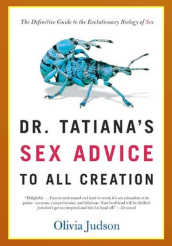
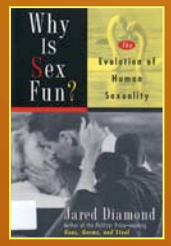
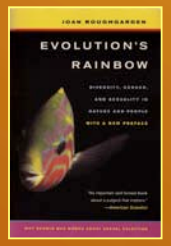
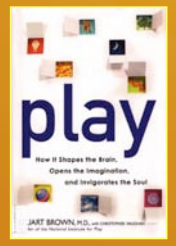
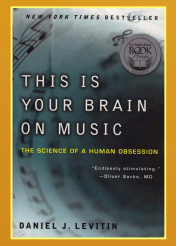
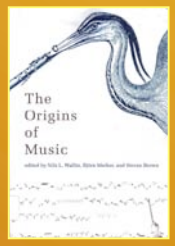


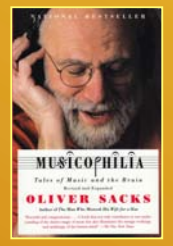










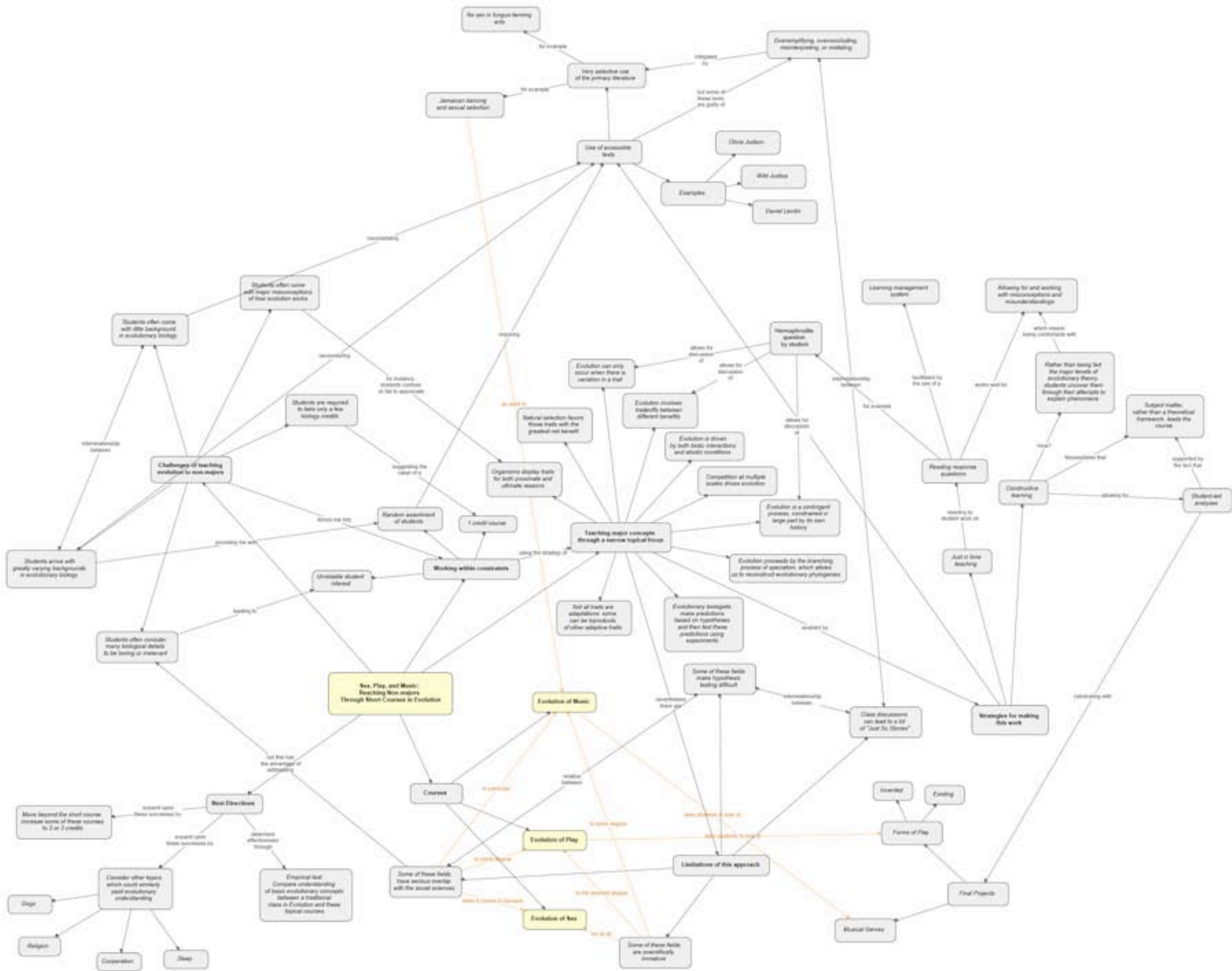


Sex, Play, and Music:

