



# **Deciphering Downtime in Disney:** Exploring the Impact of Attraction Downtime in Walt Disney World

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# Walt Disney World

- Four parks: Magic Kingdom, Epcot, Hollywood Studios, and Animal Kingdom
- Each park includes various attractions guests can enjoy
- Touring Plans helps guests navigate the parks to enjoy as many attractions as possible





# Epcot

- Most spread-out of all four parks
- **10** attractions in our data set
- Focused on closures in Remy's Ratatouille Adventure
  - Popular ride with high throughput
  - Isolated from other rides in Epcot





# Goal of Research

**Downtime:** a period of time when guests are unable to ride an attraction due to inclement weather, mechanical issues, etc.

If a ride goes down, where does that excess demand go?

- Migrate to rides in close proximity?
- Go to rides of similar caliber (thrill, sentimental, kid-friendly)?
- Do decisions differ based on time of day?



# Our Data

- Posted wait times for each attraction in 15-minute intervals over 165 days
- **Throughput:** how many guests each attraction can service per hour on average

Mission  
Space  
800 people  
per hour

Frozen  
1076  
people per  
hour

Spaceship  
Earth  
2200  
people per  
hour

- A ride with a lower wait time may have a higher throughput
- **Goal:** Convert wait time to throughput

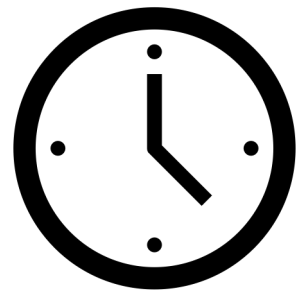




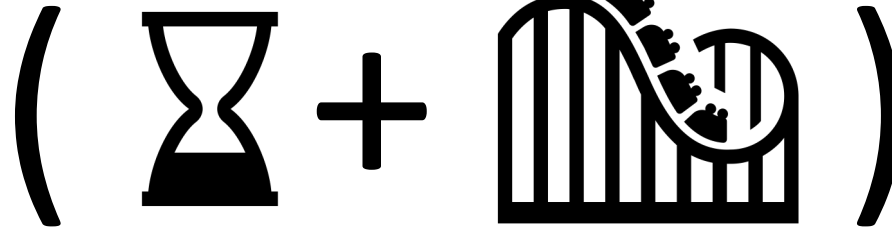
# Little's Law

Average Inventory = Average Time in System x Average Arrival Rate of Items

Average Hourly Throughput = (Average Wait Time + Ride Duration) x Hourly Capacity

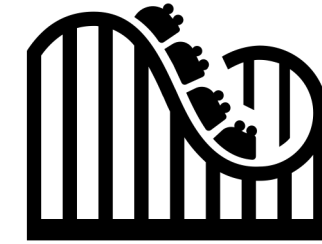


At 9:30am



Wait Time

1.25 hours



Ride Duration

0.08 of an Hour



Capacity

1076 people/hour

Conclusion: 1,431 People Are in Line or Riding Frozen from 9:30-10:30am

# Understanding Our Data


## **Attraction 1**

9:00am	15 Minute Wait
9:15am	30 Minute Wait
9:30am	20 Minute Wait

# Understanding Our Data

## Attraction 1

9:00am	15 Minute Wait	200 People
9:15am	30 Minute Wait	400 People
9:30am	20 Minute Wait	300 People





# Understanding Our Data

	<b>Attraction 1</b>	<b>Attraction 2</b>	<b>Attraction 3</b>	<b>Total</b>
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9:00am	200 People	150 People	150 People	
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9:15am	400 People	75 People	125 People	
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9:30am	300 People	100 People	200 People	
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# Understanding Our Data

	<b>Attraction 1</b>	<b>Attraction 2</b>	<b>Attraction 3</b>	<b>Total</b>
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9:00am	200 People	150 People	150 People	500
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9:15am	400 People	75 People	125 People	600
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9:30am	300 People	100 People	200 People	600
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# Understanding Our Data

## Attraction 1   Attraction 2   Attraction 3

9:00am	40%	30%	30%
9:15am	66.67%	12.5%	20.83%
9:30am	50%	16.67%	33.33%

# Understanding Our Data

	Attraction 1	Attraction 2	Attraction 3
9:30am	40%	16.67%	33.33%
9:45am	0%	20%	80%
10:00am	20%	30%	50%



