

**Title:** Influence of pitch and time accents on sequence perception  
**Ethics Approval:** 2017/058  
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## **Introduction:**

Music has many properties, such as timing (the duration of the notes, or the time between the notes), and pitch (how high the notes are). When a note has a large change in one of these properties compared to the other notes in a sequence, it creates what is known as an 'accent'. An accent stands out from the other notes, and can indicate the start or end of a group of tones. Previous studies have investigated how accents affect our perception of music. When a musical sequence contains multiple types of accents, there is debate on whether they are both processed into our perception independently (being kept separate), or if they are interactive (processed together).

Before this can be investigated, an equal size of each accent must be determined. This is needed to make sure that any effects found when the accents are combined are produced by the relationship between them, and not because one of the accents was overpowering to begin with. Only few studies have previously recognised the need to equalise the size of the accents, and none of these studies have investigated the impact that manipulating sequence structure through timing differences has on the equal accent levels. Therefore, this study aimed to identify sizes of pitch and timing accents that produce an equal task performance, whilst using musical sequences that varied in regular and irregular structures.

## **Methods:**

There were 34 participants in the study, who all had normal or corrected-to-normal hearing. The reported amount of prior musical training ranged from 0-12 years. First, participants completed a questionnaire asking about their previous musical training. This was followed by a computerised task that involved listening to a series of musical sequences, which at some point also played a 'click' sound. The click was played once through headphones, and participants had to indicate if they heard it in their left ear or right ear. The musical sequences also contained either a regular or irregular pattern of accents.

## **Results:**

The study found that task performance was better when the sequences contained timing accents compared to sequences containing pitch accents. There were no differences in performance when the size of the timing accents were made larger or smaller, nor between sequences containing a regular pattern of timing accents compared to irregular patterns. On the other hand, when participants heard sequences containing pitch accents, performance on the click task was better when the click was played at the same time as an accent within a

sequence comprised of a regular accent pattern. Interestingly, when the size of a pitch accent was larger, the listener's performance on the click task got worse.

### **Conclusion:**

Trials containing larger pitch accents found a decrease in task performance, which suggests the accents may have been distracting the listener. Studies suggest that pitch is processed more preferentially in music, but the current study instead found the timing accents to be more beneficial to task performance than pitch accents. Equal sizes of accents were unable to be identified, but the results do provide further insight into the way attention is allocated towards accents, and the way the perception of stimuli are processed.