Reaching Non-majors Through Short Courses in Evolution

Pratt

Christopher X Jon Jensen
Department of Mathematics and Science
Pratt Institute



Sex, Play, and Music: Reaching Non-majors Through Short Courses in Evolution
No sex in fungus-farming ants
Very selective use of the primary literature
Jamaican dancing and sexual selection
Oversimplifying, overgeneralizing, misinterpreting, or mislabeling
Use of accessible texts
Olivia Judson
Examples
Daniel Levitin
Students often come with major misconceptions of how evolution works
Students often come with little background in evolutionary biology
Learning management system
Allowing for and working with misconceptions and misunderstandings
Hermaphrodite question by student
Evolution can only occur when there is variation in a trait
Evolution involves tradeoffs between different benefits
Rather than being fed the major tenets of evolutionary theory, students uncover them through their attempts to explain phenomena
Subject matter, rather than a theoretical framework, leads the course
Students are required to take only a few biology credits
Natural selection favors those traits with the greatest net benefit
Evolution is driven by both biotic interactions and abiotic conditions
Challenges of teaching evolution to non-majors
Organisms display traits for both proximate and ultimate reasons
Competition at multiple scales drives evolution
Reading response questions
Constructive learning
Student-led analyses
Random assortment of students
1 credit course
Teaching major concepts through a narrow topical focus
Evolution is a contingent process, constrained in large part by its own history
Students arrive with greatly varying backgrounds in evolutionary biology
Just in time teaching
Working within constraints
Unstable student interest
Evolution proceeds by the branching process of speciation, which allows us to reconstruct evolutionary phylogenies
Not all traits are adaptations: some can be byproducts of other adaptive traits
Evolutionary biologists make predictions based on hypotheses and then test these predictions using experiments
Students often consider many biological details to be boring or irrelevant
Some of these fields make hypothesis testing difficult
Evolution of Music
Class discussions can lead to a lot of "Just So Stories"
Strategies for making this work
Next Directions
Courses
Move beyond the short course: increase some of these courses to 2 or 3 credits
Evolution of Play
Forms of Play
Limitations of this approach
Consider other topics which could similarly yield evolutionary understanding
Empirical test: Compare understanding of basic evolutionary concepts between a traditional class in Evolution and these topical courses
Some of these fields have serious overlap with the social sciences
Final Projects
Dogs
Evolution of Sex
Musical Genres
Religion
Cooperation
Sleep
Some of these fields are scientifically immature

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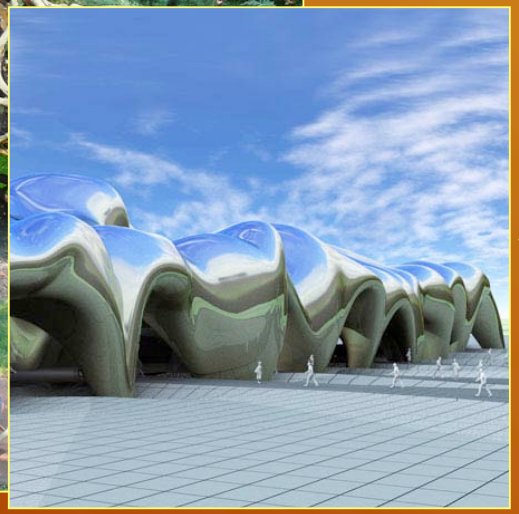
Emma Madnick - *Source:* http://www.afingo.com

Source: http://www.flickr.com/photos/aon/

Sean Gordon - *Source:* http://www.coroflot.com

Jacob Gossett - *Source:* http://www.jacobgossett.com



Elliot White - *Source:* http://www.dezeen.com

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Challenges of teaching non-majors:

- ★ Students are required to take only a **few biology credits**
- ★ Students often come with **little background** in evolutionary biology
- ★ Students arrive with greatly **varying backgrounds** in evolutionary biology
- ★ Students often come with major **misconceptions** of how evolution works
- ★ Students often consider many biological details to be **boring** or **irrelevant**

Working within constraints:

- ★ Random assortment of students
- ★ Unreliable student interest
- ★ 1 credit course

Teaching major concepts through a narrow topical focus

Christopher X Jon Jensen

Teaching major concepts through a narrow topical focus

Organisms display traits for both proximate and ultimate reasons

Competition at multiple scales drives evolution

Natural selection favors those traits with the greatest net benefit

Evolution is a contingent process, constrained in large part by its own history

Evolution can only occur when there is variation in a trait

All extant species have a phylogenetic history that results from the branching process of speciation

Evolution involves tradeoffs between different benefits

Evolutionary hypotheses make predictions that can be tested by experiments

Evolution is driven by both biotic interactions and abiotic conditions

Not all traits are adaptations: some can be byproducts of other adaptive traits

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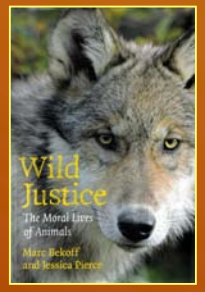
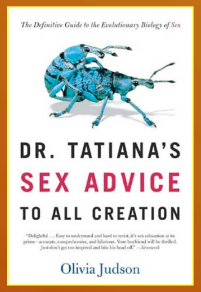
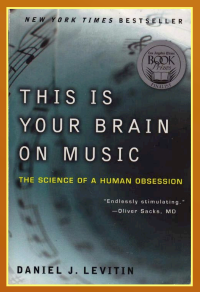
Strategies for making this work:



