

PNB 3EV3

Evolutionary Psychology Laboratory Winter 2019

When & Where: Wednesdays 11:30-1:20 in ETB 228 and Fridays 12:30-1:20 in PC 154

Instructors:

Professor: David R. Feinberg feinberg@mcmaster.ca

TA's: Marie Armstrong armstrmm@mcmaster.ca
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Office Hours: By appointment only

Course Content

Students will learn to record and analyze, and manipulate recordings of human speech and/or other vocalizations of human and nonhuman animals, as well as photographing human faces, learning morphing techniques, and testing perceptions of voices and/or faces. Students will learn transferable recording and photography techniques, spectrotemporal analysis, voice manipulations, and spectrographic representation of sound, as well as basic face morphing and analysis techniques. We will be analyzing voices and faces from an online open dataset, test if we can predict facial characteristics based on voice characteristics, and write up that analysis in a lab report.

Registrants are expected to be familiar with research in voice and face perception.

This course is designed to help develop effective, transferable techniques among many facets of scientific research such as acoustic analysis and voice and face manipulation techniques.

This course will be useful for any student pursuing a career in evolutionary psychology, perception, or clinical scenarios involving speech, voice production and/or face perception.

A laptop is not required for this course, but it is highly recommended that if you have one, you bring it to lab.

Required Readings

The required readings are articles and excerpts from both primary research literature and more elementary sources. Readings will be assigned weekly. Students are responsible for *all* of these readings, which, unless otherwise noted, can be accessed through the McMaster library. In the rare event that the reading is not available online, you may have to physically go to the library to find it.

Recording of lectures

Recording of lectures is permitted. Posting any lecture, audio recording, video, photograph, other similar media or any part of the course to the internet on public and/or private websites or apps is strictly prohibited and may result in automatic failure of the course.

Assignments and Grading

Grades will be assigned on the basis of the lab report, and one in-class presentation of their project. The lab report is worth 60% of the grade, and the oral presentation is worth 30% of the final grade. The lab report is due via email on April 2nd. Your final in-class oral presentation of your lab report will be on one of the two final weeks of the course on either March 27, March 29th, April 3 or April 5. 10% of your grade is based on class participation (i.e. discussions about the reading).

If you file acceptable documentation online with the McMaster Student Absence Form (MSAF) or with your Dean of Studies, contact your instructor immediately to figure out how to make up for lost work. For further information about missed work, medical exemptions, exam conflicts, and deferred exams, see <http://mcmaster.ca/msaf/>. You may not use the MSAF as an excuse to skip the oral presentation. If you miss your oral presentation, you will be asked to make up this presentation for your instructor at a later time. MSAF will not exempt you from submitting the lab report, but could give you an extension.

You may submit a maximum of 1 Academic Work Missed request per term. It is YOUR responsibility to follow up with your Instructor immediately (NORMALLY WITHIN TWO WORKING DAYS) regarding the nature of the accommodation.

If you are absent for reasons other than medical reasons, for more than 3 days, or exceed 1 request per term you MUST visit your Associate Dean's Office (Faculty Office). You may be required to provide supporting documentation.

Grades will be computed out of 100 points and converted to a letter grade as follows:

90-100=A+ 85-89=A 80-84=A- 77-79=B+ 73-76=B 70-72=B- 67-69=C+ 63-66=C 60-62=C- 57-59=D+ 53-56=D 50-52=D- <50=F

The instructor reserves the right to adjust final marks up or down, on an individual basis, in light of special circumstances and/or the student's total performance in the course.

Schedule of Topics and Required Readings

There is no textbook for this course. All readings are available either on the course website, on the University's Library Website, and Google Scholar, or physically at the university's libraries. We will not give you the papers, nor should you share them with each other. Part of the assignment is learning how to find a paper on the library's website. Any students caught sharing papers will be considered to be academically dishonest.

The schedule of topics and required readings are available on the course website. Please check often. Any changes to this document will be announced in class and noted on the internet.

E-mail

All students should have McMaster e-mail accounts. If you prefer to receive e-mail at another address, we will try to accommodate your request, but we cannot be responsible for the non-receipt of messages to students using non-McMaster e-mail addresses.

