Loftier Claims

Music, Culture, Evolution
Issues and Music and Sciences
Dr. David John Baker
HU Berlin, Winter 2020

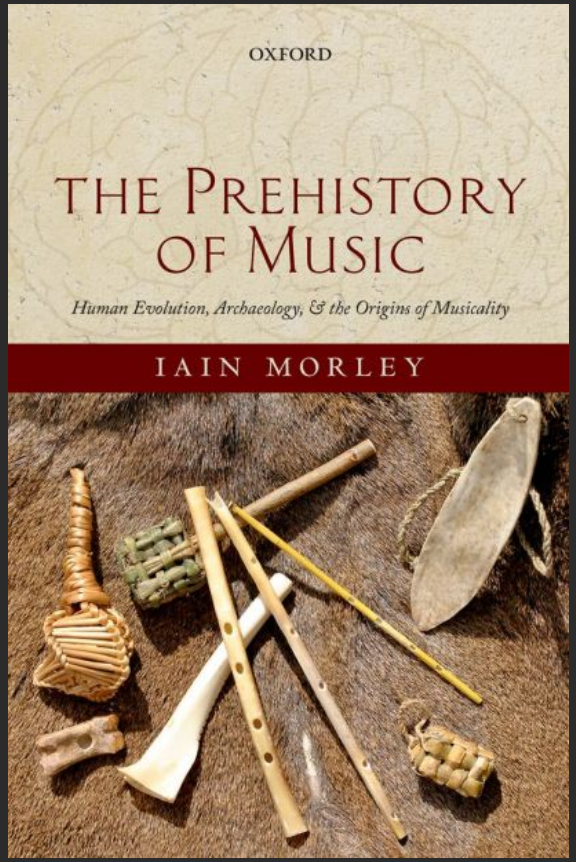
Outline

I. Music + Evolution is popular and heated area of music + science research
II. There's no going back in time to see what happened, so scientists try to piece together corroborating facts with theory
III. Though we can't look at earlier humans, we can look at other parts of the phylogenetic tree for answers
IV. All of this research depends heavily on what you even call music (not a scientific question)

Music and Pre-History

Music from a long time ago

- Origins of music have always been serious area of interest for..
  - Music Theorists
  - Music Psychologists
  - Anthropologists
  - Archeologists
  - Biologists (Darwin)
- “Origin” presents special problems because we don’t have a time machine to go back and see what people were doing thousands of years ago
- Have to find new ways to solve these problems



Discussion Question

What problems are there with studying music from hundreds of years ago that we don’t face studying the music of today?

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What problems are there with studying music from hundreds of years ago that we don't face studying the music of today?

- Not able to run experiments
- Scant data available
- Historical data is interpreted with present frameworks (presentism)
- Sound recording not available prior to 19th century
- Musical notation + writing not part of all cultures (oral traditions)
- Can't ask performers about their musical practices and culture

Starting Point Definitions

- In order to study anything, we need to have some idea what we are looking for or why we are looking for it
- Origin of Music
  - → Look at what we call music today, look for similar traces of behavior
  - → What we call music today comes with contemporary and cultural specific assumptions
- Find evidence from multiple sources that corroborate similar story

What evidence can we see?

- Ancient instruments (sound makers)
- Vocal Anatomy

Ancient Instruments

- Looking at instruments allows researchers to investigate what was possible
- The physical affordances of instrument will give clues as to what could be done
- Presumably acoustical properties will remain the same
- Piped Instruments (Aerophones)
  - Bone pipes found that date back to 40,000 years ago
  - Only materials that do not decay (tree bark, wood) will survive
  - Absence of evidence must not be taken for evidence of absence!

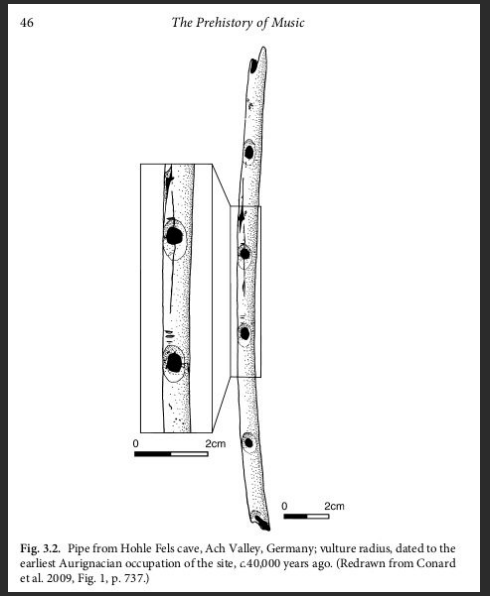


Fig. 3.2. Pipe from Hohle Fels cave, Ach Valley, Germany; vulture radius, dated to the earliest Aurignacian occupation of the site, c.40,000 years ago. (Redrawn from Conard et al. 2009, Fig. 1, p. 737.)

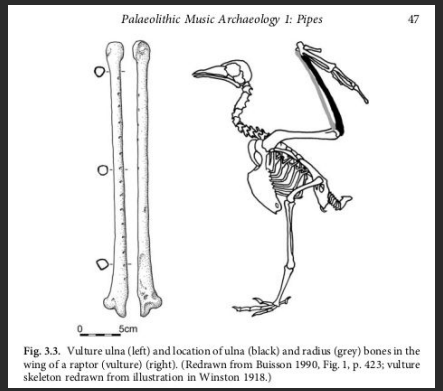
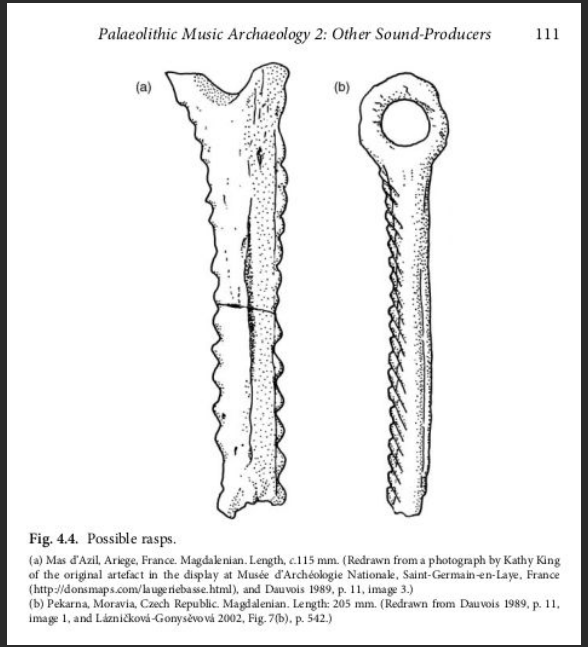


