# The Physiology of Musical Preference: A Secondary Analysis of the *Study Forrest* Dataset

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## INTRODUCTION

**Music** is a very prevalent part of our lives, and many of us consider our **musical preferences** to be unique and personal to us.

**Musically induced emotions** as well as **responses to preferred music** can be measured via psychophysiology and brain activation.

**Secondary analyses of existing datasets** can be feasible, efficient, and collaborative ways of exploring multiple questions.

**The goals of this analysis** are to explore possible physiological correlates to musical preference, while also presenting a feasibility report of performing *post hoc* analyses on a dataset not originally designed to answer these questions.

## HYPOTHESES

**H1:** Participants' degree of physiological response (|%ΔHR|, |%ΔBR|, |%ΔHRV|) will be positively correlated with their preference for each of the stimulus genres.

**H2:** Participants' physiological response (%ΔHR, %ΔBR, %ΔHRV) will correlate with the "Mellow" and "Intense" STOMP-R factor loadings of the stimuli.

## METHODS

We modeled free-form, self-reported musical preferences using the revised **Short Test Of Musical Preferences (STOMP-R)**.

Both types of physiological data, **respiratory and cardiac (PPG)**, are preprocessed and then go through a peak detection algorithm to identify breaths and heart beats, respectively.

From the data, we calculate breathing rate **(BR)**, heart rate **(HR)**, and two heart rate variability **(HRV)** metrics: **SDNN and rMSSD**. These metrics are all normalized for each participant using their overall average as the baseline.

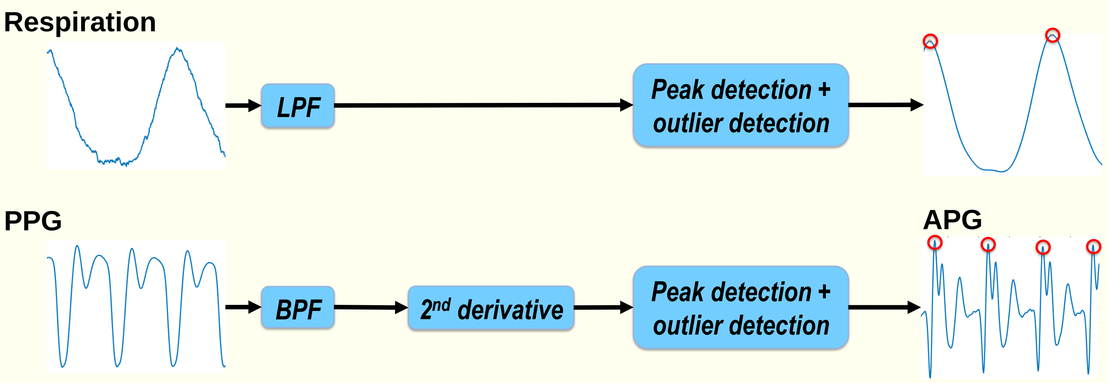


*Fig. 1: Preprocessing block diagram for calculating physiological response*

## RESULTS

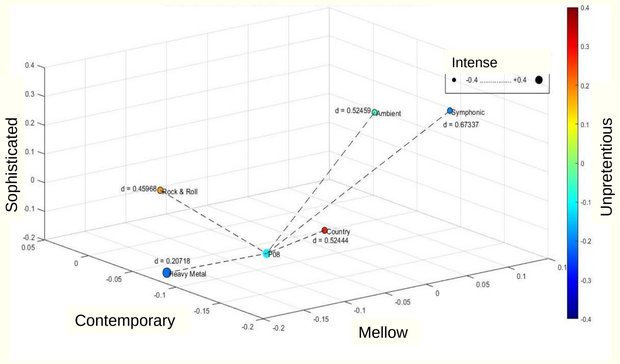


*Fig. 2: An example of "preference distances" between P08 and the 5 stimulus genres*

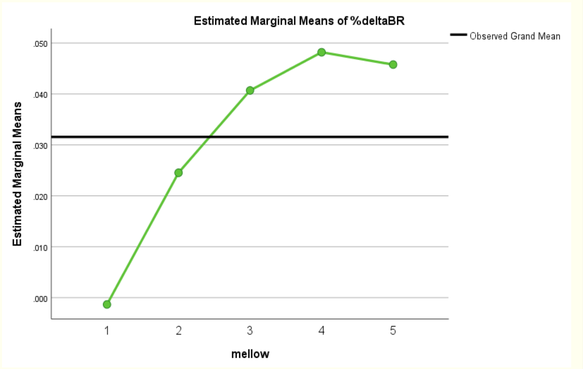


*Fig. 3: Effect of STOMP-R "Mellow" factor on breathing rate*

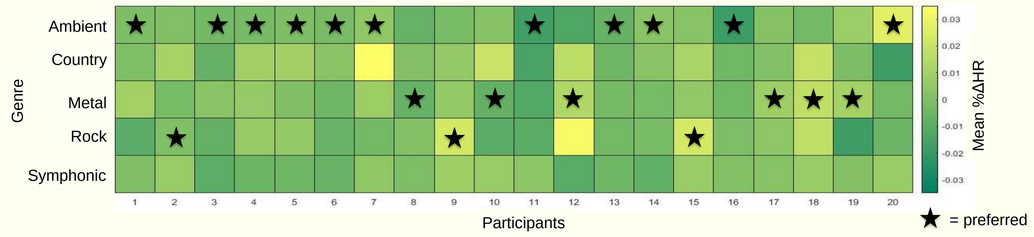


*Fig. 4: Summary of participants' avg %ΔHR with each of the five genres they were shown*

We were able to **quantitatively calculate preference** by computing a 5-dimensional **"preference distance"** between each participant and the stimulus genres.

MLR as well as a subsequent repeated measures ANOVA test both showed that **preference did not have a significant effect** on the tested physiological metrics.

Results from a repeated measures ANOVA test indicated that the **"Mellow" and "Intense"** STOMP-R factor loadings did not have significant effects on HR or HRV but **did have a significant effect on BR** ($p$ = 0.024).

## DISCUSSION & FUTURE WORK

**H1 was unsupported** by this analysis, which is not surprising given that this dataset was not originally designed for preference research.

**H2 was partially supported** through the respiration, but not cardiac, analysis. This is a result supported by prior literature. Although both are autonomically regulated, breathing is the only function we are also able to consciously control.

We find these results promising considering this is a secondary analysis on a dataset designed with other aims. We plan to design and conduct our own study to further explore these questions.

## REFERENCES


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