

Title: The influence of pitch and time on the perceived complexity in melody

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The perception of music involves complex and nuanced processing, usually with little apparent effort by the listener. Music is perceived through receiving and processing information from numerous dimensions, including pitch and time. How these dimensions work together to influence the perception of melodies is the source of ongoing debate in the research literature.

Much of the psychological research is focused on understanding if pitch and time are processed together or separately. If they are processed separately, changing the characteristics of one should not influence how the other is perceived. On the other hand, if they are processed together then the characteristics of one should influence the perception of the other.

Some of the research suggests that both can occur depending on a number of factors such as the characteristics of the music and the task required of the listener. The concept of dimensional salience has been proposed as a way of understanding these relationships. The theory suggests that one dimension (such as pitch or time) tends to draw the listener's attention more than the other. The aim of this study was therefore to investigate how pitch and time are perceived and the relationship between the two in this context.

In this experiment, prototypicality was used as a way to manipulate pitch and time. Prototypicality is a term used to describe how typical an object is (in this instance a melody). Prototypicality in terms of pitch refers to how closely the notes in a melody align with a standard musical key, while in terms of time (or rhythm) it refers to how closely notes align with a regular musical beat.

Method

This research involved participants listening to a range of different melodies which were be manipulated in various ways. Melodies were constructed in such a way that they were prototypical or atypical in terms of either pitch, or rhythm, or both. Participants were played each melody twice, then asked to rate on a scale of 1 to 7 how complex the melody sounded to them. The procedure was conducted at the music cognition laboratory at Murdoch University and took approximately one hour.

In the experiment, 62 participants rated the complexity of melodic sequences which varied in their level of prototypicality in either pitch, or time, or on both dimension. Of the participants, 11 have five or more years of formal musical training. Some of the participants' results were excluded from the analysis because they only used a small range of responses.

Results

In general, this experiment showed that those melodies that were less prototypical were rated as being more complex by the participants. Pitch was found to have more of an impact on complexity ratings by participants than time. No relationship between pitch and time was found, meaning that when one dimension saw less prototypical it did not have an impact on complexity ratings of the other dimension. There was no relationship between musical training and complexity ratings for pitch or time.

Conclusion

The first finding from the current research is that prototypicality influences how pitch and time are perceived and in particular how complex they appear to the listener. Melodies that were less prototypical on either dimension, or on both, were perceived as more complex by participants.

Results of this study support previous research which has found that pitch is prioritised by listeners. This occurs in certain situations, such as making a judgement about how complex a melody sounds. Other research has shown that time is prioritized by listeners but usually when the task they are required to complete involves specifically attending to rhythm. It has been suggested that listeners who have mostly been exposed to Western music attend more to pitch because this music emphasises melody over rhythm.

The results from this experiment also indicate that pitch and time are processed independently. There is ongoing debate about when and how pitch and time interact, and the current findings support the theory that these dimensions are processed separately. Recent research which shows that pitch and time can be either interactive or independent depending on a number of factors.

For example, it has been found that pitch and time are more likely to interact when they are relatively similar in how complex they are (for example, the number of pitches in a melody, and the number of different note lengths), but they are more less likely to interact when one dimension is much more salient to the listener. This theory was not supported in this instance. Rather than call this into question, the findings suggest that there is still more to be discovered about the nature of the interaction between pitch and time.

The findings of the current research therefore contribute to the body of psychological research into the way pitch and time are perceived. While not directly supporting the model of interaction proposed under the dimensional salience framework described above the current findings did support the concept of dimensional salience more broadly. Insight into the perception of music has benefit for the psychology of perception more broadly, and also has implications for areas outside of psychology, such as music education and composition.