Fig. 3.3. Vulture ulna (left) and location of ulna (black) and radius (grey) bones in the wing of a raptor (vulture) (right). (Redrawn from Buisson 1990, Fig. 1, p. 423; vulture skeleton redrawn from illustration in Winston 1918.)

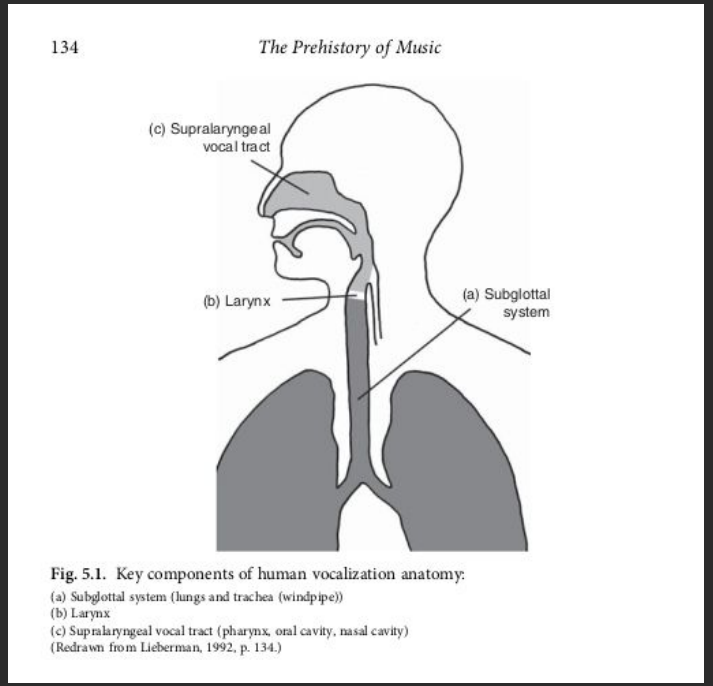
Ancient Instruments

- Possible preoccupation with melodic instruments (Morley, p.109)
  - Shows how in looking for something we bring values
  - We impose what we know on what we don't
- Percussive Instruments very important to music of world cultures
  - Percussive instruments dominate in many cultures
  - Only find evidence where it can be left behind, nothing of when for example sound is made by hitting your own body
- Use of objects is open to debate while human agency in construction, not so much



Vocal Anatomy

- Can’t preserve old sounds, but you can look at what might have made those sounds
- Fossil evidence in reconstructing evolutionary tree allows building evidence in support of ideas (induction)
- Music in modern, Western society tends to be instrumental (and people think of it as that)
    - Musicians and singers anyone?
- Examine vocal tracts of fossils



Vocal Anatomy

- In order to make something like song, need to be able to sustain some sort of pitch
  - Depends on air cavity of lungs
  - How skull and tongue can manipulate changes
  - Similar to thinking of physical affordances of flute
- Fossil evidence of similar species will allow for better approximation of when certain sounds became possible

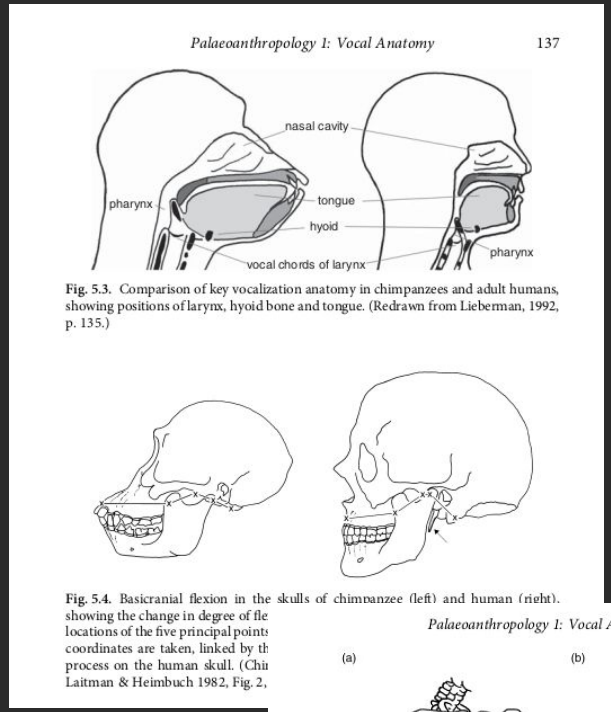


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Fig. 5.3. Comparison of key vocalization anatomy in chimpanzees and adult humans, showing positions of larynx, hyoid bone and tongue. (Redrawn from Lieberman, 1992, p. 135.)

