How does emotion-inflicting music affect memory?

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Background/Related Work

- Lots of work has been done on the intersection of music, emotion, and memory
  - Various studies have looked at the influence of listening to music on episodic memory, working memory, long term memory, and cognitive function in general.
- Example work:
  - “Emotional responses to pleasant and unpleasant music correlate with activity in paralimbic brain regions.”
  - “Let the music play or not: The influence of background music on consumer behavior.”

Research Question: How does emotion-inflicting music affect memory?

Variables:

- Independent: Type of music (ex: Happy song vs. Sad song vs. No music)
- Dependent: Score out of 100 on the memory test
  - One point per correct word
- Control: Same set of words to remember, same time constraints, same songs, same setting, same song order, major, every participant does each group with different words so any carry-over effect is controlled
- Moderator: IQ, music preference, age/level of study, current emotional state

Null Hypothesis: the type of music has no effect on memory
Alternative Hypothesis: the type of music does have a effect on their score

Experiment

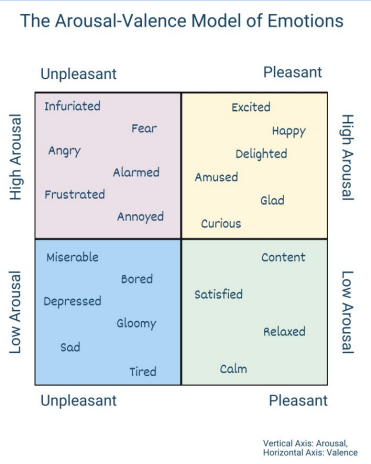
- Ask 10 Computer Science students to participate (7 undergraduate, 3 graduate)

Control	Music 1	Music 2
No Music	Happy Music	Sad Music

SILENCE	Songs:
	- Walking on Sunshine by Katrina And The Waves
	- Happy by Pharrell Williams
	- September by Earth, Wind & Fire
		- Songs:
		  - Someone Like You by Adele
		  - Train Wreck by James Arthur
		  - All of Me by John Legend

Experiment Continued

- Participants fill out the arousal-valence worksheet.
- For the duration of the three songs (11-12 minutes), the participants memorize a list of 100 words.
  - List of words is different for every group
- There is be a 20 second interval then they have three minutes to write down as many words as they can.
- They all complete all groups with different words.
- Participants fill out a post-experiment survey.



jug	sift	food
wet	snug	room
hid	flux	paw
set	frond	pie
pig	drift	feet
sap	brisk	loop
dip	lest	real
rid	slept	roof
rip	murk	pout
red	car	yawn
tab	smirk	noun
dim	mark	vow
mat	dirt	
bed	born	
sag	lord	
nun	per	
not	farm	
dot	part	
lit	snort	
gob	herd	
pack	tart	
mock	fur	
them	bar	
shop	harp	
dock	vote	
duck	hare	
dash	cute	
puck	dire	
tick	rope	
dish	lace	
sick	hike	
sack	came	
pick	bike	
bash	cove	
buck	dive	
check	tube	
scat	time	
grub	cope	
skip	sane	
clunk	late	
print	keen	
craft	gown	
melt	seek	
crux	mow	

