instructor believes that you engaged in misconduct, he will decide on an action. Following UW protocol, your instructor will inform the Dean of Students' Office of the outcome of the meeting and proposed sanction. Penalties for substantiated cases of academic misconduct include a zero on the assignment or exam, a lower grade in the course, and failure in the course. Repeated acts of academic misconduct may result in more serious actions such as probation or suspension. For complete information on proper conduct, academic misconduct, and sanctions, please see UWS Chapter 14: <http://students.wisc.edu/saja/misconduct/UWS14.html>

Special Needs

The McBurney Disability Resources Center provides a variety of services for those who might need special accommodations. Services can include counseling, testing, and recommending accommodations. Please let us know 2 weeks before each exam if you need extra accommodations, as documented by a McBurney Visa. Contact them at 1305 Linden Drive, 263-2741, or <http://www.mcburney.wisc.edu/>. In addition, the TRIO Student Support Services provides support for low-income families, first generation college students, and students with disabilities. Contact them at 16 Ingraham Hall, 1155 Observatory Drive, 265-5106, or <http://www.education.wisc.edu/trio/>.