Fig. 5.4. Basicranial flexion in the skulls of chimpanzee (left) and human (right), showing the change in degree of fle
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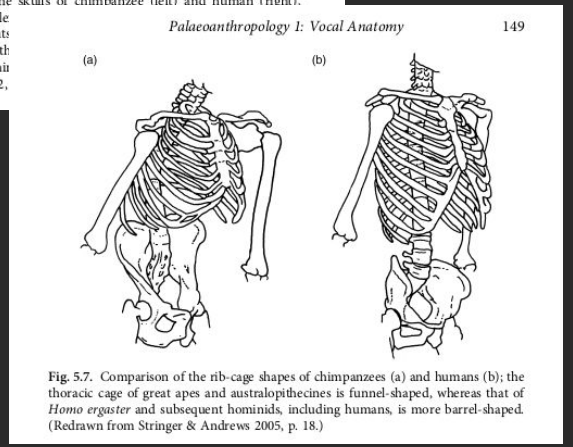


Palaeoanthropology 1: Vocal Anatomy 149

Fig. 5.7. Comparison of the rib-cage shapes of chimpanzees (a) and humans (b); the thoracic cage of great apes and australopithecines is funnel-shaped, whereas that of *Homo ergaster* and subsequent hominids, including humans, is more barrel-shaped. (Redrawn from Stringer & Andrews 2005, p. 18.)

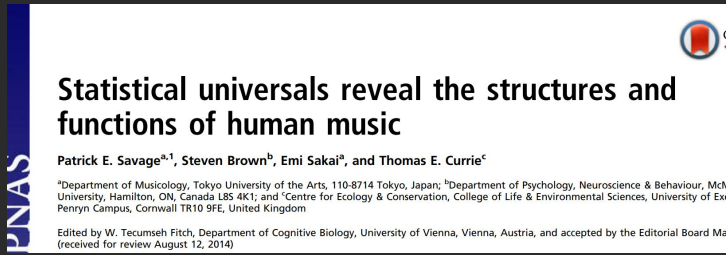
Universality, Ethnocentrism, Adaptationism

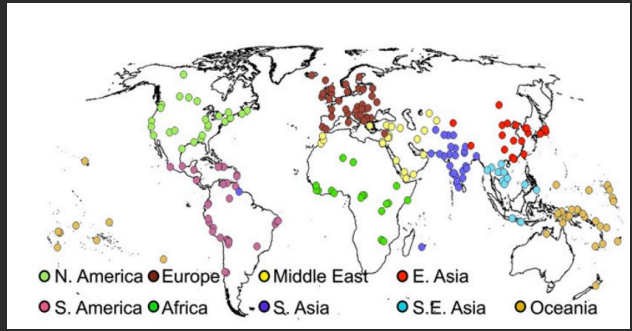
Ethnomusicology

- Modern attempts to study music of the world over past century have fallen into realm of ethnomusicology
- Ethnomusicology ~can~ be described as music of non-White, non-Europeans and faces critique based on their positionality
- Important to establish that when looking at the music of another people, place, or time that we do not bring with our values (always proves more difficult than initially thought)

The Search for Universals

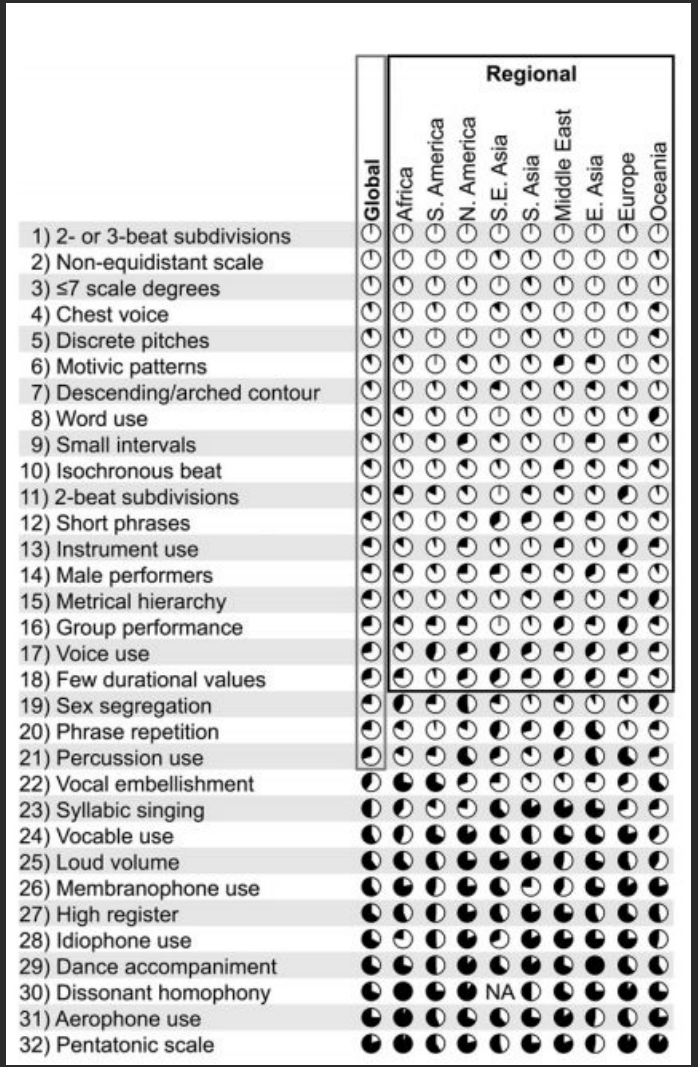
- In addition to pursuit of “origin” of music, many researchers are also interested in the idea of musical universals
- History of search for universals seen in review of articles
- Savage and colleagues recently proposed idea of statistical universals as opposed to absolute?
- Considering the problem of induction, why would Savage and authors make a claim saying these universals are statistical (happen frequently) rather than absolute?





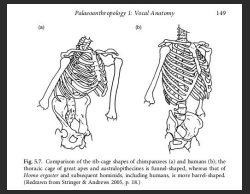
Savage's Statistical Universals

What other factors might contribute to idea of discrete pitch? Sex segregation? Dance accompaniment? Aerophone use?



Evidence Thus Far

- See so far that we have evidence of what many people would call music throughout various points in time
- Also see similar properties or features of music in many contemporary cultures
- Does it follow that “music is a universal language”?
  - Why might someone want this to be true?
  - Whose definition of music does this describe?
  - Where did it originally come from?



