

The effects of periodicity and predictability on perceiving rhythmic sound (#3733)

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1) Have any data been collected for this study already?

No, no data have been collected for this study yet

2) What's the main question being asked or hypothesis being tested in this study?

Is the perception of sound affected similarly by temporal expectations based on memory for absolute time intervals and temporal expectations based on the periodicity (regularity) of a sound sequence? We expect periodicity to lead to stronger temporal predictions than memory for absolute intervals, but only for sounds that occur in phase with the periodicity.

3) Describe the key dependent variable(s) specifying how they will be measured.

We create rhythmic sequences of sounds in which the timing of sounds can be predictable or unpredictable, and highly periodic (regular) or weakly periodic (irregular). Infrequently, we introduce a tone that is softer than expected. These deviants can occur in phase with the periodicity (on the beat) or out of phase (off the beat). To index the effect of temporal expectations on participants' auditory perception, we measure reaction times to the deviants and detection rate (number of hits/total deviants) in a speeded response task.

4) How many and which conditions will participants be assigned to?

We have a 2 (periodicity of the rhythm) x 2 (predictability of the rhythm) x 2 (position of the deviant) repeated measures design. All subjects will participate in all eight conditions.

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.

We will conduct repeated measures MANOVAs for both reaction times and detection rates with periodicity, predictability, and position as within-subject factors. For significant interaction effects (at $p < 0.05$), we will define posthoc contrasts to examine the simple effects underlying the interaction.

6) Any secondary analyses?

We will also collect scores for participants on the Gold-MSI musical sophistication questionnaire and the Beat Alignment Test (see Müllensiefen, Gingras, Musil, & Stewart, 2014). These may be used as covariates, as musical sophistication and rhythmic perceptual abilities may affect our results.

7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.

We collect data from minimally 32 participants. This number may increase depending on how speedy data collection goes.

8) Anything else you would like to pre-register? (e.g., data exclusions, variables collected for exploratory purposes, unusual analyses planned?)

Reaction times that are more than 2.5 standard deviations from the mean of a participant's reaction time in a specific condition will be excluded from the analysis as outliers, as will reaction times that are faster than 150 ms. Participants that perform really poorly and have a hit rate of less than 50% (less than 26 data points) in all conditions, will be excluded from the analysis. Participants that have less than 5 valid reaction times in any one condition (less than 10% hit rate) will be excluded from the reaction time analysis, but will be included in the analysis of the hit rates.