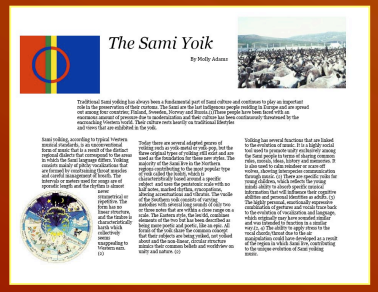




Use of accessible texts

my.pratt.edu learning management system

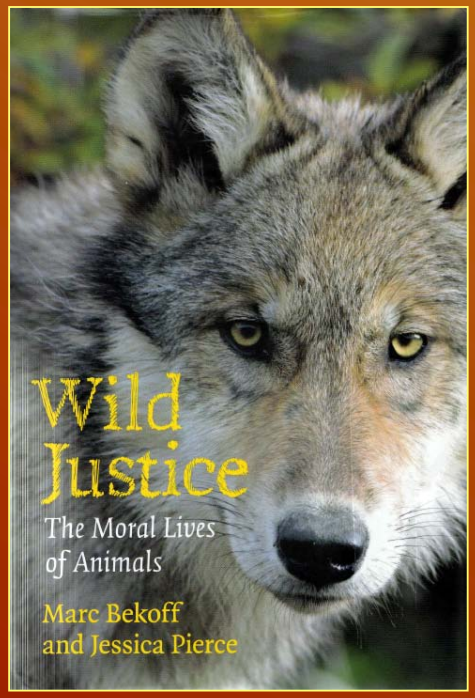
"Just in Time" teaching



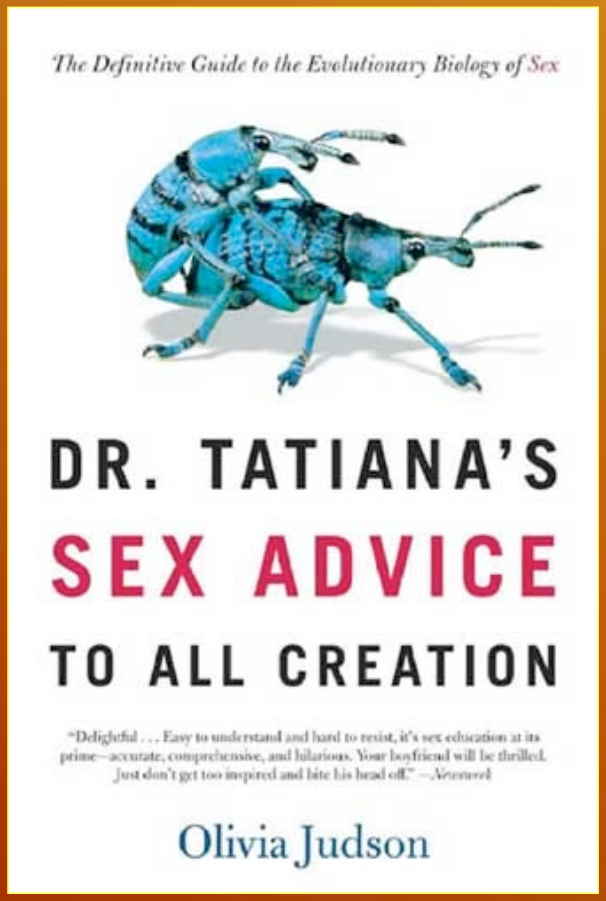
Constructive learning

Christopher X Jon Jensen

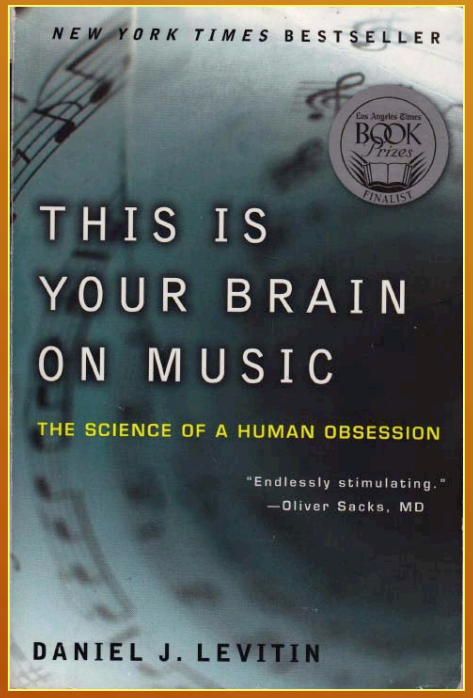
Use of accessible texts



The Evolution of Play



The Evolution of Sex



The Evolution of Music

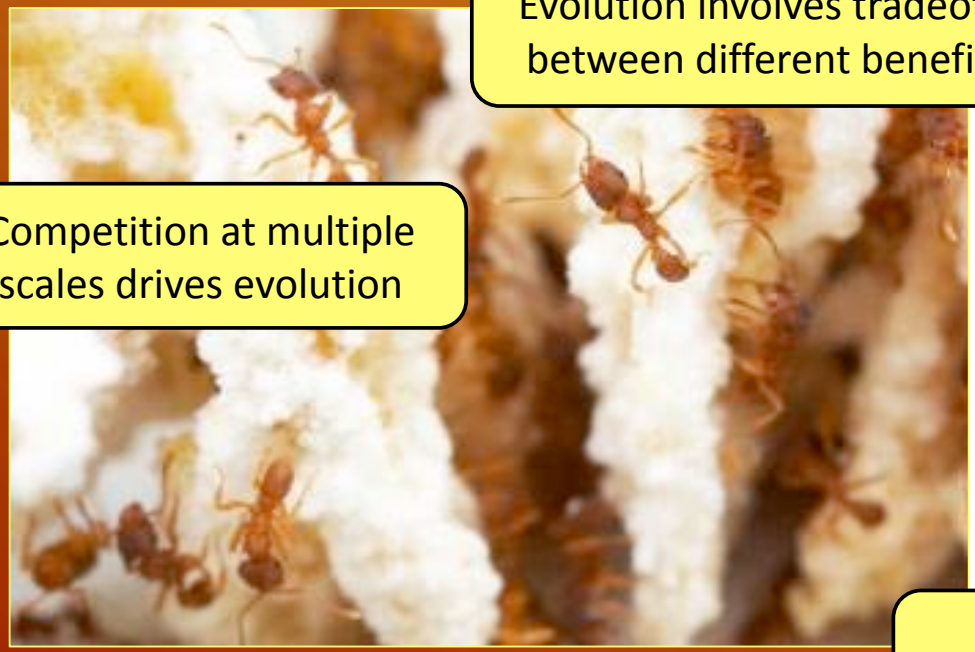
Very selective use of the primary literature

Natural selection favors those traits with the greatest net benefit

Evolution involves tradeoffs between different benefits

Evolution is driven by both biotic interactions and abiotic conditions

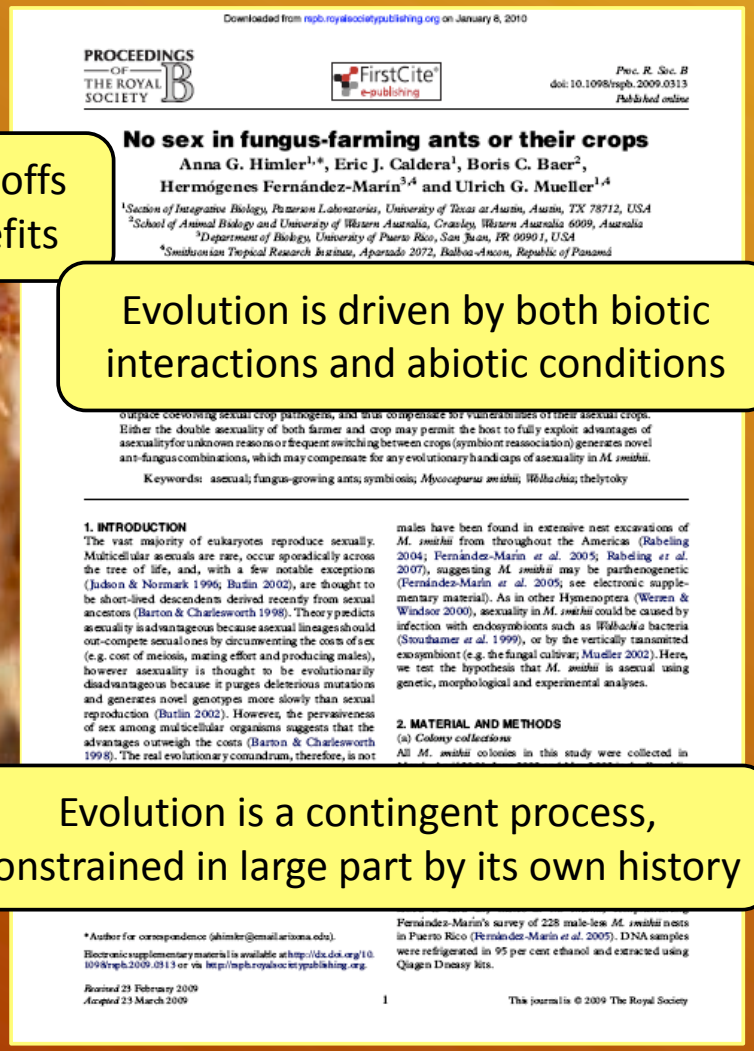
Competition at multiple scales drives evolution