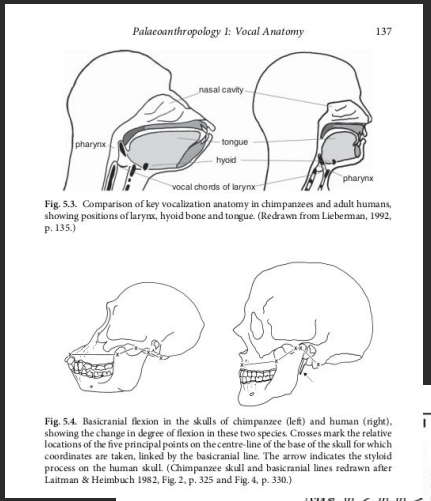


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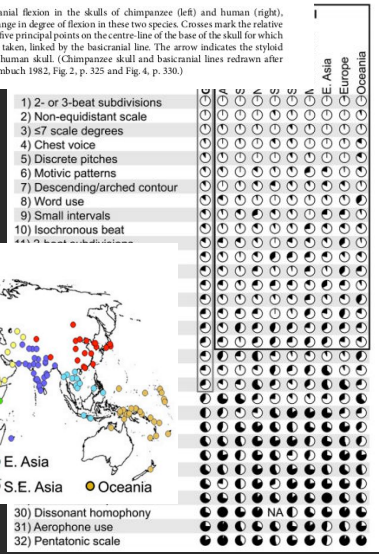
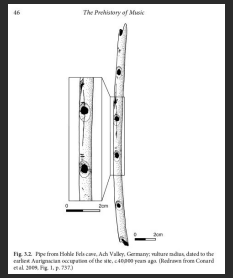
Fig. 5.4. Basicranial flexion in the skulls of chimpanzee (left) and human (right), showing the change in degree of flexion in these two species. Crosses mark the relative locations of the five principal points on the centre-line of the base of the skull for which coordinates are taken, linked by the basicranial line. The arrow indicates the styloid process on the human skull. (Chimpanzee skull and basicranial lines redrawn after Laitman & Heimbuch 1982, Fig. 2, p. 325 and Fig. 4, p. 330.)





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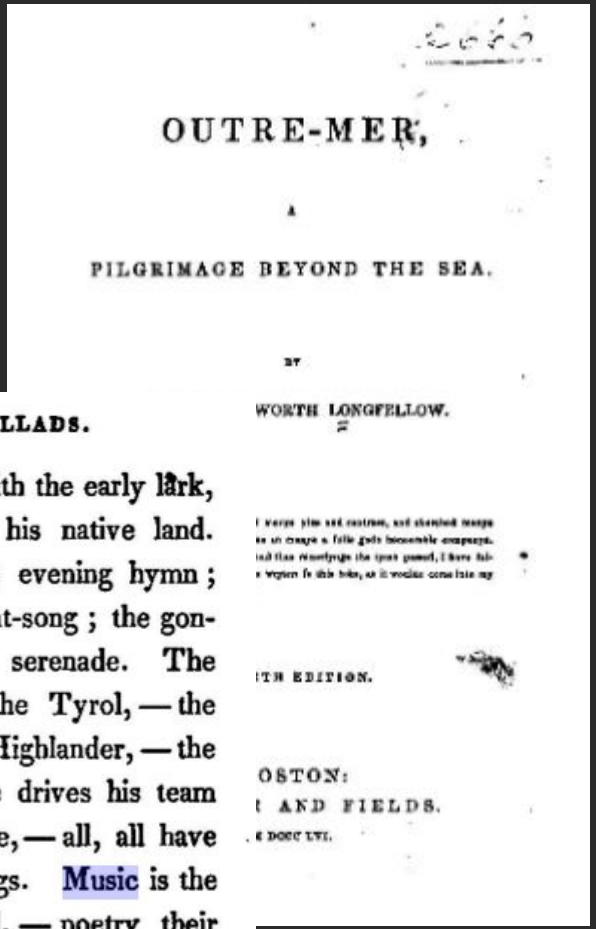
Music as Universal Language

- Longfellow, American Writer/Poet
- Outre-Mer: Pilgrimage Beyond the Sea (1835)
- Whose definition of music for Longfellow?



OUTRE-MER,

A

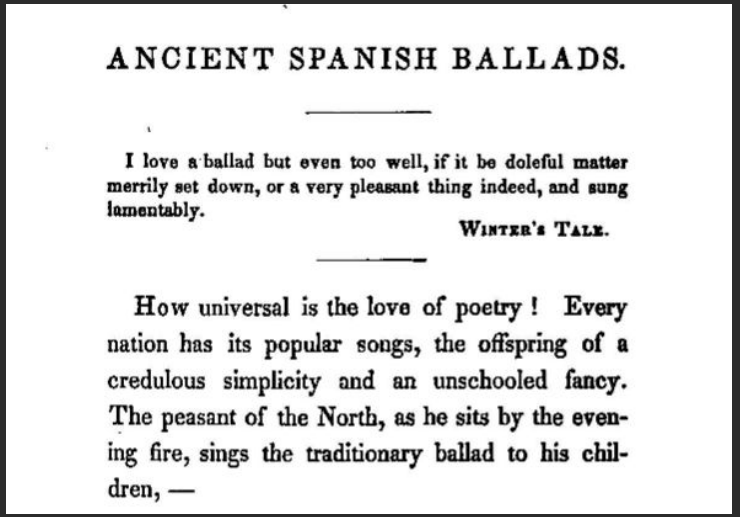
PILGRIMAGE BEYOND THE SEA.

BY

WORTH LONGFELLOW.

ITH EDITION.

OSTON:
AND FIELDS.

