



# **MUSIC AND MARIO-KART**

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# INTRODUCTION

- One of the major distractions while driving is listening to music or the radio. Research of the effects of music as a distraction on driving capabilities is important because it furthers our understanding of the impact of everyday disturbances we encounter while in the car. From studying distractions on driving abilities, we can determine situations in which it will negatively impact people's daily lives. This experiment was conducted to determine if more accidents will occur at different levels of music volume. Previous research on the study of the effects of volume levels while driving suggests that distractions impact driving capabilities and influences the amount of accidents.



# THE EFFECTS OF MUSIC ON TIME PERCEPTION AND PERFORMANCE OF A DRIVING GAME

G.G. CASSIDY AND R.A.R. MACDONALD

- In the study conducted by Cassidy and Macdonald, they set out to determine if high arousal and low arousal volumes of music affected people's driving abilities while performing a simulated driving operation.
  - There were 70 participants in the study, 38 male and 32 female. Participants were between the ages of 18-25 and mainly undergraduate university students.
  - This was a within group study. Participants completed the driving simulation for all 7 conditions, including a control group, a low level music arousal group and a high level music arousal group. They then recorded 6 measures, including time and accuracy.
  - Participants were asked to be in the study and completed a consent form to eliminate other confounding variables within their study. Participants were then asked to complete a set of three laps on a simulated driving apparatus. They did this for each of the 7 sound conditions and after completed a post-experiment questionnaire rated self estimates of performance and experience. Experimenters recorded the dependent variables while each participant performed the driving task. They found that low volume music had a higher finishing time with less accidents and higher music volume created a lower finishing time but with more accidents.
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# BACKGROUND MUSIC AS A RISK FACTOR FOR DISTRACTION AMONG YOUNG-NOVICE DRIVERS

WARREN BRODSKY AND ZACK SLOR

- In the study by Brodsky and Slor, they designed an experiment to find out if the type of music listened to while driving affected driving abilities.
- There were 85 participants. They were on average 17.6 years old and all had a valid driver license for at least 7 months. The experiment was took place in Israel.
- This was a within groups study. Each participant traveled by car while listening to one of 3 sound conditions; a driver preferred music group, an experimenter decided music group and a control music group. Experimenters collected data by recording the number of times there was a driver deficiency. This was done by giving either a verbal warning or a brake intervention to avoid collision. They found that driver preferred music created more accidents.



- From previous studies and research done on music and driving abilities from Brodsky and Cassidy, we have enough evidence to support our hypothesis. We applied previous findings from the articles to our experiment to further the statistical significance of our results.
- We based the design of our experiment off of prior research. We used the driver simulation apparatus, Mario Kart, and measured the effects of music volume on number of accidents and overall time taken to complete the course.



# HYPOTHESIS

- Our hypothesis for our experiment is that the higher the music volume, the more accidents will be caused at a longer finishing period.
- The control group will have the least accidents and use least amount of time to finish the course. The Low volume group will have more accidents and a higher time than the control group, but less than the high volume group. The high volume group will have the most accidents and take the most time to finish the course.



# METHODS

- Participants-
  - 25 females, 20 males
  - At least 18 years of age
  - Had to have played Mario Kart at least once before
  - No volume: 18, Low volume: 15, high volume: 12



# METHODS CONTINUED...

- Materials/apparatus
  - Wii
  - Steering wheel controller
  - Mario Kart 8 game
  - Beats by Dre Headphones
  - Pen/ Survey
  - Iphone
  - Song Choice: Bahamian Rhapsody by Queen
  - Randomizer





# METHODS CONTINUED...

## ○ Procedure

- Participants randomly assigned
- Given the survey sheet to fill out.
- Told directions- stay on course as best as they could and to put on the headphones
- Music volume was adjusted depending on condition (L: 5 bars, H:10 bars, Control: 0 bars)
- Music started playing if they were in L or H Condition
- All played on the same track using the same car and character
- During the game, experimenter counted the amount of times all four wheels of the car came off the road (accident)
- Time was recorded
- Debriefed participants



## METHODS CONTINUED...

- Anything unusual in experiment?
  - Our beats headphones ran out of battery so we used ear buds and put the beats over them
- Put in excel