https://www.utexas.edu

Evolution is a contingent process, constrained in large part by its own history

All extant species have a phylogenetic history that results from the branching process of speciation



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No sex in fungus-farming ants or their crops

Anna G. Himler[1,*], Eric J. Caldera[1], Boris C. Baer[2], Hermógenes Fernández-Marín[3,4] and Ulrich G. Mueller[1,4]

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outplace coevolving sexual crop pathogens, and thus compensate for vulnerabilities of their asexual crops. Either the double asexuality of both farmer and crop may permit the host to fully exploit advantages of asexuality for unknown reasons or frequent switching between crops (symbiont reassociation) generates novel ant–fungus combinations, which may compensate for any evolutionary handicaps of asexuality in *M. smithii*.

Keywords: asexual; fungus-growing ants; symbiosis; *Mycocepurus smithii*; *Wolbachia*; thelytoky

1. INTRODUCTION

The vast majority of eukaryotes reproduce sexually. Multicellular asexuals are rare, occur sporadically across the tree of life, and, with a few notable exceptions (Judson & Normark 1996; Butlin 2002), are thought to be short-lived descendents derived recently from sexual ancestors (Barton & Charlesworth 1998). Theory predicts asexuality is advantageous because asexual lineages should out-compete sexual ones by circumventing the costs of sex (e.g. cost of meiosis, mating effort and producing males), however asexuality is thought to be evolutionarily disadvantageous because it purges deleterious mutations and generates novel genotypes more slowly than sexual reproduction (Butlin 2002). However, the pervasiveness of sex among multicellular organisms suggests that the advantages outweigh the costs (Barton & Charlesworth 1998). The real evolutionary conundrum, therefore, is not

males have been found in extensive nest excavations of *M. smithii* from throughout the Americas (Rabeling 2004; Fernández-Marín *et al.* 2005; Rabeling *et al.* 2007), suggesting *M. smithii* may be parthenogenetic (Fernández-Marín *et al.* 2005; see electronic supplementary material). As in other Hymenoptera (Werren & Windsor 2000), asexuality in *M. smithii* could be caused by infection with endosymbionts such as *Wolbachia* bacteria (Stouthamer *et al.* 1999), or by the vertically transmitted exosymbiont (e.g. the fungal cultivar; Mueller 2002). Here, we test the hypothesis that *M. smithii* is asexual using genetic, morphological and experimental analyses.

2. MATERIAL AND METHODS

(a) *Colony collections*

All *M. smithii* colonies in this study were collected in

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Electronic supplementary material is available at http://dx.doi.org/10.1098/rspb.2009.0313 or via http://rspb.royalsocietypublishing.org.

Fernández-Marín's survey of 228 male-less *M. smithii* nests in Puerto Rico (Fernández-Marín *et al.* 2005). DNA samples were refrigerated in 95 per cent ethanol and extracted using Qiagen Dneasy kits.

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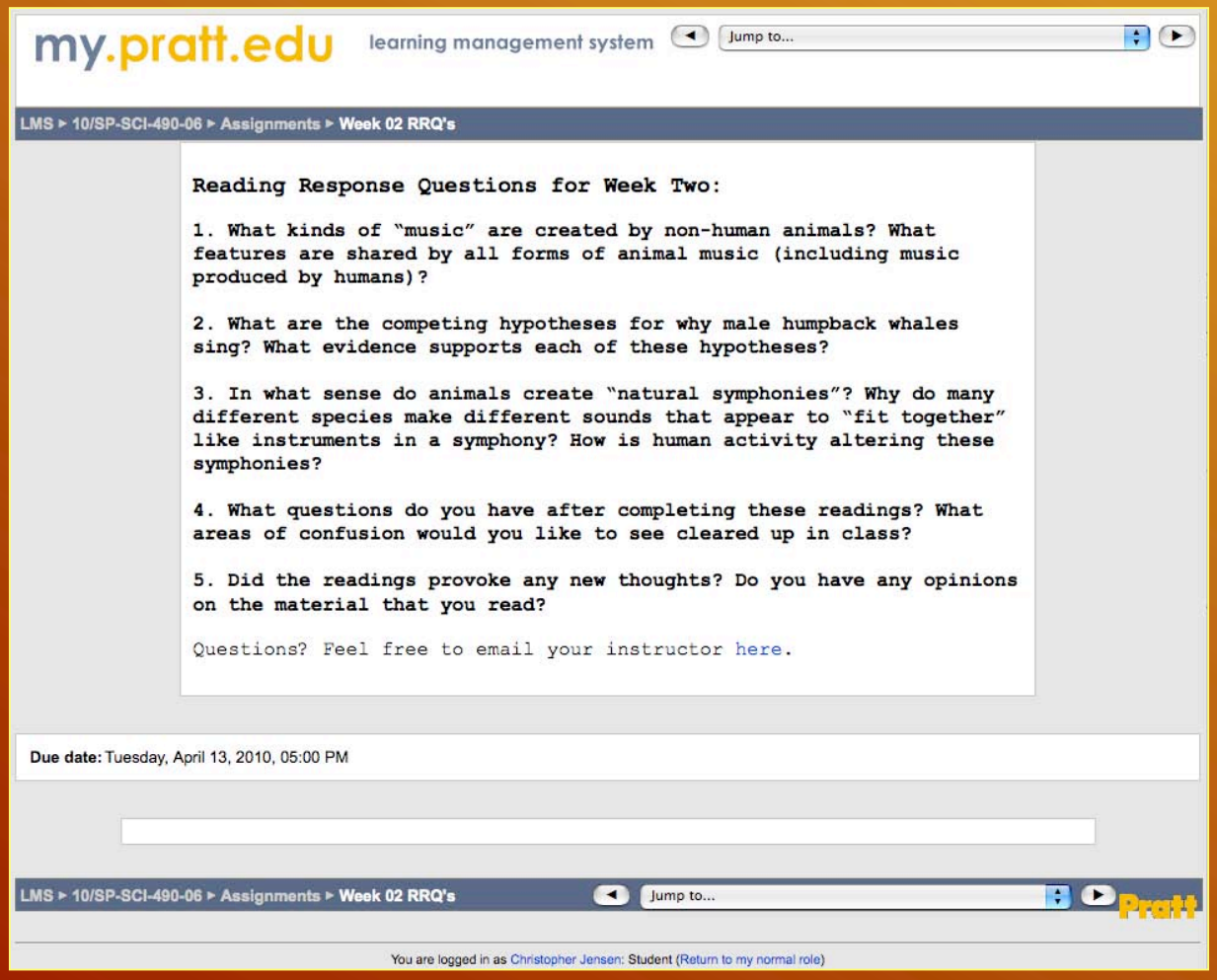
“Just in Time” teaching