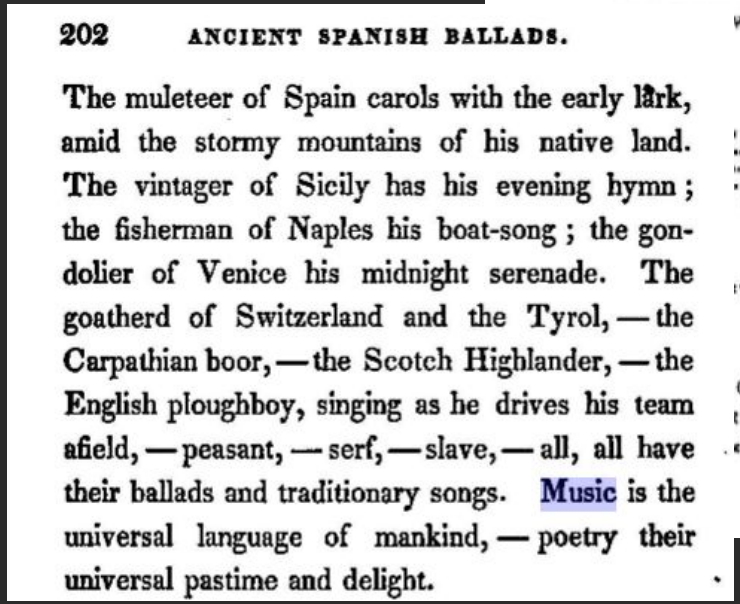


ANCIENT SPANISH BALLADS.

I love a ballad but even too well, if it be doleful matter merrily set down, or a very pleasant thing indeed, and sung lamentably.

WINTER'S TALE.

How universal is the love of poetry! Every nation has its popular songs, the offspring of a credulous simplicity and an unschooled fancy. The peasant of the North, as he sits by the evening fire, sings the traditionary ballad to his children, —



202 ANCIENT SPANISH BALLADS.

The muleteer of Spain carols with the early lark, amid the stormy mountains of his native land. The vintager of Sicily has his evening hymn; the fisherman of Naples his boat-song; the gondolier of Venice his midnight serenade. The goatherd of Switzerland and the Tyrol, — the Carpathian boor, — the Scotch Highlander, — the English ploughboy, singing as he drives his team afield, — peasant, — serf, — slave, — all, all have their ballads and traditionary songs. Music is the universal language of mankind, — poetry their universal pastime and delight.

Building Off Claims

- Longfellow and idea of music universal used recently in *controversial* Science Paper (2019)
- Team of researcher led by post-doctoral researcher Sam Mehr
- Article uses similar corpus approach as Savage et. al to make further claims of this
- Will use this paper as guide to show example of review paper

RESEARCH

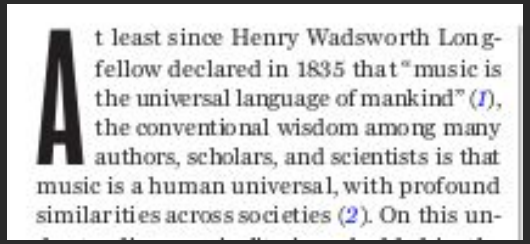
RESEARCH ARTICLE

PSYCHOLOGY OF MUSIC

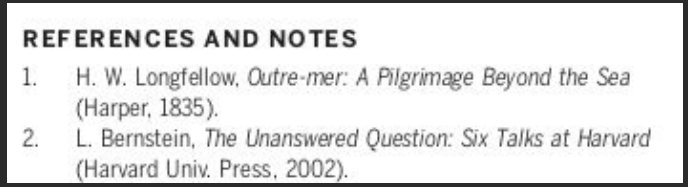
Universality and diversity in human song

Samuel A. Mehr[1,2,3]*, Manvir Singh[4]*, Dean Knox[5], Daniel M. Ketter[6,7], Daniel Pickens-Jones[8], S. Atwood[2], Christopher Lucas[9], Nori Jacoby[10], Alena A. Egner[2], Erin J. Hopkins[2], Rhea M. Howard[2], Joshua K. Hartshorne[11], Mariela V. Jennings[11], Jan Simson[2,12], Constance M. Bainbridge[2], Steven Pinker[2], Timothy J. O'Donnell[13], Max M. Krasnow[2], Luke Glowacki[14]*

What is universal about music, and what varies? We built a corpus of ethnographic text on musical behavior from a representative sample of the world's societies, as well as a discography of audio recordings. The ethnographic corpus reveals that music (including songs with words) appears in every society observed; that music varies along three dimensions (formality, arousal, religiosity), more within societies than across them; and that music is associated with certain behavioral contexts such as infant care, healing, dance, and love. The discography—analyzed through machine summaries, amateur and expert listener ratings, and manual transcriptions—reveals that acoustic features of songs predict their primary behavioral context; that tonality is widespread, perhaps universal; that music varies in rhythmic and melodic complexity; and that elements of melodies and rhythms found worldwide follow power laws.



At least since Henry Wadsworth Longfellow declared in 1835 that "music is the universal language of mankind" (*1*), the conventional wisdom among many authors, scholars, and scientists is that music is a human universal, with profound similarities across societies (*2*). On this un-



REFERENCES AND NOTES

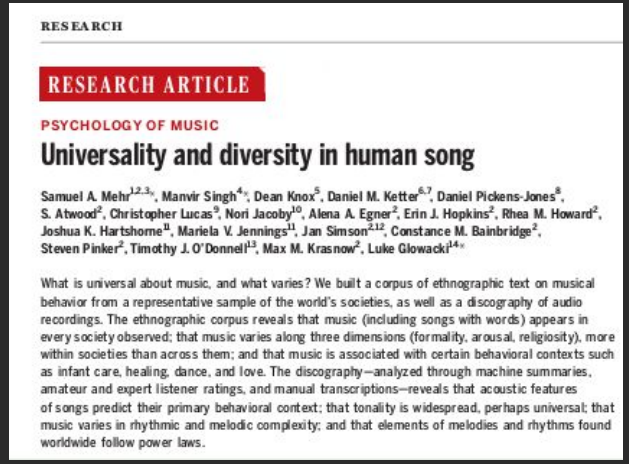
1. H. W. Longfellow, *Outre-mer: A Pilgrimage Beyond the Sea* (Harper, 1835).
2. L. Bernstein, *The Unanswered Question: Six Talks at Harvard* (Harvard Univ. Press, 2002).

