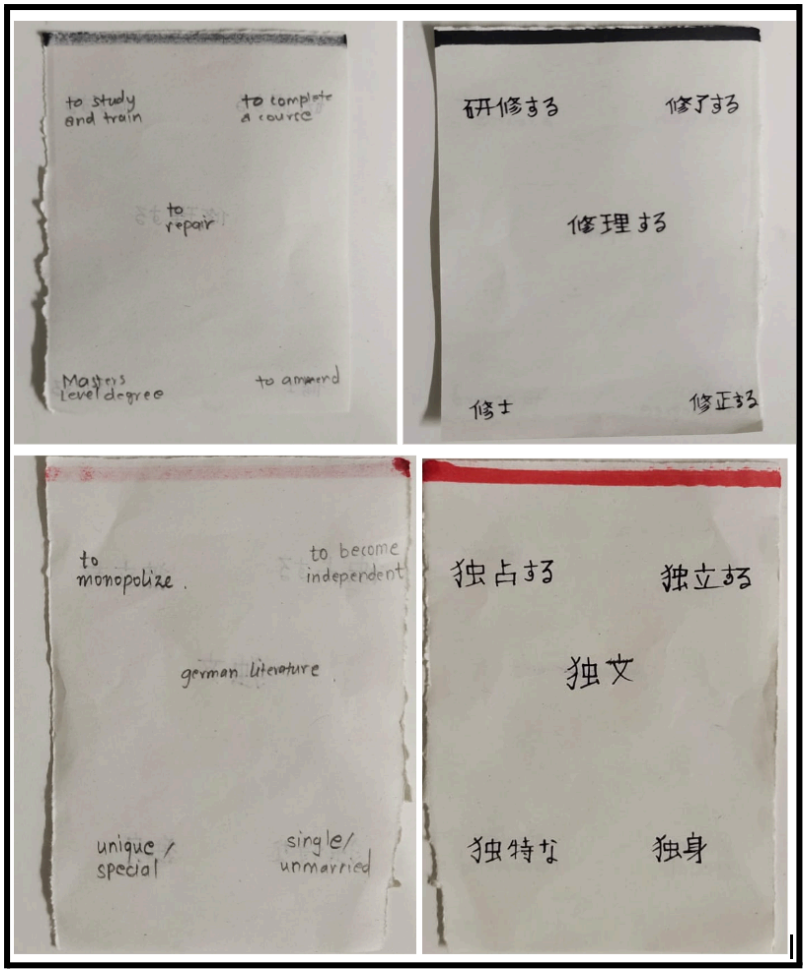
Memory X Music

Experiment-I Report

INTRODUCTION :
We often hear that listening to music puts us in a better state due to which we perform better at a number of different tasks. I wanted to learn the meanings of various japanese words I read on websites, signs, governmental buildings, etc.
The catch is, I don't know that many Kanji's. So I performed the following experiment to find out how many new words my mind is able to grasp before and after listening to music?

PREREQUISITES:
Make flash cards where each card has words in Japanese on one side and in English on the other. Make sure you have 2 decks of cards, marked with different colours. This is so that you do not use the same cards while not listening and listening to music.
Each card contains words which have at least 1 kanji which is similar in all the words.

Examples are given below
Black Cards : For learning without music
Red Cards : For learning with music



EXPERIMENTAL SETUP:

Writing the japanese words : I made sure that each deck has an equal number of adjectives, nouns etc to make sure both decks have equally difficult japanese words.

Following were the steps I took to perform the experiment.

(1) Don't listen to any music at least 1 hour before the experiment.
(2) Take the cards from the black deck and try to associate the words in Japanese and their meanings in English.
(3) Do this for 10 mins with as many cards as you can
(4) Take rest for 10 mins and then test how many words you were able to get correct
(5) Take a gap of 30 mins
(6) Listen to music for 10 mins (EDM or your favourite genre of music)
(7) Immediately take the red deck and similarly try to associate the words in Japanese and their meanings in English.
(8) Take a rest for 10 mins without listening to music and then check how many words you got correct this time.
(9) Start the experiment again the next day with a new set of cards. Do not use the same cards again since they will be easier to remember and we will then be comparing long term memory which is not the objective of this experiment.