"Just in Time" teaching

Evolution can only occur when there is variation in a trait

Evolution involves tradeoffs between different benefits

Is it possible for humans/other mammals to be hermaphrodites and impregnate themselves due to some weird mutation?

Evolution is a contingent process, constrained in large part by its own history

Christopher X Jon Jensen

Constructive learning:

Subject matter, rather than a theoretical framework, leads the course

Rather than being fed the major tenets of evolutionary theory, students uncover them through their attempts to explain phenomena

Student-led analyses

Student-led analyses:

Final Project Guidelines

There are two pathways for this Final Project, **INVENTION** and **ANALYSIS**:

Objectives of the project (INVENTION):

1. Invent a new form of play designed to increase the survival and/or reproduction of players.
2. Research the benefits of play, obtaining at least THREE OUTSIDE SOURCES that report relevant information about forms of play involved in your invention.
3. Describe your new form of play (how it works, when and where it is done, any rules or conventions).
4. Explain the goals of this activity:
   - ☐ Based on the different types of play discussed in class, what kind(s) of play did you try to incorporate into this activity?
   - ☐ What benefits might participants of this activity enjoy? How might these benefits increase the evolutionary fitness of practitioners?
5. Compose a *Project Summary* that describes your invention (see below).
6. Present your project to the class:
   - ☐ Using your *Project Summary* as you main prop, briefly describe your project.
   - ☐ Answer questions about your project posed by fellow students and your instructor.

Objectives of the project (ANALYSIS):

1. Choose a form of play (broadly defined) that humans engage in.
2. Research this form of play, obtaining at least THREE OUTSIDE SOURCES that report relevant information about your chosen form of play.
3. Describe this form of play (how it works, when and where it is done, any rules or conventions).
4. Analyze the nature of this activity:
   - ☐ Based on the different types of play discussed in class, what kind(s) of play are involved in this activity?
   - ☐ What are the costs of this activity to participants?
   - ☐ What benefits might participants of this activity enjoy? How might these benefits increase the evolutionary fitness of practitioners?
5. Compose a *Project Summary* that describes your analysis (see below).
6. Present your project to the class:
   - ☐ Using your *Project Summary* as you main prop, briefly describe your project.
   - ☐ Answer questions about your project posed by fellow students and your instructor.

Format and scope of the *Project Summary*:

1. Present your *Project Summary* as a PDF.
2. Because it will be used to aid your presentation, format your *Project Summary* as a letter-sized (8.5" x 11") landscape document (in other words, width is longer than height).
3. The text component of your *Project Summary* should be 250-350 words in length.

Final Project Guidelines

Objectives of the project:

1. Choose a contemporary genre of music:
   - ☐ This genre should be reasonable specific. Large categories like "hip hop" or "classical" or "reggae" are too broad; try to pick a subgenre of larger genres. It may be helpful to pick a particular era of a particular genre if the form of music you are interested in has a rich and broad history.
   - ☐ If a reasonably large population of people listens to a particular genre of music, we will consider it contemporary (remember that a thousand years is nothing in the history of evolution). Even if the genesis of a particular genre is somewhat ancient, so long as the genre is still performed and appreciated today, we will call it contemporary.
   - ☐ The musical form need not be from our culture; feel free to research forms of music not generally embraced by western ears.
2. Research both the genre you have selected and any relevant science that explores questions that relate to your genre, obtaining at least THREE OUTSIDE SOURCES that report relevant information.
3. Select three representative songs that exemplify the genre of music that you have selected.
4. Describe your chosen genre of music, giving a brief account of its history, musical conventions, where and how it is performed, and what distinguishes it from similar and/or related genres.
5. Analyze your chosen genre of music based on the concepts learned in the class, which could include answering questions such as:
   - ☐ How does this genre of music interact with the way we perceive different elements of music (consonance/harmony/timbre/melody/harmony/rhythm)?
   - ☐ Is there any connection between this genre of music and the music made by other species?
   - ☐ Does this genre of music relate to or shed light on our musical history?
   - ☐ Does this genre of music support any of the hypotheses about why or how music evolved?
   - ☐ What is the function of this music and why is it popular and/or successful?
6. Compose a *Project Summary* that describes your analysis (see below).
7. Present your project to the class:
   - ☐ Using your *Project Summary* as you main prop, briefly discuss your project.
   - ☐ Answer questions about your project posed by fellow students and your instructor.

Format and scope of the *Project Summary*:

1. Present your *Project Summary* as a PDF.
2. Because it will be used to aid your presentation, format your *Project Summary* as a letter-sized (8.5" x 11") landscape document (in other words, width is longer than height).
3. The text component of your *Project Summary* should be 250-500 words in length.
4. Your *Project Summary* should be limited to one page, although your are welcome to take liberties with the layout in order to communicate all of your ideas: just make sure that other students and your instructor can clearly read the text.