Review IMS Paper Requirements

- Introduction
  - Provide context and rationale for target paper
  - Identify author’s goals and motivations
- Methods
  - Demonstrate you understand what the authors did
  - Use class glossary to connect terms with choices in paper
- Critique
  - Find issues with paper where you have insight
- Assertions
  - Suggest what they could do differently

Paper ~ Introduction

- Context and Rationale
  - Long humanistic history of music and universality
  - Even examples within field of music
    - Corpus work from Savage et. al
    - Work of Alan Lomax
    - Blacking
  - Authors contributing to music + universal literature
- Author's Goals and Motivations
  - Establish via a corpus study that music is universal
  - Appear to be motivated so that answer is that music has universal properties



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Critique ~ Methods

- Demonstrate you know what authors did
  - Use corpus approach to look for examples of music in cultures
  - Explain in detail paper's Figure 1
- Use glossary to establish thinking
  - Use inductive argument to assert universality of music
  - Paper fails to operationalize music
  - No deductive claims are made
  - Difficult to justify any sort of falsification since examples where music was not found, they went looking for where it was.

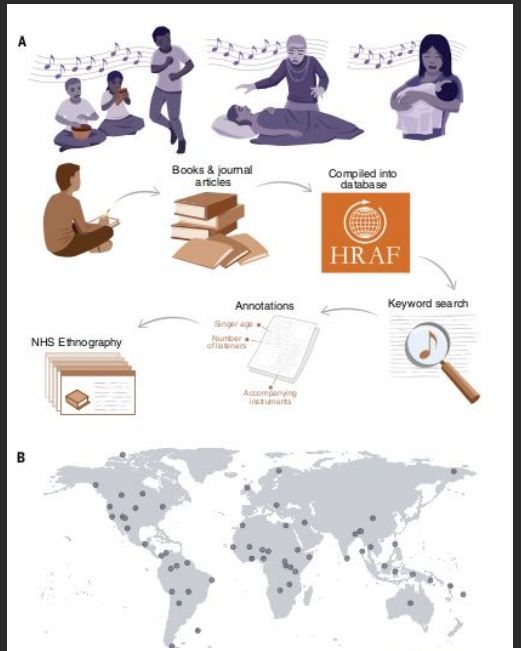

Fig. 1. Design o
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Probability Samp
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outside the database (*63*–*68*). Thus, music is present in 100% of a large sample of societies, consistent with the claims of writers and scholars since Longfellow (*1*, *4*, *5*, *10*, *12*, *53*, *54*, *58*–*60*, *69*–*73*). Given these data, and assuming that the sample of human societies is representative, the Bayesian 95% posterior credible interval for the population proportion of human societies that have music, with a uniform prior, is [0.994, 1].

Paper ~ Critique

- Find issue where you have insights
  - Lack of Engagement with Musicological/Ethnographic literature
  - Even Savage paper not cited
  - Historical quote typically not good way to couch scientific theory
  - Leonard Bernstein is not representative of “authors, scholars, and scientists”. Reading the literature would actually suggest many people oppose these types of questions
  - Questions of induction and deductive claims not clearly established
  - Paper has little engagement of theory that would produce the data

Paper ~ Assertions

- Suggest what authors could do differently
- In actual paper
  - Adopt operational definition of music
  - Engage with more of musicological literature
  - Not switch between Bayesian methods that are claims of subjective, inductive modeling and frequentist methods that presume ability to deductively assert falsifiable claims
- Needs to engage with literature that discusses why these types of claims are harmful to cultures being investigated
- Acknowledge in paper that people of cultures investigated might not conceptualize their behavior in the methods shown here

Break

Cross Species Work

Cross Species Work

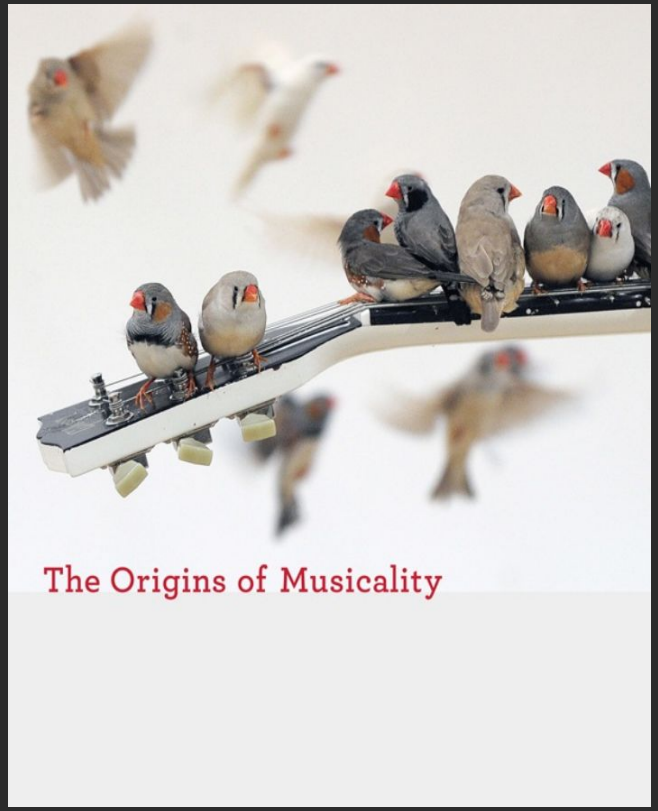

Figure P.1 Participants of the 2014 Lorentz Workshop "What Makes Us Musical Animals? Cognition, Biology and the Origins of Musicality." Top row, from left to right: Carel ten Cate, Willem Zuidema, Hugo Merchant, Marisa Hoeschele. Middle row: Simon E. Fisher, Yukiko Kikuchi, David Huron, Laurel J. Trainor, Martin Rohrmeier, Judith Becker, Jessica Grahn, Yuko Hattori, Bruno Gingras, Geraint A. Wiggins. Bottom row: Isabelle Peretz, W. Tecumseh Fitch, Ani Patel, Björn Merker, Henkjan Honing, Iain Morley, Sandra E. Trehub. Not in Picture: Peter Tyack, Constance Scharff, and Julia Kursell. Photographer: Merwin Olthof.

