BIBB 060: Music and the Brain

Thursday, 2-5 Room 202 Lynch

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Every human culture that has ever been described makes some form of music. The musics of different cultures cover a wide range of styles, but also display fascinating similarities, and a number of features are shared by even the most disparate musical traditions. Within our own culture, music is inescapable- there are very few individuals who do not listen to some form of music every day, and far more who listen to music virtually all day long. Appreciation of music comes very early- newborns prefer music to normal speech, and parents all over the world sing to their babies, and what’s more, they do so in a fundamentally similar way. And yet, despite this seeming ubiquity, the real origin and purpose of music remains unknown. Music is obviously related to language, but how? Why do so many cultures make music in such similar ways? What goes into the formation of musical "taste" and preferences? What is the nature of musical ability, and how do musicians differ from non-musicians? Does music have survival value, either for the individual or for the group, or is it merely "auditory cheesecake", a superfluous byproduct of evolution?

In this course, we will look for answers by looking at the brain. Almost 200 years of scientific research into brain mechanisms underlying the production and appreciation of music is increasingly shedding light on these and other questions. Although the sciences and the arts are often seen as entirely separate or even in opposition, studying the brain is actually telling us a lot about music, and studying music is telling us just as much about the brain.

Class meets weekly, Thursdays from 2-5 in room 202, Lynch Laboratories (and sometimes, Leidy 12). Most classes will be divided into two parts, separated by a short break (\* \* \*). There will be weekly readings from classic texts but also from the primary literature, and short assignments from time to time to help guide you through the reading. Grades will be based on these assignments *(20 points),* a take-home midterm *(30 points),* and a presentation and short paper on a topic of your choice *(50 points).*

CLASS DATE TOPIC

1 Sept 3 **Overture**

Introduction to biomusicology, ethnomusicology

and the study of musical universals.

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Overview of topics and techniquesCLASS DATE TOPIC

2 Sept 10 **Musical universals (and near-universals) II**

*Reading:* ([Peretz, 2006](#_ENREF_15)) *Optional readings:* ([Nettl, 2000](#_ENREF_13)), ([Brown and Jordania, 2011](#_ENREF_4))

Musical universals, part II: *listening* for musical universals \* \* \*

Intro to neurons, part 1: Cajal and the neuron doctrine

3 Sept 17 **Developmental neuromusicology**:

*Reading:* ([Trehub, 2003](#_ENREF_19))

The musical predispositions of infants

*Discussion: predispositions, or early learning?*

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*Guest speaker:* Melanie Cedrone, Biomedical library specialist Using Pubmed, Psychinfo, and Scopus

Intro to neurons, part 2: the resting potential

4 Sept 24 **From sound to brain**

*Reading****:*** Chapters 2 and 3([Pierce, 1992](#_ENREF_16))

Intro to neurons, part 3: the action potential

*Lab: neuron demo in Leidy 12*

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Sound, strings and standing waves

The ear (and especially, the cochlea)

5 Oct 1 **Pitch and periodicity**

*Reading:* ([McDermott and Oxenham, 2008](#_ENREF_11), ) ([Loui et al., 2010](#_ENREF_8)).; *optional reading:* ([Bendor and Wang, 2006](#_ENREF_1)) ([Zatorre, 2003](#_ENREF_19)),.

Pitch salience and relative pitch

*Lab exercise: analysis of sounds with and without pitch*

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Absolute pitch

6 Oct 8 **Consonance and dissonance**

*Reading:* Chapter 5 in([Pierce, 1992](#_ENREF_16))**;** ([Tramo et al., 2001](#_ENREF_18))

Historical perspective: Pythagoras, Galileo and Newton

Helmholtz, beating and “roughness”

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Search for and research topics for final projects

7 Oct 15 **Consonance and dissonance 2: consonance = harmonicity?**

*Reading:* Chapter 6 in([Pierce, 1992](#_ENREF_16))**;** ([McDermott et al., 2010](#_ENREF_10))**;**([Cousineau et al., 2012](#_ENREF_6))

Consonance, harmonicity and tonal fusion

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*Lab: sound spectra part II- intervals*

Discuss final projects

8 Oct 22 **Scales (or, Pythagoras n’ me):**

*Reading:* Chapter 4 in ([Pierce, 1992](#_ENREF_16)); Chapter 10 (Deutsch, 1999)

9 Oct 29 **Comparative approaches: the music (?) of animals**

*Readings:* Chapters 4 and 5, excerpts ([Brown et al., 2000](#_ENREF_5)) ([McDermott and Hauser, 2007](#_ENREF_9))

Song learning and performance in zebra finches

Special guest vocalist: Dr. Marc Schmidt, Department of Biology

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Comparative approaches: do animals make music?

**For classes 10-14 the second half of class will be used for student presentations**

10 Nov 5 M**usic, language, and laterality**:

*Reading:* ([Patel, 2003](#_ENREF_14)) ([Koelsch, 2005](#_ENREF_7))

11 Nov 19 M**usic, language, and laterality**, part 2:

The conversation continues.

*Reading: T.B.A.*

12 Nov 19 **Music and emotion:**

*Readings:* ([Blood et al., 1999](#_ENREF_2)) ([Menon and Levitin, 2005](#_ENREF_12)) ([Salimpoor et al., 2011](#_ENREF_17))

13 Nov 26 TBA *class left blank to allow for wiggle room in the syllabus*

14 Dec 3 **Finale: recap of major themes**

Evolution and origin of music

*Reading:* ([Brown, 2003](#_ENREF_3))

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Trehub SE (2003) The developmental origins of musicality. Nat Neurosci 6:669-673.

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