

Stat 101B-Project Proposal

Group information:

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Name: Xuan Lin 204278880

Name: Chi Cho 604210789

Name: Junjie Qiu 204213563

Name: Xiaoyu Wang 604327727

Description:

The purpose of our project of experiment on the islanders is to test how methamphetamine affects the islanders' physiological capability and also if heavy metal music has influence on the effect of performance in running. Good physical capability can contribute to the success in sport career. Before Olympic Games or some sport games, a majority of athletes have to consume energy drink for strengthening their performance while in practice. So, we want to discover if the effect of methamphetamine could improve our athletes' performance and help them succumb the goals and free their fear in the competition. Our experiment is designed to how much the different amount of methamphetamine can affect running out door in 100m and how it is related to heavy metal music in order to find if music can stimulate the effect of methamphetamine.

We choose methamphetamine and whether to listen to heavy metal music or not as our treatment factors. Methamphetamine injection is the controlled treatment factor, and heavy metal music is the nuisance treatment factor. And in order to specify the result out, we are also going to test how different levels of treatment affect time of a lap by setting three levels amount of methamphetamine treatment like 50mg, 100mg, and 150mg. And the response factor to test their physical capability is running 100m outdoor. So, the response variable is the time in running 100m outdoor. Other nuisance factors are the pre-existing health problem for each person, gender, age and etc. We will randomly select 10 observations (islanders) from the population, and assign a number on each observation. We random assign methamphetamine levels (50mg, 100mg, 150mg) to the 10 observations, and record the result of 5 of them running tests a certain time without offering heavy metal music to each subject. The time gap between treatments and doing running is 30 minutes, which is held-constant. Then, we offer heave metal music after the injection to the rest of 5 observations, and also random assign 3 levels amount of methamphetamine to the this groups. After that let them redo the running tests after 30 minutes. Similar to this process, we will do replications of the experiment and collect data of 50mg, 100mg, and 150 mg methamphetamine injection on all observation both with and without heavy metal music. One nuisance factor of the experiment is the pre-existing health problems that might affect the memory test. However, we randomize the assignments to all observations, which reduce the effect of this. There still exist some other nuisance factors, like learning effect, gender, age, ability of learning, races, family history and education levels. After we collect all data from observations, we will test on different amount of methamphetamine affect the physical capability or not, if heavy metal music has effect on physical capability, and if interaction affect it as well. Then we will use R to show the plot and statistical analysis to prove our hypothesis.

- 1) One response variable: time in running outdoor 100m
- 2) Two treatment variables; heavy metal music(Nuisance), methamphetamine(50mg, 100mg, 150mg, controlled)
- 3) One controlled variable: Time gap between injection, type of heavy metal music, environment
- 4) Nuisance factors: pre-existing health problems, learning effect, outdoor temperature, age, gender, education levels and etc.

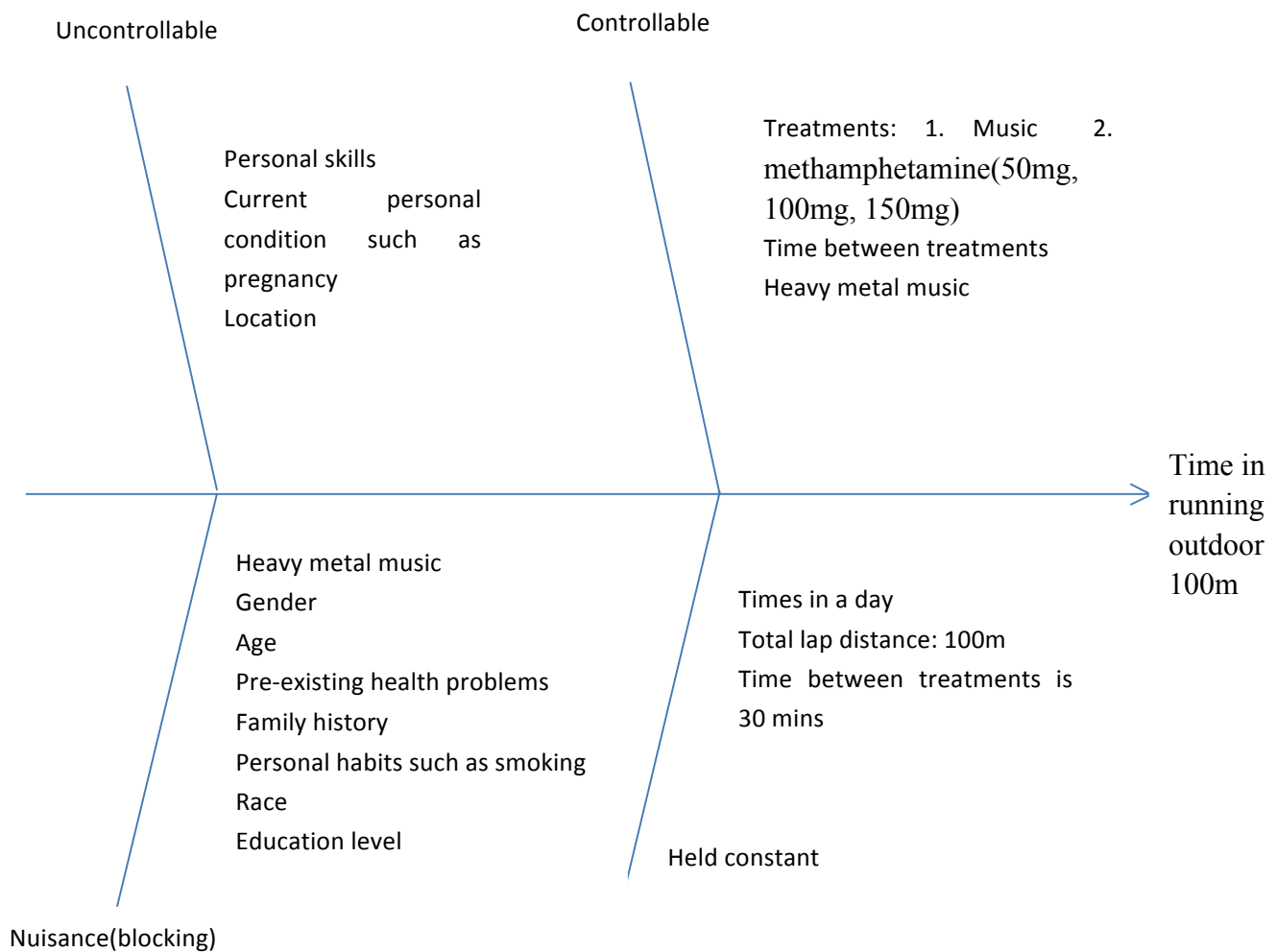
Our sample is collected from the island home. Also, our analysis based on 10 observations. Here is our data:

methamphetamine injection

Name	Residence	music	injection	runtime				
james mccarthy	fairheaven	no	50	13.7				
james mccarthy	fairheaven	no	100	14.7				
james mccarthy	fairheaven	no	150	14.7				
jose kennedy	sunrise	no	50	19.6				
jose kennedy	sunrise	no	100	19.6				
jose kennedy	sunrise	no	150	18.5				
daichi gonzalez	macondo	no	50	16.4				
daichi gonzalez	macondo	no	100	15.5				
daichi gonzalez	macondo	no	150	15.2				
shuana durand	point dubois	no	50	19.1				
shuana durand	point dubois	no	100	18.1				
shuana durand	point dubois	no	150	17.5				
saika carrasco	edwardton	no	50	14.2				
saika carrasco	edwardton	no	100	13.6				
saika carrasco	edwardton	no	150	13.5				

chloe castro	naoki falls	yes	50	19.9				
chloe castro	naoki falls	yes	100	20.5				
chloe castro	naoki falls	yes	150	19.4				
Josefa steiner	gorda	yes	50	23				
Josefa steiner	gorda	yes	100	23.5				
Josefa steiner	gorda	yes	150	21.4				
Megane steiner	rockford	yes	50	23.4				
Megane steiner	rockford	yes	100	24.5				
Megane steiner	rockford	yes	150	24.3				
Aya lopez	pollina	yes	50	18.3				
Aya lopez	pollina	yes	100	18.3				
Aya lopez	pollina	yes	150	17.2				
Jamie durand	carrasco	yes	50	17.8				
Jamie durand	carrasco	yes	100	17.3				
Jamie durand	carrasco	yes	150	16.1				