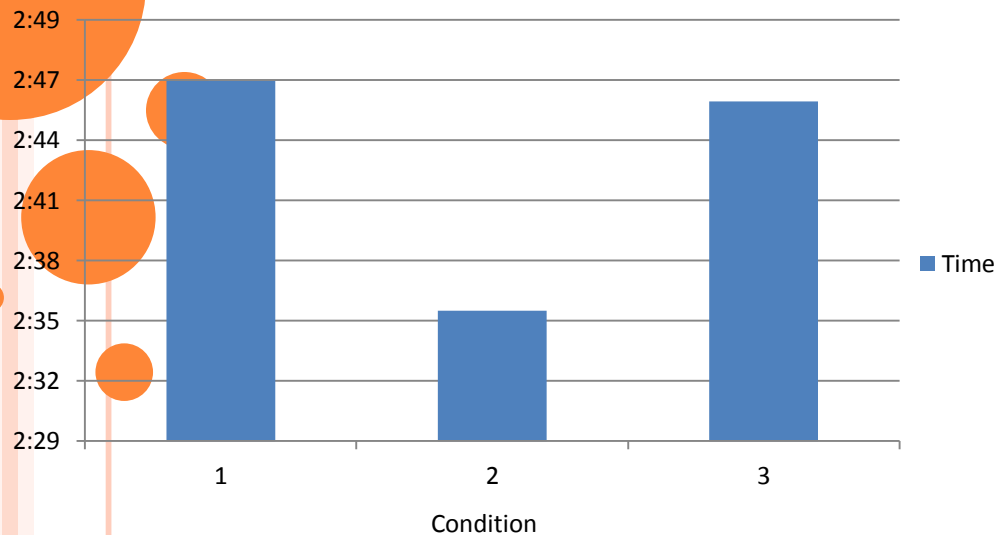


# Results

The total mean time was  
 $M=2:43$ ,  $SD=0:20$

The effects of volume on the total time taken to complete the course there was no significant effect found [ $F(2,42)=1.28$ ,  $p>.05$ ].

**Figure 1: Mean Amount of Time**

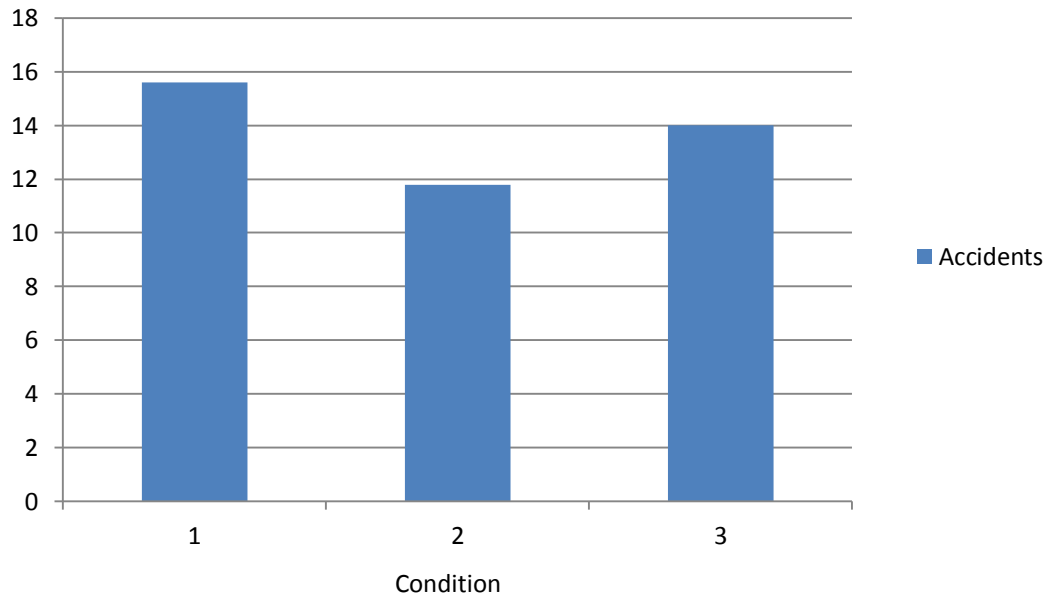


# RESULTS

The total mean number of accidents was  $M=13.91$ ,  $SD=6.7$

When looking at the effects of volume on the number of accidents committed there was no significant effect found [ $F(2,42)=1.36$ ,  $p>.05$ ]

Figure 2: Mean Number of Accidents



## SUMMARY OF RESULTS

- Alternate hypothesis 1: The high volume condition(7 notches) would produce the most increased number of accidents among drivers.
- Alternate hypothesis 2: The high volume condition(7 notches) would take drivers the longest amount of time to complete three laps.
- none of the alternate hypotheses were supported by evidence, this says that the high volume condition(7 notches) would not produce the most accidents among drivers nor the greatest time taken among drivers.