Shared Abilities

- Idea with cross species work is to isolate aspects of “music” that are available to humans and look for cognitive abilities to do those in other species
- For example, what cortical structures allow for animals to learn songs, keep the beat, or make music?
- To what degree do we project what it’s like to be human on other species?

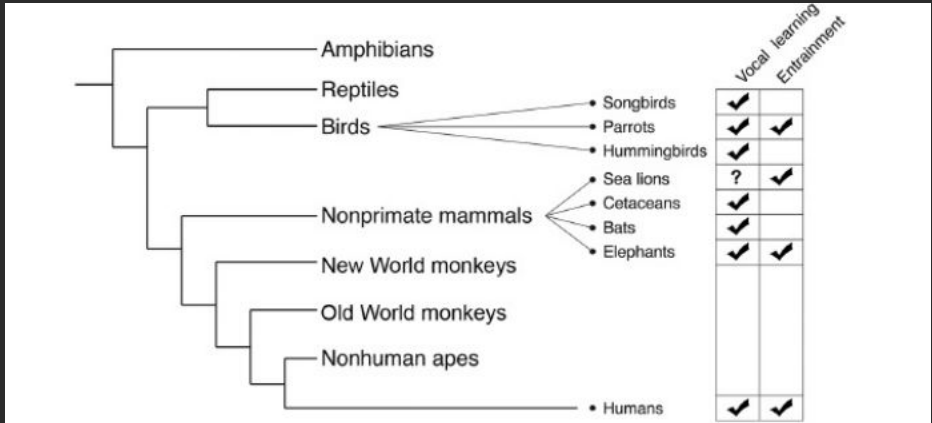

Figure 7.1 Species with vocal learning and entrainment abilities and their relationship in a phylogenetic tree.

Case Studies

- Birds
- Seals
- Elephants
- Dogs

Birds and Spectral Sounds

- Birds often used as example of species that makes music
- Birds “sing” melody to each other
- Composers find inspiration in bird song
- But do birds hear birds like humans hear birds?

CrossMark
click for updates

Songbirds use spectral shape, not pitch, for sound pattern recognition

Micah R. Bregman[a], Aniruddh D. Patel[b], and Timothy Q. Gentner[c,d,e,f,1]

[a]Department of Cognitive Science, University of California, San Diego, La Jolla, CA 92093; [b]Department of Psychology, Tufts University, Medford, MA 02155; [c]Department of Psychology, University of California, San Diego, La Jolla, CA 92093; [d]Section of Neurobiology, University of California, San Diego, La Jolla, CA 92093; [e]Neurosciences Graduate Program, University of California, San Diego, La Jolla, CA 92093; and [f]Kavli Institute for Brain and Mind, La Jolla, CA 92093

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Humans easily recognize “transposed” musical melodies shifted up or down in log frequency. Surprisingly, songbirds seem to lack this capacity, although they can learn to recognize human melodies

relational pitch processing for tone sequences (22, 29, 30; but see refs. 31, 32). Although songbirds can easily learn to discriminate between sequences of several tones (say, ascending vs.

Birds and Spectral Songs

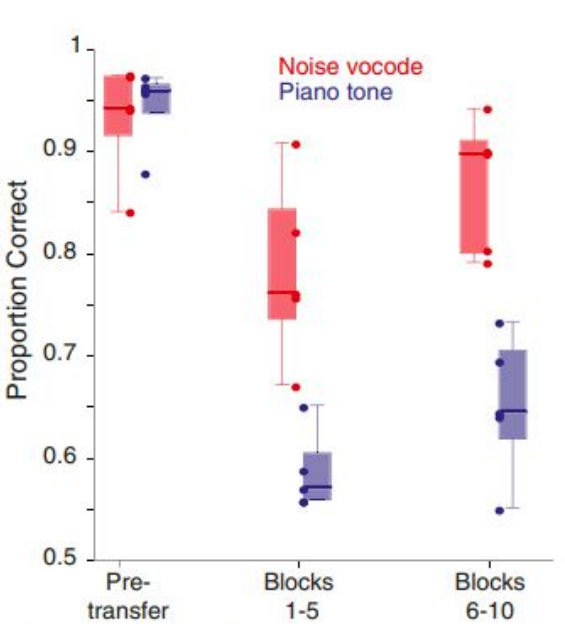


Fig. 3. Comparison of transfer to noise-vocoded versus piano-tone sequences. Box plots showing the proportions of correct responses averaged over the first and second sets of 100-trial blocks during the transfer to the noise-vocoded (red) and piano-tone (blue) stimuli. Performance over the 500 trials just before each transfer is also given. Circles show the data for each subject in each condition. A similar analysis based on 50-trial blocks shows the same effects.

