

# Music 227: The Perception and Cognition of Music

## Carleton College, Northfield, MN: Spring 2010

**Instructor:** Justin London  
**Phone:** x4397;

**Office:** 215 Old Music Hall  
Mon. 1:30-3:00  
Wed. 10:00-11:00

### Course Materials

*Methods in Behavioral Research*, 9th Edition, by Paul C. Cozby  
Additional Materials: mp3 files, PDFs in the course folder.

### What is Music 227 about?

There is a long and vibrant program of research in auditory perception and cognition which goes back to the 19th century. This research can tell us a good deal about how and why music (even music from very different times and/or places) sounds and affects us the way it does, as our ears and brains impose fundamental constraints on musical structure. For example, the choice of tones in the construction of a musical scale is limited by the ways we categorize pitches, as well as by the limits of our ability to discriminate between them. This course is an introduction to this research, with a focus on the perception of musical pitch.

### Who is this class for?

Music 227 is aimed at both music students with little or no background in psychology, as well as psychology or biology students with little or no formal training in music. The goal of the course is to introduce you to the discipline and enable you to understand current research in music psychology.

### What will we do in class?

In this class we will examine a number of foundational issues/problems in pitch perception: the categorical perception of pitches (i.e., “hearing notes”), a famous paradox of pitch perception (the “Tritone Paradox”), the phenomenon of perfect or absolute pitch, how pitches and chords give rise to a sense of key, and (last but not least) tone deafness. Teams of students will prepare an introductory presentation of a classic text, will re-run (some) of the experiments in these texts, analyze their data, and present their results to the class. In order to do this, basic aspects of experimental method and design, along with elementary statistical analysis, will be covered in the first part of the course.

I will help each team in preparing relevant demonstrations and stimuli, setting up experimental trials, and with their background research on the topic. Each project will have several components:

- Preparing a summary reading guide of the primary/target article
- Preparing a bibliography of related articles, especially more recent research
- Setting up and running a re-creation of part of a “classic” experiment
- Collating data and performing statistical analyses from that experiment
- Writing up and presenting your results to the class

As you can see from the syllabus, each team will have an intense time of it during their “topic week”; please plan your schedules accordingly. Your **grade** will be based on the following components:

- Midterm Exam (15%): This will be a take-home exam given at the end of the 4th week.
- Group Project (55%): breakdown for component parts TBA; this may vary based on topic.
- Final Project (30%): a proposal for an music perception/cognition experiment in an area of your choice, including bibliography, experimental hypothesis, proposed research method and mode of analysis.

Please consult the syllabus regarding the due dates for various assignments. Your Final Project will be chosen in consultation with Prof. London.

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**SYLLABUS OF LECTURES AND CLASS ACTIVITIES**

<b>Date</b>	<b>Class topic #1</b>	<b>Class Topic #2</b>	<b>Readings, Homework</b>
3.30	Introduction to the class: syllabus, book, materials, activities, grading.	An overview of research areas in music perception and cognition	Butler on Music Psychology
4.1	Describing music: physicists, psychologists, musicians, and ordinary listeners.	A <u>very</u> quick introduction to the rudiments of music	Handout; Musical Examples in Course Folder; Cozby Chs 1, 2
4.6	Finishing up musical rudiments.	Basic Aspects of Perception and Psychophysics	Boring on Perception and Psychophysics
4.8	Prof. Fernan Jaramillo, Guest lecture	An introduction to the cochlea: place vs. periodicity theories of pitch	Purves on the Auditory System
4.13	The MOZART EFFECT©	STATS I: Descriptive Statistics: Means, Medians, and Variability	Rauscher, Shaw, & Ky; Cozby CH 12
4.15	Experimental Design	2x2 ANOVA test run	Cozby CHs 4, 5, 8, 9
4.20	More Experimental Design	STATS II: Inferential Stats: The t-test, ANOVA, and Chi-Square	Cozby CHs 10, 12, 13
4.22	Pitch Perception and Discrimination	<u>Team #1</u> : Run Trial: Categorical Perception of intervals	Moore on Pitch; Burns and Ward on Categorical Perception
4.27	<u>Team #1</u> : Data Presentation	Categorical Perception of other parameters; context & affordance.	Clarke on Categorical Perception of Rhythm
4.29	Pitch Direction: Height and Chroma	<u>Team #2</u> : Run Trial	Shepherd on Pitch; Deutsch on the Tritone Paradox
5.4	<u>Team #2</u> : Data Presentation	Music and Language	Patel on music-language relations
5.6	Absolute Pitch: A Special Kind of Auditory Memory	<u>Team #3</u> : Run Trial	Ward on "classic" AP; Levitin on AP in Pop Music
5.11	<u>Team #3</u> : Data Presentation	Context is Important: a Lesson from Li, Logan, and Pastore	Li, Logan, and Pastore
5.13	Musical Keys: Some More Music Theory	<u>Team #4</u> : Run Trial	Krumhansl and Kessler on Tonality
5.18	<u>Team #4</u> : Data Presentation	Key Perception and Musical Geometry	--
5.20	Amusia: A window into the neurobiology of music	<u>Team #5</u> : Run Trial	Peretz on Amusia; the Motreal Test Battery
5.25	<u>Team #5</u> : Data Presentation	The pros and cons of online testing	TBA
5.27	THIS CLASS LEFT INTENTIONALLY BLANK	THIS CLASS LEFT INTENTIONALLY BLANK	THIS CELL LEFT BLANK
6.1	JML Presents Work on Tempo Perception	Preparations for final projects	