# BACKGROUND MUSIC AS A RISK FACTOR FOR DISTRACTION AMONG YOUNG- NOVICE DRIVERS (BRODSKY, W. & SLOR, Z, 2012)

- The purpose of the study was to explore the effects of driver-preferred music on driving behavior.
  - Distraction was measured by driver deficiency (miscalculation, aggressiveness, violations)
- 3 driving conditions:
  - -two trips: DrvPrefMus (driver preferred music)
  - -two trips: InCarMus (alternative)
  - -two trips: NMus (control)
- Results: driver deficiency
  - 510 trips -> 61 (12%) were without violation
    - 77 (90%) committed 1 violation
    - 78 (92%) one violation without music
    - 84 (98%) with preferred music



# BACKGROUND MUSIC AS A RISK FACTOR FOR DISTRACTION AMONG YOUNG-NOVICE DRIVERS (BRODSKY, W. & SLOR, Z, 2012)

- The results that Brodsky et al. in relation to our results is below.
  - Did not support our findings
    - significant difference between violations without music and preferred music
    - trips with driver preferred music significant more severely deficient driving behaviors, miscalculation, inaccuracy, traffic violations, aggressiveness.
  - Did support our findings
    - perceived driver caution: no significant difference with or without music.
    - driving with alternate music produced significant less deficient driving behavior like violations, aggression than preferred music.
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# THE EFFECTS OF MUSIC ON TIME PERCEPTION AND PERFORMANCE OF A DRIVING GAME (CASSIDY, G. & MACDONALD, R., 2010)

- The purpose of the study was to see whether self-selected music would create more or less distracted driving game performance than experimenter-selected music.
- 6 measures tested(some listed below)
  - 1) estimated times
  - 2) estimated inaccuracies
  - 3)actual inaccuracies
  - 4)actual time
- Seven conditions total(some listed below)
  - 1)silence
  - 2) low arousal music (peaceful and relaxing)
  - 3)high arousal music (faster tempo music)
  - 4) self-selected music
  - 5) car sounds





# THE EFFECTS OF MUSIC ON TIME PERCEPTION AND PERFORMANCE OF A DRIVING GAME (CASSIDY, G. & MACDONALD, R., 2010)

## Results

- main effect of sound on lap condition,
- lap time shorter for high arousal overall,
- low arousal took longest and had more inaccuracies than silence but less than high, H-arousal 18.7, low arousal 7.4, silence 6.5
- participants over est. time in self-selected and under est. in experiment selected.
- main effect of sound on est. inaccuracies.
- self selected inaccuracies 3.0, lap time was 99.2, and h-arousal lap time was 98.8, silence was longer than car sounds.



# THE EFFECTS OF MUSIC ON TIME PERCEPTION AND PERFORMANCE OF A DRIVING GAME (CASSIDY, G. & MACDONALD, R., 2010)

Cassidy et al. findings were some what related to our findings

- Did support our findings
  - lap time shorter for high arousal
- Did not support our findings
  - Low arousal music took longest, and had more inaccuracies than silence.
  - Main effect of sound on inaccuracies and lap conditions



# LIMITATIONS OF STUDY

## Methodological Issues

- Applicability of the Driving Task
- Head Phone Qualities
- Environment
- Operational Definitions of DVs
- Experience
- Limited Participant Number
- Inter-rater reliability
- Limited Factors in Music
  - Preference, Volume, Tempo, etc.



# FUTURE IMPLICATIONS

- While the results of this study were not supportive of our original hypotheses, it did show a consistency between time and accidents in the three factorial levels. With a greater restriction of confounds and higher participant number similar studies may be able to reach a more significant result regarding the influence of music volume on driving behaviors
- Additional Research may want to investigate various other measurements of driving behaviors and conditions stemming from music volume.



# REFERENCES

- CASSIDY, G.G. and MACDONALD, R.A.R. (2010), The effects of music on time perception and performance of a driving game. *Scandinavian Journal of Psychology*, 51: 455–464.
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