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Christopher X Jon Jensen

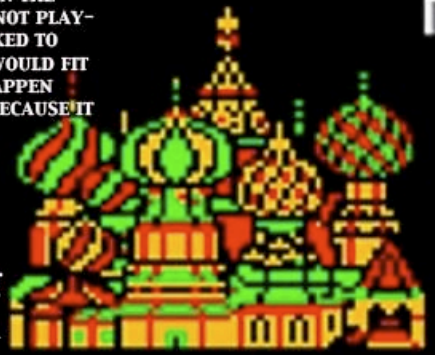
Katelyn Szczesniak

TETRIS™

Tetris is a puzzle video game designed and programmed in 1984 by Alexey Pazhitnov, a Russian working for the Academy of Science of the USSR in Moscow. In Tetris a random sequence of blocked shapes called tetrominoes fall down the playing field and must be rotated (by 90 degrees) by the player and fit together at the bottom of the playing field. The player wants to keep the smallest amount of tetrominoes on the playing field as possible. In order to do this they must fit the pieces together in rows and once a row is completely filed it will disappear from the playing field. Tetris has been created for nearly every video game console and computer operating system, as well as mobile phones and portable music players like ipod.

Tetris is considered play because it is done willingly by the player without any immediate benefit and for enjoyment. Tetris can be seen as two different types of play, object and social. Tetris is object play because without the object, the video game system or other electronic device the game can not be played. The player is interacting with the object well playing and using hand eye coordination. Tetris can be considered social play because it is often played by two players. This interaction and communication between the two players makes it social play. The mutual enjoyment of Tetris play can lead to social bonds between the players.

Playing Tetris could be considered a waste of time because it takes away from time that could be spent doing other necessary activities such as working a job to make money to feed, cloth, and shelter yourself. This would be a cost to the player. Also this game has been known to cause what is called the Tetris effect. The Tetris effect is a repetitive stress symptom that occurs involuntarily in the brain in which the player will picture Tetris combinations when they are not playing the game. Also they may start applying the qualities of the Tetris blocked to real life objects and begin to involuntarily try to figure out where they would fit in places like shelves, cabinets, or on the street. This has been known to happen after long term play of Tetris and can be considered a cost to the player because it can be distracting from normal thoughts and activities.



The costs associated with playing Tetris are only true problems when the game is played obsessively. According to research by Dr. Richard Haier prolonged Tetris play can lead to more efficient brain activity. Dr. Haier discover that when first playing Tetris brain function increases and more cerebral energy is consumed which can be measured by the glucose metabolic rate. When a Tetris player more skilled at the game the brain is shown to reduce its use of glucose, which shows more efficient brain activity. Tetris play in moderation can therefore heighten the brains cognitive functions such as reasoning, processing, and language skills. Tetris can therefore have evolutionary benefits to the player. With higher cognitive brain function the player will be able to process and reason information quicker which will be a benefit when doing important decision making that could aid in survival.

Katelyn Szczesniak

social networking and media.

elise dee

Elise Dee

The use of social networking services is as a form of play behavior that has recently experience a spontaneous increase in popularity. Social Networking Sites are web-based services that allow individuals to create profiles within a particular system, articulate a list of other users with whom they share a connection. [1] They come in a variety of formats. Some services require payment to access certain content. These are often used to initiate romantic connections or achieve goals unrelated to play behaviors, like business and capital gain. This analysis focuses on free networking sites with an emphasis on friend networking and social media (e.g. Twitter, Facebook, Tumblr). This framework is used to gain social capital – an individual's robust network of established social bonds and personal recognition. [2][3]

While many individuals use social networking tools to communicate with people who are within their current social circle, virtual networks can extend internationally, creating vast and diverse global communities. Social media also provides the technical means for activating weak or 'latent ties' by viewing the social networks of other users. [4] [5] The main focus is to engage in social and recreational communication, an inherently social play behavior. According to Stuart Brown's description of the different types of social play, Social Networking incorporates elements of friendship, creates a sense of belonging and shares some of the same benefits as storytelling and narrative play. These virtual communities provide a platform through which individuals can grasp an understanding of a broad array of viewpoints.[6] Exposure to these viewpoints and other shared interests creates an arena for social interaction where people can develop and hone their social and collaborative skills, learn about the world, themselves and their role in society [7] , develop a sense of trust within groups, form romantic connections, propagate ideas and reinforce established social bonds. Brown claims social play serves as a bridge to cooperation and allows human society to work and individuals to be close to each other.[8] The setting of a play environment on these networking sites has resulted in a sense of camaraderie and support among users (e.g. The global response on such networks after the recent earthquake in Haiti or the use of Twitter during the Iranian election protests).

It seems inevitable that this heightened means of communicative play will impact the future of human evolution. In modern society, the transfer of memes significantly influences natural selection. The survival of the fittest is, in part, a war of ideas and social networking sites are the battleground. Thus, the most relevant aspect of these social networking sites is that they allow people connect, take charge of their own experience, and get what they need –whether it is social play, ideas, information or support –from each other.[9] Given the scope and innovative nature of social networking, it could be one of the most multi-faceted and generally beneficial forms of play for adults.

Image Source: Peter Sutherland

TALL BIKE JOUSTING AS A FORM OF PLAY

Tall bike jousting is a highly dangerous martial sport. Combatants are mounted on bikes that can be as high as six feet. The modern tall bike, not to be confused with a penny father, is typically built by welding one bicycle frame atop another. A common practice amongst bicycle clubs such as Black Label Bike Club (others include Skidmarxxx and Cut Throats to name a few), the first bike jousting tournament was introduced in Minnesota by the BLBC Minneapolis chapter, and has now spread nationwide to other cities such as Reno, New Orleans, Austin, and New York [1].

Somewhat like traditional knight jousting, the goal of a tall bike joust is to ride toward an opponent and dislodge them with a handmade lance. Most believe the more blood the better, a typical mentality shared by both participants of the joust and its spectators [2]. Combatants rarely wear any form of protection but are generally more than willing to endure the pain involved, as they are often under the influence of alcohol (although inebriation is not necessarily a requirement of the game). The lances are usually constructed of a large PVC pipe and padding made from foam. Winners who are bike club members attain points for every tournament. Those with the most points by the end win a trophy, and all debauchery ensues.