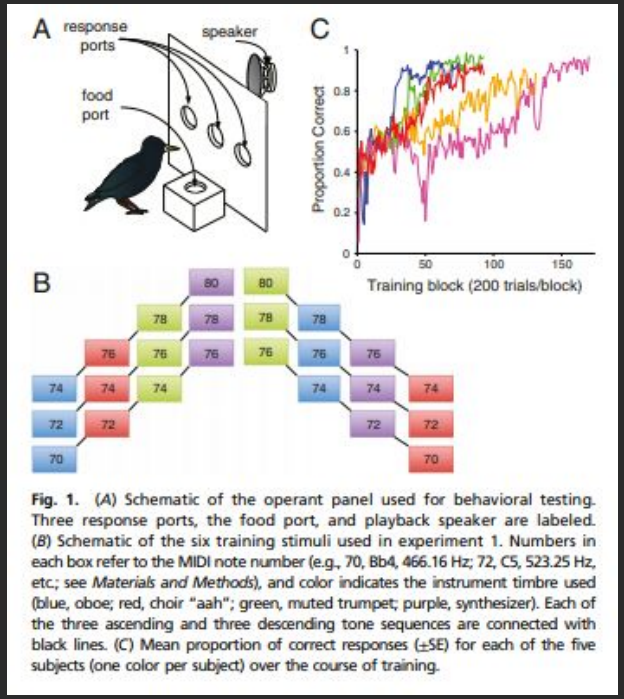
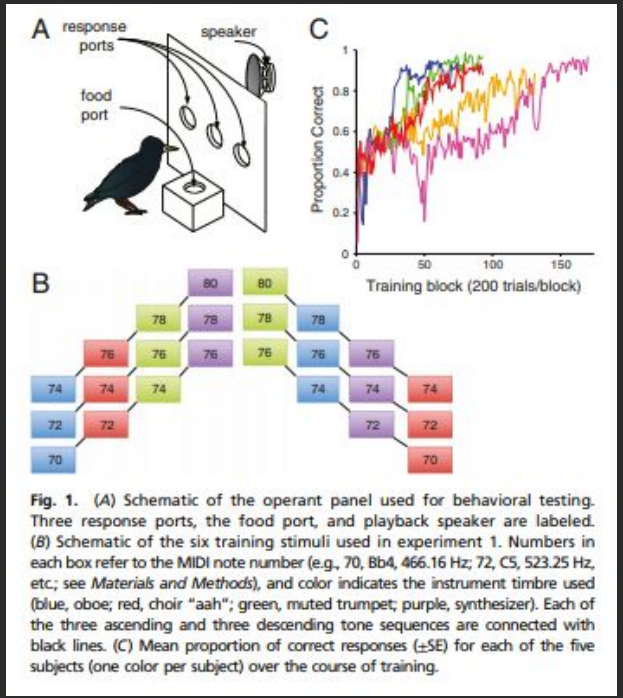


Fig. 1. (*A*) Schematic of the operant panel used for behavioral testing. Three response ports, the food port, and playback speaker are labeled. (*B*) Schematic of the six training stimuli used in experiment 1. Numbers in each box refer to the MIDI note number (e.g., 70, Bb4, 466.16 Hz; 72, C5, 523.25 Hz, etc.; see *Materials and Methods*), and color indicates the instrument timbre used (blue, oboe; red, choir "aah"; green, muted trumpet; purple, synthesizer). Each of the three ascending and three descending tone sequences are connected with black lines. (*C*) Mean proportion of correct responses (±SE) for each of the five subjects (one color per subject) over the course of training.

Birds and Spectral Songs

- Birds in experiment used spectral envelope, not pitch
- How birds communicate constrained by their ability to hear and think about sound
- Human and bird auditory systems are different
- Does this mean they are not making music?



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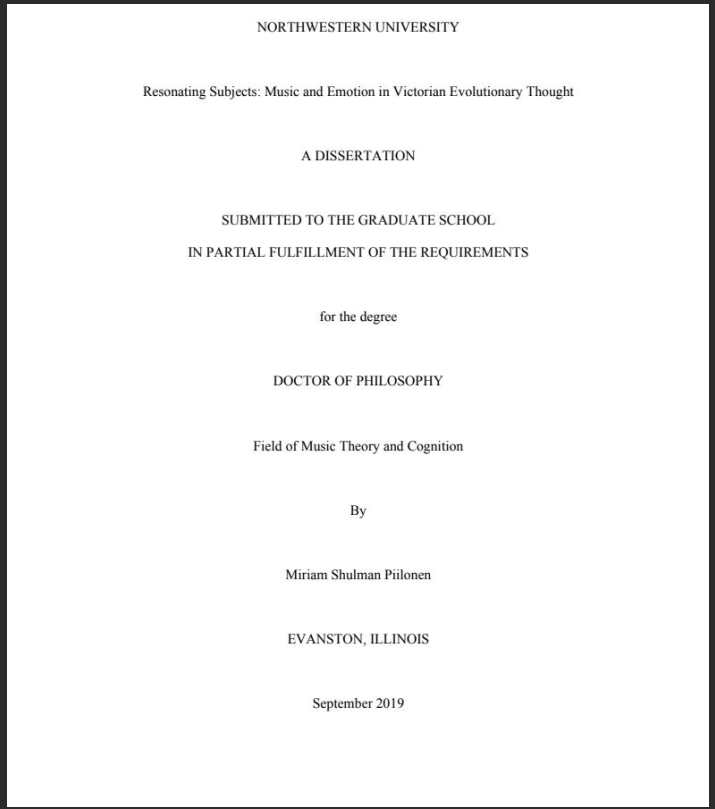
Seals

Questioning Definitions

Evolutionary Claims are Ontological Claims

- “Evolutionary claims are ontological claims” -- Piilonen
- Music itself is unstable category
- Investigation of music assumes that its structure is already understood
- Claims of music are also then claims about humans and their behavior



NORTHWESTERN UNIVERSITY

Resonating Subjects: Music and Emotion in Victorian Evolutionary Thought

A DISSERTATION

SUBMITTED TO THE GRADUATE SCHOOL
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

for the degree

DOCTOR OF PHILOSOPHY

Field of Music Theory and Cognition

By

Miriam Shulman Piilonen

EVANSTON, ILLINOIS

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Review Questions

- What are the problems associated with studying the history of music?
- What are some examples of bring contemporary values into the study of the history of music?
- Why might researchers be interested in studying the music of other species?
- Why might researchers be interested in studying the diversity of contemporary music making?
- What is meant when Piilonen writes that claims about music are ontological claims?