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Take Home Assignment
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Music, Mind & Technology

Mapping Cross-cultural Internal Representations in Music

The bottom line of the lecture was to highlight the challenge faced by the cognitive research community: that most of the samples that are taken are biased. The participants in the research being conducted are usually WEIRD - **W**estern, **E**ducated, **I**ndustrialised, **R**ich and **D**emocratic. The speaker, Nori Jacoby, summarised some of his research papers highlighting exactly this - how culture and environment can play a significant role in our understanding and how we might potentially misconstrue a trait to be of biological origin when in reality, it might just be the result of social conditioning of the participants involved. The paper titled "Most people are not WEIRD" was a survey on the representation of WEIRD people as opposed to non-WEIRD people in the experiments. It showed how skewed the representation of people is and argues that to understand human psychology, behavioural scientists must stop doing most of their experiments on Westerners.

The lecture was divided into two parts: the first part, in which the speaker discussed his paper "Integer Ratio Priors on Musical Rhythm Revealed Cross-culturally by Iterated Reproduction", and the second part, in which the speaker summaries his finding from his paper titled "Universal and Non-universal Features of Musical Pitch Perception Revealed by Singing". He also briefly touches on how music is transmitted through oral tradition, which was again a study from his paper titled "Studying the Effect of Oral Transmission on Melodic Structure using Online Iterated Singing Experiments".

Summary (Part 1)

The speaker investigates the cross-cultural perception of musical rhythm and the role of integer ratios in the formation of musical structures.

He provides a brief introduction to the concept of musical rhythm, as well as a discussion of prior research on the subject. He explains how musical rhythm is a complex phenomenon and then discusses the concept of "integer ratio priors", which has been suggested as a potential explanation for the emergence of musical rhythm in different cultures.

He then explains the usage of an iterated reproduction task to assess the cross-cultural perception of musical rhythm. After this, the speaker shows how the data revealed that participants from different cultures had different perceptions of musical rhythm. Specifically, the data showed that participants from different cultures had a preference for structures based on integer ratios. The results also showed that these integer ratio structures were preferred more often than other structures, even when the temporal regularity of the stimuli was held constant.

Finally, the speaker summarises his findings and concludes how their study provides evidence for the role of integer ratios in the formation of musical structures and that their findings could be used to inform future research in the field of music cognition.

Summary (Part 2)

The speaker now discusses the findings from his paper "Universal and Non-universal Features of Musical Pitch Perception Revealed by Singing".

He highlights how music is perceived in different cultures. First, he gives a primer on the various psychophysical and acoustic features that contribute to music perception.

After this, he explains the experiment. The experiment used singing in different languages, as well as music from different cultures, and measured the acoustic properties of each song. A comparison of the acoustic properties of the songs to the number of likes and dislikes they received from listeners was also made.

By doing this, it was found that the acoustic properties of the songs had a significant influence on their popularity, but that some of these effects were universal, while others were language-specific.

He also emphasises the importance of considering universal and language-specific features when designing musical activities when concluding.

After that, he briefly touches upon the finding from his paper "Studying the Effect of Oral Transmission on Melodic Structure using Online Iterated Singing Experiments", which examines how music is transmitted through oral traditions.

Then he explains the experiment. An online singing experiment was created, in which participants sang the melody of a song, and then the melody was passed to the next participant. This process was repeated until the melody had gone through all of the participants. The acoustic properties of the melody were measured at each step to see how it changed as it was passed from person to person.

It was found that the melody was modified each time it was passed from one participant to the next, and that some of these changes were universal, while others were culturally contingent.

In summary, the speaker concludes the findings of the paper, reiterating the importance of considering both universal and language-specific features when designing musical activities.

Discussion on Research Papers

The two papers which I found pertinent to the lecture content are: "Musical evolution in the lab exhibits rhythmic universals"[1] and "Motor constraints influence cultural evolution of rhythm"[2].

The following is the set of questions answered for the first paper:

A. What are the primary contributions and takeaways of the chosen paper?

The paper "Musical evolution in the lab exhibits rhythmic universals" provides significant contributions to the field of music cognition and evolutionary psychology. The study identifies universal patterns in the evolution of musical rhythm, suggesting an innate component to the human perception of music. It sheds light on the evolutionary origins of music, demonstrating that it may have evolved as a means of social communication and

[1] Ravignani, A., Delgado, T. & Kirby, S. Musical evolution in the lab exhibits rhythmic universals. Nat Hum Behav 1, 0007 (2017).