Tall bike jousting incorporates object, locomotor, and social play. Object play is involved for the reason being that the tall bike, in itself, enables the jousting. Locomotor play is involved because combatants must physically exert and push their bodies to unbelievable limits. A jouster must be agile, able bodied, and physically fit. Social play is involved for obvious reasons. Aside from the fact that each tournament must have at least two combatants, jousting is always a real crowd pleaser. A sense of communal spirit in everyone is involved. Those jousting and aiming to earn points for their club are cheered for and aided by those around them. The spectacle, in all its oddness, is truly a wonder to watch amidst a crowd of drunk and cheering people of all ages, ethnicities, and economic backgrounds. Despite the level of danger involved, and probably for this reason, tall bike jousting promotes a heightened level of camaraderie and social bonding, bringing a community of bike enthusiasts ever more closer together.

Despite the high risks of serious injury, bike jousting still has its benefits-- release of aggression under a semi-controlled environment, preparation for self defense in unexpected situations, improvement of one's biking skills, improvement of one's fitness levels (such as speed and stamina), and most importantly, the solidification of social bonds amongst other bike club members and friends. The benefits in being in a bike club are the same as being in any other organized social group. These benefits include strengthened friendships, protection, inspiration, the ability to draw from many resources, and a sense of personal and communal identity. Jousting, although a seemingly violent form of play, is actually a benevolent means of building and maintaining lifelong relationships.

Jennifer Shear, 2010

[1] Wikipedia.org, Black Label Bike Club, http://en.wikipedia.org/wiki/Black_Label_Bike_Club, Accessed 2010-March-25.

[2] Gross, Matt. (2005) New York Magazine, Rough Riders, http://nymag.com/nymetro/news/people/columns/intelligencer/9381/, Accessed 2010-March-25.

CAMPING

Hannah Wertheim

Recreational camping began as early as the 1850's as a means for urban, middle class to escape city life and reconnect with nature [1]. Camping activities were enjoyed for the health benefits associated with fresh air and exercise and as a means to bonding with family and friends. Modern camping styles range from cushy RV camping to the more rugged backpacking, canoeing, and tenting forms of camping [2].

Camping is typically done in groups, often with friends or family, and can generally involve such activities as hiking, swimming, boating, fishing, story telling, and exploring. Depending on the type of camping and the type of activities that the camper partakes in, camping can be categorized as three different forms of play: locomotor, social, and object play. Locomotor play is associated with physical activities like hiking, setting up camp, and canoeing, which can function to build up strength and dexterity. Canoeing and fishing are forms of object play, in which the camper interacts with the tools (paddle, fishing rod) as part of the activity. All of these activities can also be encompassed in social play, as they are typically done in groups with shared experiences and roles.

Camping is an interesting kind of vacation for an individual to choose in that it separates the camper from the comfort, familiarity, and technological luxuries of modern life. Through camping, the individual exposes themselves to the elements without the usual protection of urban living. Possible dangers such as injury, wild animals, getting lost, and inclement weather are all factors that campers are exposing themselves to [3]. Basic camping supplies and gear, like sleeping bags and tents, can also be expensive [4] and planning can be cumbersome. However, these costs can easily be overlooked in the face of the social and physical benefits of camping activities.

The physical and strength boosting activities associated with camping enhances the overall fitness of the camper, which can affect overall reproductive success and survival. The shared experience of outdoor living also acts to tighten social bonds and develop leadership skills within the camping group. Children who participated in camping programs have been show to develop better social skills and higher self esteems that carry through into their normal lives [5]. The bonds formed and skills learned in the camping environment, as well as the reenergizing nature of the outdoor vacation, help to form a more successful individual in the long run.

Student-led analyses:

Final Project Guidelines

There are two pathways for this Final Project, **INVENTION** and **ANALYSIS**:

Objectives of the project (INVENTION):

1. Invent a new form of play designed to increase the survival and/or reproduction of players.
2. Research the benefits of play, obtaining at least THREE OUTSIDE SOURCES that report relevant information about forms of play involved in your invention.
3. Describe your new form of play (how it works, when and where it is done, any rules or conventions).
4. Explain the goals of this activity:
   - ☐ Based on the different types of play discussed in class, what kind(s) of play did you try to incorporate into this activity?
   - ☐ What benefits might participants of this activity enjoy? How might these benefits increase the evolutionary fitness of practitioners?
5. Compose a *Project Summary* that describes your invention (see below).
6. Present your project to the class:
   - ☐ Using your *Project Summary* as you main prop, briefly describe your project.
   - ☐ Answer questions about your project posed by fellow students and your instructor.

Objectives of the project (ANALYSIS):

1. Choose a form of play (broadly defined) that humans engage in.
2. Research this form of play, obtaining at least THREE OUTSIDE SOURCES that report relevant information about your chosen form of play.
3. Describe this form of play (how it works, when and where it is done, any rules or conventions).
4. Analyze the nature of this activity:
   - ☐ Based on the different types of play discussed in class, what kind(s) of play are involved in this activity?
   - ☐ What are the costs of this activity to participants?
   - ☐ What benefits might participants of this activity enjoy? How might these benefits increase the evolutionary fitness of practitioners?
5. Compose a *Project Summary* that describes your analysis (see below).
6. Present your project to the class:
   - ☐ Using your *Project Summary* as you main prop, briefly describe your project.
   - ☐ Answer questions about your project posed by fellow students and your instructor.

Format and scope of the *Project Summary*:

1. Present your *Project Summary* as a PDF.
2. Because it will be used to aid your presentation, format your *Project Summary* as a letter-sized (8.5" x 11") landscape document (in other words, width is longer than height).
3. The text component of your *Project Summary* should be 250-350 words in length.