OBSERVATIONS:

Following were the observations for 5 different days

	without_music	with_music
1	19	23
2	24	24
3	21	26
4	19	20
5	24	23

We can see on Day 1, I got 19 words correct without music and 23 with music.
Rest are values for other days.

STATISTICAL INTERVALS AND SOME VISUALISATIONS:

Following are the values for Mean, Median , 1st and 3rd Quartile

```
without_music    with_music
Min.   :19.0   Min.   :20.0
1st Qu.:19.0   1st Qu.:23.0
Median :21.0   Median :23.0
Mean   :21.4   Mean   :23.2
3rd Qu.:24.0   3rd Qu.:24.0
Max.   :24.0   Max.   :26.0
```

The values for a 95% confidence interval are as follows

```
       Variable Mean       SD       SE CI_Lower CI_Upper
1 Without Music 21.4 2.509980 1.122497 18.28345 24.51655
2    With Music 23.2 2.167948 0.969536 20.50814 25.89186
```

Values for 95% confidence interval

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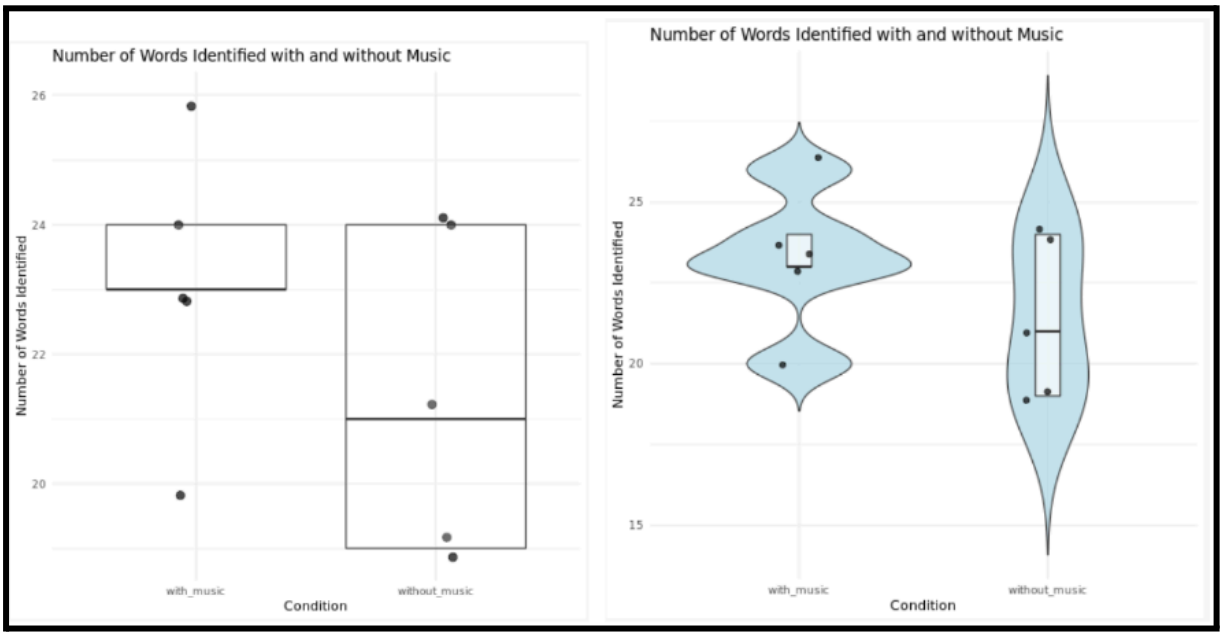
Difference in means: 1.8
95% Confidence Interval: -1.620357 to 5.220357
```

Boxplot and the Violin Plots are as follows



DISCUSSION:
We observe that the mean and median are higher in the music case than without music. Also we can see with the boxplot and with the violin plot that my performance is higher with music. There seems to be less deviation and more predictability in my performance with music which can help me come close to knowing info like what is the rate at which I can learn japanese words, etc.
Practically, it seems to be good enough for me to do this on a regular basis.

The number of samples here were limited to 5 but I intend to continue this experiment throughout this semester and see how much improvement I make in reading Japanese words. I also intend to add another variable (running) so that we can make some interesting comparisons.

REFERENCES :
I used the Kanji Basic Plus app used in the Japanese School (CEGLOC) at the University of Tsukuba for getting Japanese words which were equal in terms of difficulty.