Cause and effect Diagram



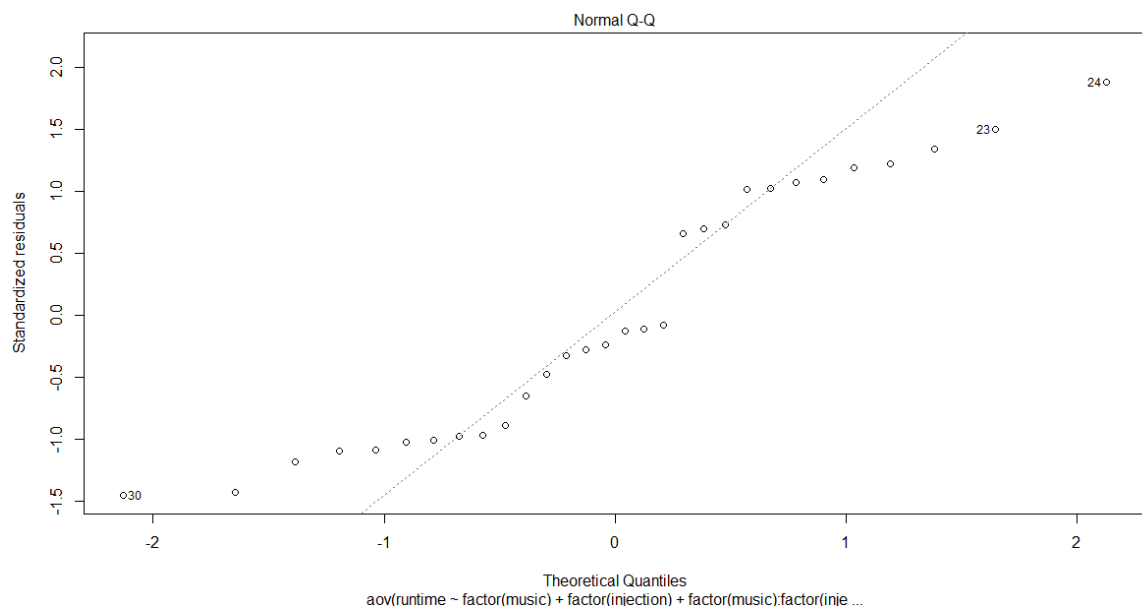
F-statistic Analysis

```
> output = aov(runtime ~ factor(music) + factor(injection) + factor(music):factor(injection), data = methamphetamine)
> summary(output)
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
factor(music)	1	124.03	124.03	16.433	0.00046
factor(injection)	2	3.95	1.98	0.262	0.77171
factor(music):factor(injection)	2	0.78	0.39	0.052	0.94983
Residuals	24	181.15	7.55		

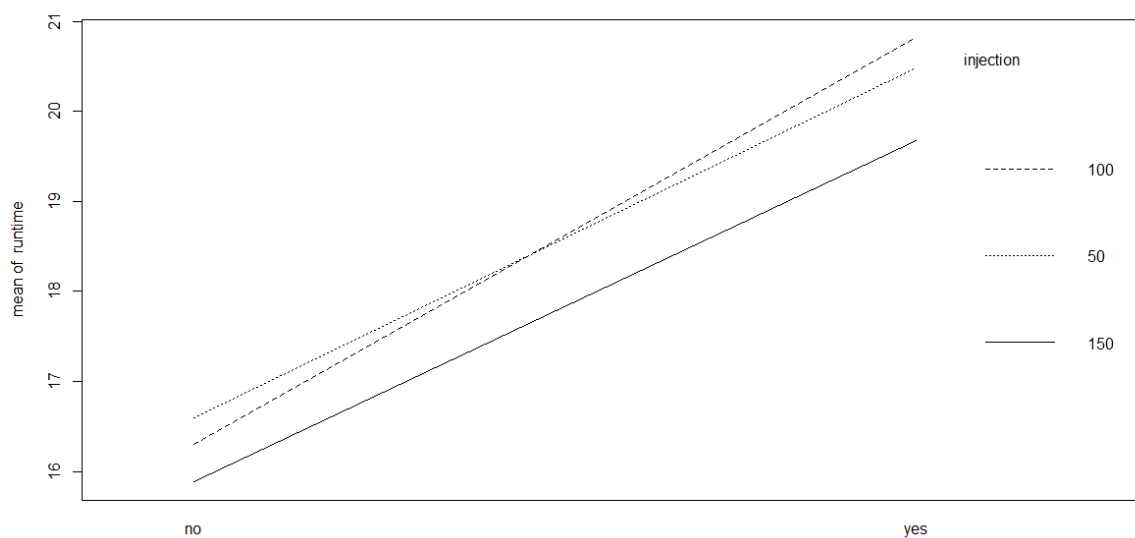
Conclusion: Based on the data above, when the significance level $\alpha=0.5$, all the $p\text{-value} > 0.05$, we failed to reject the null hypothesis and we believe we don't have enough evidence and sample size to claim that factor of injection and music and their interaction have effects on the results of improving physical performance. In our opinions, since the sample size is so small, we can't make it accurate and may have the error that we may fail to reject the null.

plot(output)



Conclusion: It is shown qq-plot suggestive of Normal distribution.

```
>with(methamphetamine,interaction.plot(music,injection,runtime  
)
```



Conclusion: The interaction plot shows us that methamphetamine with 50 mg and 100 mg have better effect than 150mg on increasing physical performance with heavy metal music. And, it seems heavy metal music play a significant role to stimulus athletes' performance.

Agenda

Week 3-4

-We will focus on preliminary data collection on islanders needed for the future experiment, also figure out variables for the experiment.

Week 5-7

-We will analyze all data and variables including in the experiment, and we try to make the experiment design more completed.

Week 8-9

-We will make a conclusion for our experiment and create a complete report by data and graphs to make a conclusion.

Week 10-Final

-We will revise and summarize all proposals and create a PowerPoint presentation according to all the results.