Final Project Guidelines

Objectives of the project:

1. Choose a contemporary genre of music:
   - ☐ This genre should be reasonable specific. Large categories like "hip hop" or "classical" or "reggae" are too broad; try to pick a subgenre of larger genres. It may be helpful to pick a particular era of a particular genre if the form of music you are interested in has a rich and broad history.
   - ☐ If a reasonably large population of people listens to a particular genre of music, we will consider it contemporary (remember that a thousand years is nothing in the history of evolution). Even if the genesis of a particular genre is somewhat ancient, so long as the genre is still performed and appreciated today, we will call it contemporary.
   - ☐ The musical form need not be from our culture; feel free to research forms of music not generally embraced by western ears.
2. Research both the genre you have selected and any relevant science that explores questions that relate to your genre, obtaining at least THREE OUTSIDE SOURCES that report relevant information.
3. Select three representative songs that exemplify the genre of music that you have selected.
4. Describe your chosen genre of music, giving a brief account of its history, musical conventions, where and how it is performed, and what distinguishes it from similar and/or related genres.
5. Analyze your chosen genre of music based on the concepts learned in the class, which could include answering questions such as:
   - ☐ How does this genre of music interact with the way we perceive different elements of music (consonance/harmony/timbre/melody/harmony/rhythm)?
   - ☐ Is there any connection between this genre of music and the music made by other species?
   - ☐ Does this genre of music relate to or shed light on our musical history?
   - ☐ Does this genre of music support any of the hypotheses about why or how music evolved?
   - ☐ What is the function of this music and why is it popular and/or successful?
6. Compose a *Project Summary* that describes your analysis (see below).
7. Present your project to the class:
   - ☐ Using your *Project Summary* as you main prop, briefly discuss your project.
   - ☐ Answer questions about your project posed by fellow students and your instructor.

Format and scope of the *Project Summary*:

1. Present your *Project Summary* as a PDF.
2. Because it will be used to aid your presentation, format your *Project Summary* as a letter-sized (8.5" x 11") landscape document (in other words, width is longer than height).
3. The text component of your *Project Summary* should be 250-500 words in length.
4. Your *Project Summary* should be limited to one page, although your are welcome to take liberties with the layout in order to communicate all of your ideas: just make sure that other students and your instructor can clearly read the text.

The Sami Yoik

By Molly Adams

Traditional Sami yoiking has always been a fundamental part of Sami culture and continues to play an important role in the preservation of their customs. The Sami are the last indigenous people residing in Europe and are spread out among four countries; Finland, Sweeden, Norway and Russia.(1)These people have been faced with an enormous amount of pressure due to modernization and their culture has been continuously threatened by the encroaching Western world. Their culture rests heavily on traditional lifestyles and views that are exhibited in the yoik.

Sami yoiking, according to typical Western musical standards, is an unconventional form of music that is a result of the distinct regional dialects that correspond to the areas in which the Sami language differs. Yoiking consists mainly of pitchy vocalizations that are formed by constraining throat muscles and careful management of breath. The intervals or meters used for songs are of sporadic length and the rhythm is almost never symmetrical or repetitive. The form has no linear structure, and the timbre is characteristically harsh which collectively seems unappealing to Western ears. (2)

Today there are several adapted genres of yoiking such as yoik-metal or yoik-pop, but the three original types of yoiking still exist and are used as the foundation for these new styles. The majority of the Sami live in the Northern regions contributing to the most popular type of yoik called the luohti, which is characteristically based around a specific subject and uses the pentatonic scale with no half notes, marked rhythm, syncopations, altering accentuations and vibratos. The vuolle of the Southern yoik consists of varying melodies with several long sounds of only two or three notes that are within a close range on a scale. The Eastern style, the leu'dd, combines elements of the two but has been described as being more poetic and poetic, like an epic. All forms of the yoik share the common concept that their subjects are being yoiked, not yoiked about and the non-linear, circular structure mimics their common beliefs and worldview on unity and nature. (2)

Yoiking has several functions that are linked to the evolution of music. It is a highly social tool used to promote unity exclusively among the Sami people in terms of sharing common rules, morals, ideas, history and memories. It is also used to calm reindeer or scare off wolves, showing interspecies communication through music. (2) There are specific yoiks for young children, which reflects the young minds ability to absorb specific musical information that will influence their cognitive abilities and personal identities as adults. (3) The highly personal, emotionally expressive combination of gestures and vocals trace back to the evolution of vocalization and language, which originally may have sounded similar and was intended to function in a similar way.(2, 4) The ability to apply stress to the vocal chords/throat due to the air manipulation could have developed as a result of the region in which Sami live, contributing to the unique evolution of Sami yoiking music.

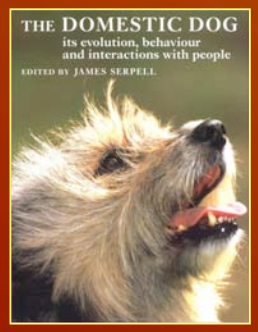
Challenges for this approach:

- ★ Some of these fields make **hypothesis testing difficult**
- ★ Some of these fields are **scientifically immature**
- ★ Class discussions can lead to a lot of **"Just So Stories"**
- ★ Some of these fields have serious **overlap with the social sciences**

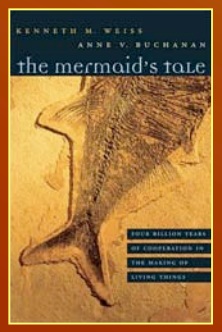
Next directions:

- ★ **Empirical test:** Compare understanding of basic evolutionary concepts between a traditional class in Evolution and these topical courses
- ★ **Move beyond the short course:** increase some of these courses to 2 or 3 credits
- ★ Consider **other topics** which could similarly yield evolutionary understanding...

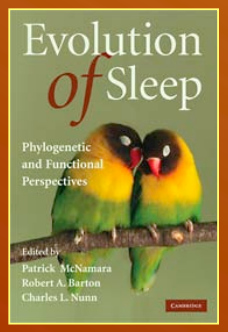
Dogs?



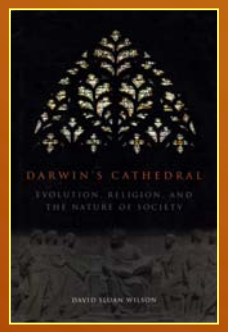
Cooperation?

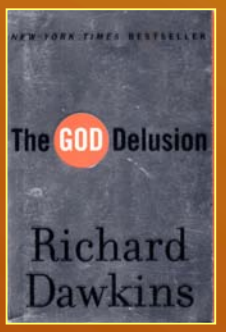


Sleep?



Religion?





Questions?

Syllabi for all the courses discussed today, as well as an archive of this presentation, can be found at:

www.christopherxjjensen.com