Neither can the instructors be responsible for returning telephone calls from students. Any student wishing to contact an instructor should use e-mail. Please use formal English letter writing style when writing emails to the instructors. Emails starting with colloquial phrases like, “Yo prof” or “Hey”, or using some form of writing typically used in sms messages, 1337, etc. are not acceptable in an academic environment. We expect that at the 3rd year of university, all students will be able to communicate in a professional manner.

Course Web Site

All students registered in this course have access to the course website which you can access under the PNB 3EV3 course listing on the departmental web site, or via avenue.mcmaster.ca. We will post lecture notes, term test feedback, and other course-related materials in this folder. Lecture slides are prepared with care and are often being improved upon until the minute class begins. We will do our best to get you the slides before class begins, but we cannot guarantee this will happen. Slides are not a replacement for taking notes.

Policy Reminder

Your attention is drawn to the Statement on Academic Ethics and the Senate Resolutions on Academic Dishonesty, as found in the Senate Policy Statements distributed at registration and available in the Senate Office. Any student who infringes one of these resolutions will be treated according to the published policy. Academic dishonesty consists of misrepresentation by deception or other fraudulent means and can result in serious consequences, e.g. a grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, at <http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf>

Schedule of topics (subject to change)

Week 1 - Recording voices & basic voice measurements

Readings

<http://music.columbia.edu/cmcc/MusicAndComputers/> • Chapters 1 & 2

Boersma, P., & Van Heuven, V. (2001). Speak and unSpeak with PRAAT. *Glott International*, 5(9-10), 341-347. - Available at:

http://www.fon.hum.uva.nl/paul/papers/speakUnspeakPraat_glott2001.pdf

Lecture

- Reading Review
- How is sound represented digitally?
 - Sampling rates
 - Spectrograms
- Bit depth
- Recording Voices
 - Microphone types
 - Signal to noise ratio
 - Clipping
 - What sounds do you record?
- Sound recording/Analysis software
 - Praat
 - Audacity

Lab

- Voice Lab Visit
 - What is a soundbooth
 - Acoustic foam
 - Record a voice
- Installing Praat
 - View a spectrum
 - View a spectrogram

Week 2 – Source Filter Theory & Pitch

- Fitch, W. T. (2000). The evolution of speech: a comparative review. *Trends in cognitive sciences*, 4(7), 258-267.
- Collins, S. A. (2000). Men's voices and women's choices. *Animal Behaviour* , 60 (6), 773 - 780

Lecture

- Reading review
- Measuring duration, amplitude, and pitch
- Measuring Noise in the voice
 - Jitter
 - Shimmer
 - Harmonics to Noise Ratio
- Research on pitch, duration, & amplitude

Lab

- Measuring Pitch, Harmonics to Noise Ratio, Jitter, and Shimmer by hand
- Using scripts to measure Pitch, Harmonics to Noise Ratio, Jitter, and Shimmer

Week 3 – Formant Frequencies

Readings

- Pisanski, K., Fraccaro, P. J., Tigue, C. C., O'Connor, J. J., Röder, S., Andrews, P. W., ... & Feinberg, D. R. (2014). Vocal indicators of body size in men and women: a meta-analysis. *Animal Behaviour*, 95, 89-99.
- Levitt, Andrea, and Margery Lucas. "Effects of Four Voice Qualities and Formant Dispersion on Perception of a Female Voice." *Psychology of Language and Communication* 22.1 (2018): 394-416.

Lecture

- Formant frequencies
 - What are they?
 - How to derive them
 - How to measure them
 - How to Estimate Vocal Tract Length
- Research on Formant frequencies

Lab

- Measuring formants by hand
- Using scripts to automatically measure formants
- Calculating vocal tract length estimates

Week 4 – Manipulating voices

Readings

Feinberg, D. R., Jones, B. C., Little, A. C., Burt, D. M., & Perrett, D. I. (2005). Manipulations of fundamental and formant frequencies influence the attractiveness of human male voices. *Animal Behaviour*, 69(3), 561-568.

Puts, D. A. (2005). Mating context and menstrual phase affect women's preferences for male voice pitch. *Evolution and Human Behavior*, 26(5), 388-397.

Lecture

- How to normalize amplitude
 - RMS vs Peak
- Reversing Sounds
- How to manipulate pitch
- How to manipulate formants
- How to manipulate pitch and formants
- Applications of these manipulations in research

Lab

- Manipulate pitch
- Manipulate formants
- Combined manipulations
- Normalize amplitude
- Reverse Sounds
- How to do this by hand
- How to automatically script this

Week 5 - Putting it all together

Reading

Pisanski, K., Fraccaro, P. J., Tigue, C. C., O'Connor, J. J., Röder, S., Andrews, P. W., ... & Feinberg, D. R. (2014). Vocal indicators of body size in men and women: a meta-analysis. *Animal Behaviour*, *95*, 89-99.

