PSYC 86: Selective Developmental Deficits
Spring 2013
Tu & Th: 10:00-11:50
X Period: W 3:00-3:50
Moore Hall 303

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Course description:
Cognitive neuropsychology relies on selective deficits to shed light on the organization of the brain. In the past, nearly all selective deficits reported in the neuropsychological literature involved brain-damaged patients who lost particular abilities, but many selective deficits due to failures of development have been identified in recent years. These include deficits affecting computations concerned with color, faces, objects, spatial abilities, music, language, reading, number, and memory. This course will discuss the theoretical basis of selective deficits, examine the cognitive and neural profiles of particular selective developmental deficits, and consider the more general implications of selective developmental deficits and the research opportunities they present.

Course goals
-- Provide a deeper understanding of neurocognitive organization and its development.
-- Improve your capacity to assess the strengths and weaknesses of psychological measures and neuropsychological studies.
-- Develop your ability to identify interesting research questions and the creativity to design experiments to assess these questions.

Grading

Participation: 15%
Paper presentations: 25%
Brief papers: 10%
Project presentation: 20%
Project write-up: 30%

Participation (15%): This course is a seminar so its success depends on your participation. For most classes, we will read several papers and you will need to be prepared to discuss these papers. You should generate at least one discussion question/issue for each reading and email it to me by 9pm the night before class. In some papers, you will encounter methods that you may not fully understand (e.g., fMRI, event-related potentials, genetic analyses), but you will still be able to understand the logic of the experiments and the conclusions. Making sense of a

study even when you don't fully understand is something that scientists have to do frequently. Feedback provided to other students after project presentations will also contribute to your participation mark. Given the centrality of discussions to our class, your attention should be on class the entire period and I will dock points for texting, emailing, web-surfing, etc. **Attendance is mandatory.**
WARNING: If discussions are not up to par due to poor preparation, I may have pop quizzes at the start of class and will factor quiz scores into your final grade.

Paper presentations (25%): Most classes will include two 20-minute presentations about papers related to the topics covered in the assigned readings. The development of oral/visual presentation skills is likely to be valuable for you regardless of what you do after Dartmouth, and most students don't get enough practice with it. These presentations should cover the background literature, the research question and experimental logic, the method, the results, and the implications. When reviewing the background literature, you'll sometimes need to present figures from the key papers that set the stage for the current paper. I will give a paper presentation in the first class to give you a model, though feel free to improvise. We'll have a projector so you can present PowerPoint slides, sample tasks, video clips, etc. Be sure to leave time at the end for questions and discussion. Once enrollment is finalized, you'll choose the readings you'd like to present. If you prefer to present a different paper on one of your assigned topics, please check with me first. I'd recommend getting to know your presentation very well beforehand, delivering it to a friend would be worthwhile. They can let you know what they didn't understand and explaining material is a good aid to developing your understanding.

Brief papers (10%): You will write a brief (1/2 page) thought paper on the readings for each class. You could focus on one issue that you found interesting, further experiments inspired by the readings, a substantial weakness that you believe undermines the conclusions, etc. These papers should not simply be summaries of the articles. Please send me your brief paper via email by 9pm the night before class. This will allow me to scan them for potential discussion questions for class.

Project: Fifty percent of your grade will come from your final project. For it, you will need to become familiar with the literature pertaining to a selective developmental disorder, identify an interesting research question, and design a set of experiments that will address this question. An ideal research question would shed light on a selective developmental disorder **and** on the normal human brain. For example, Duchaine et al. (2006) tested predictions made by the different cognitive accounts of prosopagnosia in a single prosopagnosic participant. The results provided insight into the cognitive deficit in that particular individual, but the more important conclusion was that humans have mechanisms specialized for upright faces.

I'll be happy to meet with you as you attempt to decide on a disorder to focus on, and we should definitely meet as you're choosing a research issue to address. Since you won't be able to carry out your experiments (at least not now), the sky is the limit. If you know enough about fMRI, genetics, ERP, or other techniques to involve them in your project, go for it.

Project presentation (20%): During the final weeks of class, you will give a presentation discussing your project that will last approximately 20-30 minutes (depending upon how many students enroll in the course). You will present your project in the same way that you'd present a completed paper except that you won't have data to present or conclusions to draw. Although you will not present data, you'll probably find it useful to present figures with possible results so you can discuss the implications of different results (For an example, see Figure 2 in Yovel & Duchaine (2006) Journal of Cognitive Neuroscience. Paper is available in the Developmental Prosopagnosia folder). You'll need to explain your tasks to your audience, and you may find it useful to present sample items during your presentation.