[2] Miton Helena, Wolf Thomas, Vesper Cordula, Knoblich Günther and Sperber Dan 2020 Motor constraints influence cultural evolution of rhythm Proc. R. Soc. B.

coordination. The findings contribute to our understanding of the role of music in human evolution and suggest that music may have played a crucial role in the development of human social communication and coordination.

B. How is the chosen paper relevant to the lecture? Which components from the lecture align(and/or misalign) with the paper, and how?

The computer program developed in the study provides a new tool for studying the evolution of music and highlights the importance of cultural context when studying musical rhythm, which is what was highlighted in the lecture as well. The paper offers insights into the evolutionary origins and cross-cultural variability of musical rhythm, providing a new approach to studying the evolution of music.

C. If the hypothesis present in the paper were to be tested in the Indian context, what similarities and differences would you expect? Use the learnings and discussions from the lecture in order to answer this question.

Some similarities that might be observed include the presence of certain universal rhythmic patterns that are found across cultures, such as the presence of strong and weak beats and the use of syncopation. Additionally, some of the principles of rhythmic structure that were identified in the original study, such as the principle of maximal evenness, may also be observed in Indian music.

However, there are also likely to be some significant differences. For example, Indian classical music often uses complex rhythmic cycles and meters that are not found in Western music, and these may not be accurately captured by the computer program used in the original study. Additionally, the perception and preferences for certain rhythmic patterns may differ in the Indian context due to cultural factors such as historical influences, religious practices, and regional differences.

The following is the set of questions answered for the second paper:

A. What are the primary contributions and takeaways of the chosen paper?

The paper provides significant contributions to the field of music cognition and evolutionary psychology. The study demonstrates that motor constraints, such as the physical limitations of the human body, can influence the evolution of rhythmic patterns in music. It shows that certain rhythmic patterns are more likely to emerge and persist in a cultural context when they align with the motor constraints of the performers. The paper offers insights into the complex interplay between biological and cultural factors in the evolution of music and highlights the importance of considering motor constraints when studying the evolution of musical rhythm. Overall, the paper provides a new perspective on the role of motor constraints in shaping cultural evolution and has important implications for understanding the origins and variability of musical rhythm across cultures.

B. How is the chosen paper relevant to the lecture? Which components from the lecture align(and/or misalign) with the paper, and how?

The paper examines how the cultural transmission of musical rhythm patterns is influenced by the motor constraints of the human body, highlighting the complex interplay between biological and cultural factors in the evolution of music. The influence of culture in the evolution of music is established, thereby emphasising the need to have a fair representation of participants in cognitive science experiments, an issue which was raised at the beginning of the lecture.

The study also explores how cultural traditions and transmission can shape the way people move and interact with their environment, impacting the evolution of rhythmic patterns in music. The authors argue that culture plays a critical role in the evolution of musical rhythm, as it shapes the way that people learn, produce, and perceive musical patterns.

Furthermore, it highlights the importance of considering cultural factors when studying musical rhythm, indicating that cultural context can have a significant impact on the evolution of musical patterns. By examining the influence of culture on motor behaviour, the study provides new insights into the relationship between culture and human behaviour, suggesting that cultural traditions and practices can shape the way people move and interact with their environment.

C. If the hypothesis present in the paper were to be tested in the Indian context, what similarities and differences would you expect? Use the learnings and discussions from the lecture in order to answer this question.

Some similarities and differences might be expected. On the one hand, some of the motor constraints that were identified in the original study, such as the limitations of the human body in terms of speed and precision, are likely to be present in the Indian context as well. This suggests that certain rhythmic patterns may be more likely to emerge and persist in Indian music when they align with these motor constraints.

On the other hand, there are also likely to be some significant differences. For example, Indian classical music often uses complex rhythmic cycles and meters that are not found in Western music, and these may present unique motor constraints that are not accounted for in the original study. Additionally, the perception and preferences for certain rhythmic patterns may differ in the Indian context due to cultural factors such as historical influences, religious practices, and regional differences.