Maryn, Y., Roy, N., De Bodt, M., Van Cauwenberge, P., & Corthals, P. (2009). Acoustic measurement of overall voice quality: a meta-analysis. *The Journal of the Acoustical Society of America*, *126*(5), 2619-2634.

Lecture

- Compiling the data
- Descriptive statistics
- Visualizing the data
- How to interpret the analyses we conducted
- Pitfalls, gotchas, and fixes

Lab

- Visualize data
- Compute exploratory statistics
- Reanalyze poorly measured voices based on findings

Week 6 – Photography for research

Reading

<https://osf.io/us86m/>

<https://improvephotography.com/photography-basics/> (read full tutorial)

Torrance, J. S., Holzleitner, I. J., Lee, A. J., DeBruine, L. M., & Jones, B. C. (2018). Does head tilt have category-contingent effects on leadership ratings?. *PsyArXiv*. December, 17.

Lecture

- Taking Photographs
- Review of face research

Lab

- Trip to Feinberg lab to take photos

Week 7 – Symmetry and Sexual Dimorphism

Reading

Penton-Voak, I. S., Jones, B. C., Little, A. C., Baker, S., Tiddeman, B., Burt, D. M., & Perrett, D. I. (2001). Symmetry, sexual dimorphism in facial proportions and male facial attractiveness. *Proceedings of the Royal Society of London B: Biological Sciences*, 268(1476), 1617-1623.

Hughes, S. M., Pastizzo, M. J., & Gallup, G. G. (2008). The sound of symmetry revisited: Subjective and objective analyses of voice. *Journal of Nonverbal Behavior*, 32(2), 93-108.

Lecture

- Sex typicality of face shape
- Symmetry

Lab

- Delineate faces
- Measure symmetry & sexual dimorphism

Week 8 – Face morphs and transforms

Reading

Perrett, D. I. (1994). Facial shape and judgements of female attractiveness. *Nature*, 368, 17.

Perrett, D. I., Lee, K. J., Penton-Voak, I., Rowland, D., Yoshikawa, S., Burt, D. M., ... & Akamatsu, S. (1998). Effects of sexual dimorphism on facial attractiveness. *Nature*, 394(6696), 884-887.

DeBruine, L. M. (2002). Facial resemblance enhances trust. *Proceedings of the Royal Society of London B: Biological Sciences*, 269(1498), 1307-1312.

Lecture

- Morphs
- Transforms
- Caricatures

Lab

- Create averages
- Make transforms
- Make caricatures

Week 9 – Face and voice together

Reading

Feinberg, D. R., Jones, B. C., DeBruine, L. M., Moore, F. R., Smith, M. J. L., Cornwell, R. E., ... & Perrett, D. I. (2005). The voice and face of woman: One ornament that signals quality?. *Evolution and Human Behavior*, 26(5), 398-408.

Valentova, J. V., Varella, M. A. C., Havlíček, J., & Kleisner, K. (2017). Positive association between vocal and facial attractiveness in women but not in men: a cross-cultural study. *Behavioural processes*, 135, 95-100.

Lecture

- What (if any) is the relationship between voice and face?

Lab

- Creating face images based on voice (or other) characteristics

Week 10 – Analyzing Face Shape

Reading

- <http://cherry.dcs.aber.ac.uk:8080/wiki/recipes/AnalysingMasculinityFromShape>
- Almanza-Sepúlveda, M. L., Dudin, A., Wonch, K. E., Steiner, M., Feinberg, D. R., Fleming, A. S., & Hall, G. B. (2018). Exploring the morphological and emotional correlates of infant cuteness. *Infant Behavior and Development*, 53, 90-100.

Lecture

- Principle Components Analysis of face shape

Lab

- Principle Components Analysis of face shape

Week 11

Reading

<https://cran.r-project.org/doc/contrib/Karp-Rcommander-intro.pdf>

Lecture

- How to compile and analyze your data

Lab

- Compiling and analyzing your data

Week 12

No reading

In Class Presentations

Week 13

No reading

In Class Presentations