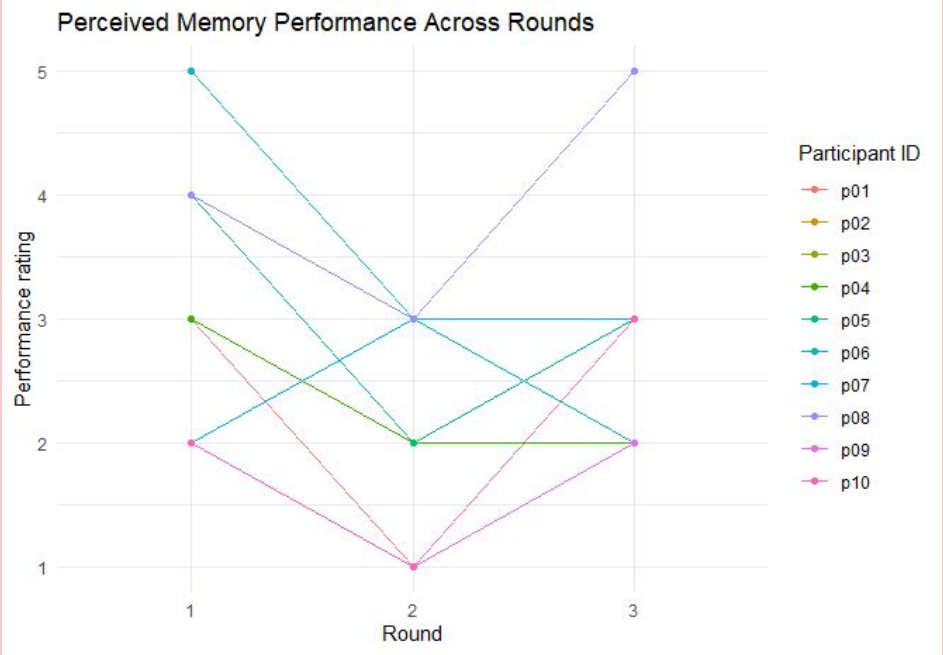
Testing

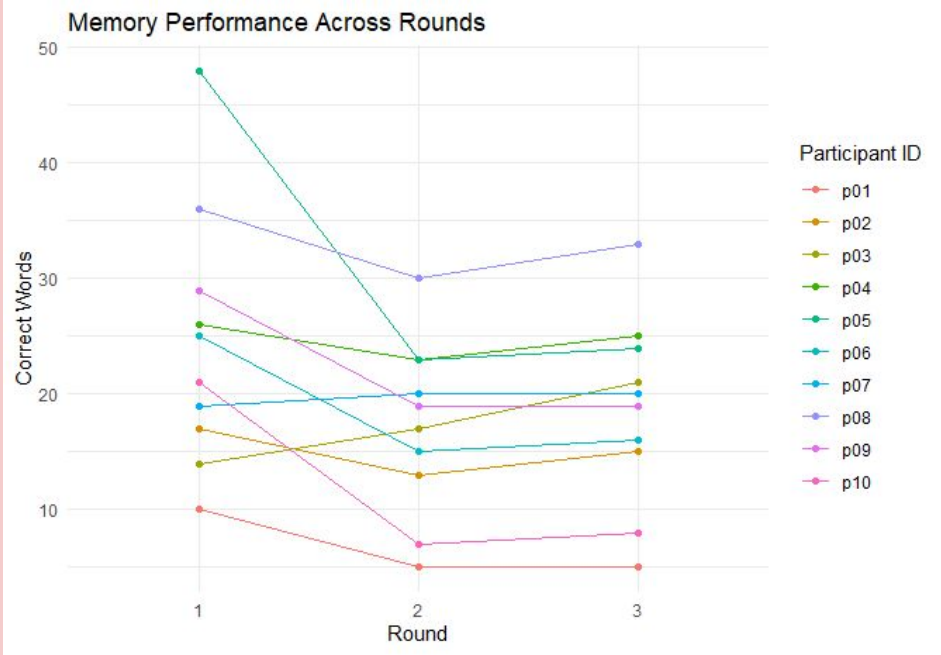
- We used Mixed-effects model and repeated measures ANOVA tests to determine whether music had any impact on participants' memory
- Post-hoc analysis on ANOVA model to get pairwise comparisons between rounds
- Descriptive stats:
  - 10 Northeastern students aged 20-24 years old, 7 undergrads and 3 grads
  - Most listen to 1-2 hrs or 4-6 hrs of music on average daily
  - Most had 6-8 hours of sleep the night before the experiment
  - Most had a self-reported physical well-being of average or better

Results

- Both models show a significant decrease in memory performance between control and the 2 music rounds
- However, there is a slight increase in performance with sad music than with happy music (not significant)
- Perceived performance of the participants was also recorded and they felt the music was a bit distracting but sad music to be better for memorizing than happy music

Results (Contd.)





Round 1: Control

Round 2: Happy music

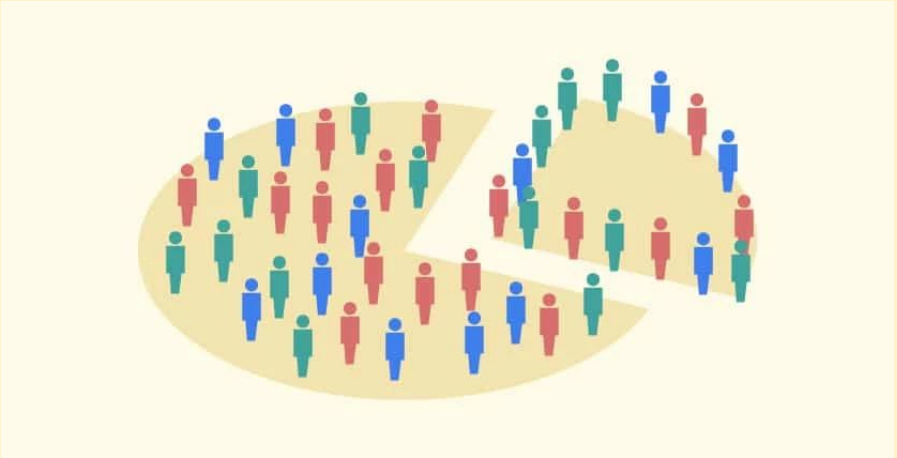
Round 3: Sad music

Discussion

- Interesting to note that participants did notice a decrease in performance between rounds 1 and 2
- But some felt that they performed their best with sad music
- Even though there is no significant difference, we did notice an increase during sad round compared to happy round
- Actual performance, however, is significantly worse during both music rounds
- These results may disprove our current hypothesis, but open up future avenues of research by tweaking our hypothesis like analyzing different types of memory or focusing on different music genres

Limitations

- Sample size
  - Would’ve liked more participants
- Time constraints
  - Would’ve changed the experiment design



Future Research

- Try the experiment with instrumental music
- Use a more standardized approach to choose songs
- Test memory for longer durations
- Use more variety of memory tests