Project write-up (30%): Please email me your 8-12 page project write-up by 11pm on Thursday May 30. It should consist of an extended introduction and a method section. I say 'extended introduction' because in addition to the background literature, it should present possible results and what those results would indicate. Although you will not create the experiments you propose, write your method section with the same amount of detail usually included in a typical journal article (not an abbreviated method section like papers in Science or Nature). If your experiments involve imaging, you don't need to specify the nitty-gritty of the scanning protocol and the data analysis (Scanner details; TR; flip angle; etc), but you should be include information necessary to understand how the experiment will work.

Creativity

The best scientific research depends on creativity, and many scientists owe their success more to creativity than intelligence. Creative ideas often arrive in an instant, but extended focus on a set of issues provides the raw materials that can lead to creative insights. Creativity will be central to your final project so I'd advise that you immerse yourself in the literature while trying to identify a research question and an experimental approach.

Lateness and failure to complete major assignments

All papers and presentations are due at the date and time specified. Late papers, without an official documented College excuse (health or family emergency), will be accepted but penalized. No extensions will be granted due to computer failure, roommate difficulties, printing problems, etc. Grades will be reduced by 10% for every 24-hour period a paper is late. According to College policy, there are no excused absences from class for participation in College-sponsored extracurricular activities. Completion of all of the major assignments is necessary to pass the course.

Disabilities

Any student with a documented disability needing academic adjustments or accommodations is requested to speak with me by the end of the second week of the term (Jan 13). All discussions will remain confidential, although the Academic Skills Center may be consulted to verify the documentation of the disability.

Below are the readings. These may change, and I'm open to suggestions.

Mar 26: Introductions, cover syllabus, lecture on cognitive neuroscience approach
Paper Presentation by Prof Duchaine

Mar 28: Brief lecture on acquired selective deficits; method in neuropsych
Work out presentation assignments (X)
Caramazza 06, Moscovitch 97
Group case study: What would you do if you could test Patient CK?

Apr 2: Functional specialization
Sperber chapter (p119-138), Pinker, Cosmides/Tooby primer
Presentations: Pitcher 09
Group case study: ?

Apr 4: Functional specialization, development, and genetics
Ramus 06 (247-260), Marcus chapter 3, Garcia 66
Presentations: Vallortigara 06, Cook 1989

Apr 9: Intro to face processing and its development
Duchaine & Yovel 07, McKone 2009, Sugita 08, Freiwald & Tsao 11
In class: Mangini figure; Double eyes
Presentations: Golarai 07, LeGrand 2003

Apr 11: Cognitive investigations of DP
Duchaine 2006; Russell 2008; DeGutis 2012
Presentations: DeGutis 2007 (Kirsten?)
Group case study: What would you investigate if you could test Edward?

Apr 16: Neural and genetic investigations of DP
Garrido 2009; Thomas 2008; Wilmer 2010
Presentations: Eimer 2012, Duchaine 2007

Apr 18: Dyslexia and specific language impairment
Marcus 06; Ramus 04; Dehaene 2011
Presentations: Bishop 1995; Watkins 2002

Apr 23: Dyscalculia
Butterworth profile; Butterworth 11; Halberda 08; Cohen Kadosh 10
Presentations: Mussolin 2010; Pica 2004

Apr 25: Developmental topographical disorientation
Aguirre 99 (p.1618-); Wolbers 10; Iaria 09; Palmer 10
Presentations: Iaria 05; Maguire 00

Apr 30: Voice agnosia, Amusia, & Color Agnosia

Garrido 2009 (Neuropsychologia), Stewart 11, Hyde 07,
Presentations: Nijboer 07, Peretz 09 Brain

May 2: Visuospatial impairment
McCloskey 95; McCloskey Ch.18
Presentation: Valtonen 2006
Group case study: McCloskey participant

May 7: Memory conditions
LePort 2012; Suddendorf 2009
60 Minutes segments
Presentation: Hurley 2011

X--May 8: Presentations of proposed experiments
May 9: Presentations of proposed experiments
May 16: Presentations of proposed experiments
May 21: Presentations of proposed experiments

May 23: Synesthesia: Intro and cognitive basis (Michael Banissy)
Cohen Kadosh 07 TICS; Ward 13; Witthoft 13
Presentations: Bargary 09; Nikolic 2011

May 28: Synesthesia: Neural & genetic basis
Rouw 10; Brang 2011; Terhune 2011
Presentations: Brang 10
Group case study: Synesthesia investigation

References

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