**FINAL PROJECTS Due 5:00 PM, Monday June 7th.**

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**M227 Course Readings**

1. Butler, David. "Introduction" from *The Musician's Guide to Music Perception and Cognition*. New York: Schirmer Books (1992): 1-14.
2. Hallam, Susan, Cross, Ian, and Thaut, Michael. Table of Contents, *Oxford Handbook of Music Psychology*. Oxford: Oxford University Press (2009): v-viii.
3. Boring, Edwin G. *Sensation and Perception in the History of Experimental Psychology*. New York: D. Appleton-Century Co. (1942): 3-18; 34-45.
4. Purves, Dale "The Auditory System." In *Neuroscience*, 4th ed. Ed. Dale Purves, George J. Augustine, David Fitzpatrick, et al. Sunderland: Sinauer Associates (2008): 313-342.
5. Rauscher, Frances H., Shaw, Gordon L, and Ky, Katherine N. "Music and Spatial Task Performance." *Nature*, **365** (1993): 611.
6. Moore, Brian C. J. "Pitch Perception" in *An Introduction to the Psychology of Hearing*, 5th edition. New York: Elsevier Academic Press (2004): 195-214; 230-31.
7. Burns, E. M., & Ward, W. Dixon. "Categorical perception: Phenomenon or epiphenomenon? Evidence from experiments in perception of melodic musical intervals." *Journal of the Acoustical Society of America* **63** (1978): 456-468.
8. Clarke, Eric F. "Categorical Rhythmic Perception: An Ecological Perspective." in *Action and Perception in Rhythm and Music*, ed. Alf Gabrielsson. Stockholm: Royal Swedish Academy of Music **55** (1987): 19-33.
9. Shepherd, Roger. "Circularity in Judgements of Pitch." *Journal of the Acoustical Society of America* **36** (1964): 2345-53.
10. Deutsch, Diana. "The tritone paradox: An influence of language on music perception." *Music Perception* **8.4** (1991): 335-47.
11. Patel, Aniruddh. "Language, music, syntax, and the brain." *Nature Neuroscience* **6.7** (2003): 674-681.
12. Ward, W. Dixon. "Absolute Pitch" in *The Psychology of Music, 2nd ed.* Ed. Diana Deutsch. San Diego: Academic Press (1999): 265-298.
13. Levitin, Daniel. "Absolute memory for musical pitch: Evidence from the production of learned melodies." *Perception & Psychophysics* **56.4** (1994): 414-423
14. Li, Xiaofeng, Logan, Robert J. and Pastore, Richard E. "Perception of acoustic source characteristics: Walking sounds." *Journal of the Acoustical Society of America* **90** (1991): 3036-49.
15. Krumhansl, Carol, & Kessler, Edward. "Tracing the dynamic changes in perceived tonal organization in a spatial representation of musical keys." *Psychological Review* **89** (1982): 334-68
16. Bregman, Albert. *Auditory Scene Analysis: The Perceptual Organization of Sound*. Cambridge, MA: MIT Press (1990): 1-29.
17. Peretz, Isabelle, Champod, Anne Sophie, and Hyde, Krista. "Varieties of musical disorders: The Montreal battery of evaluation of amusia." *Annals of the N.Y. Academy of Sciences* **999** (2003): 58-75.