# Understanding Our Data

	Attraction 1	Attraction 2	Attraction 3
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9:30am	40%	16.67%	33.33%
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9:45am	0%	20%	80%
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10:00am	20%	30%	50%
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# Understanding Our Data

## Attraction 1   Attraction 2   Attraction 3

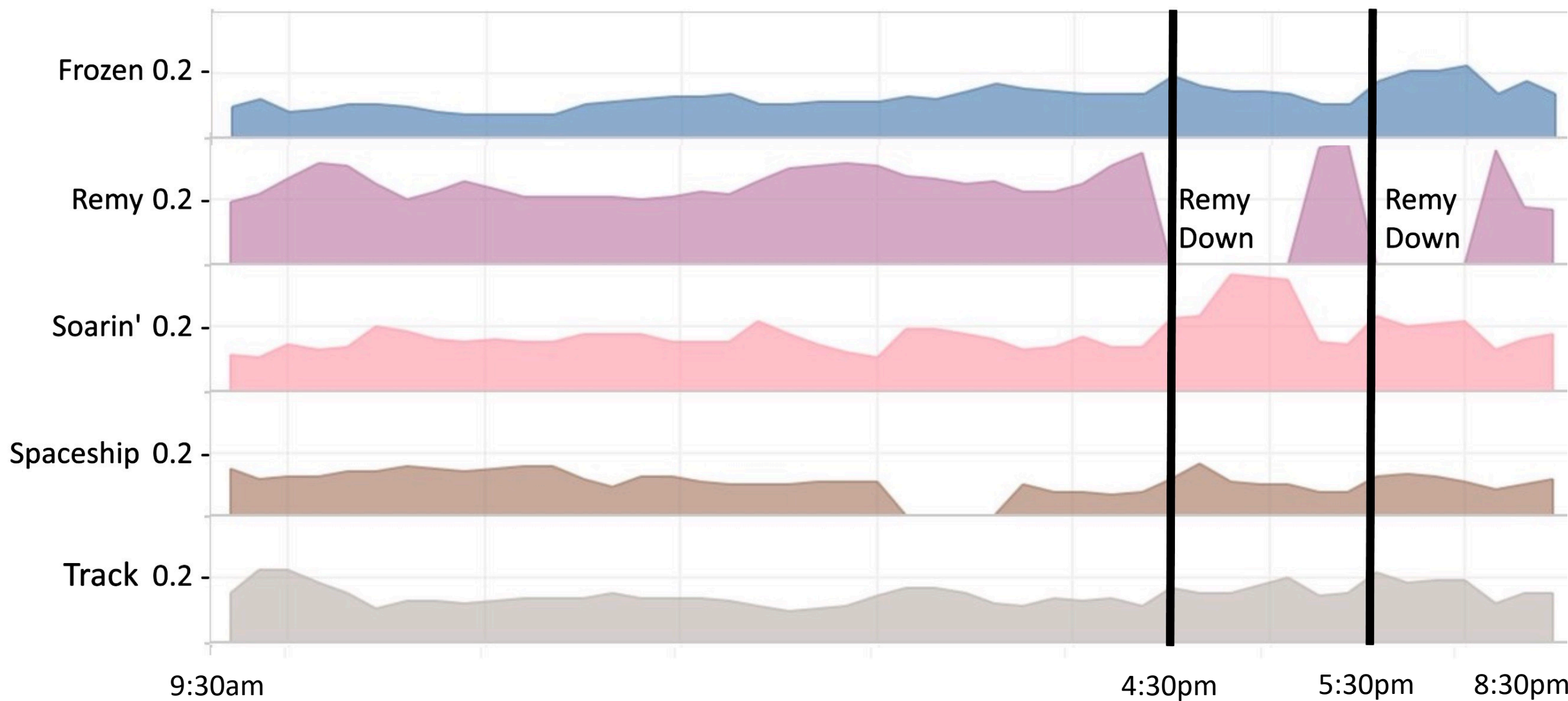
9:30am	40%	16.67%	33.33%
9:45am	0%	20%	80%
10:00am	20%	30%	50%



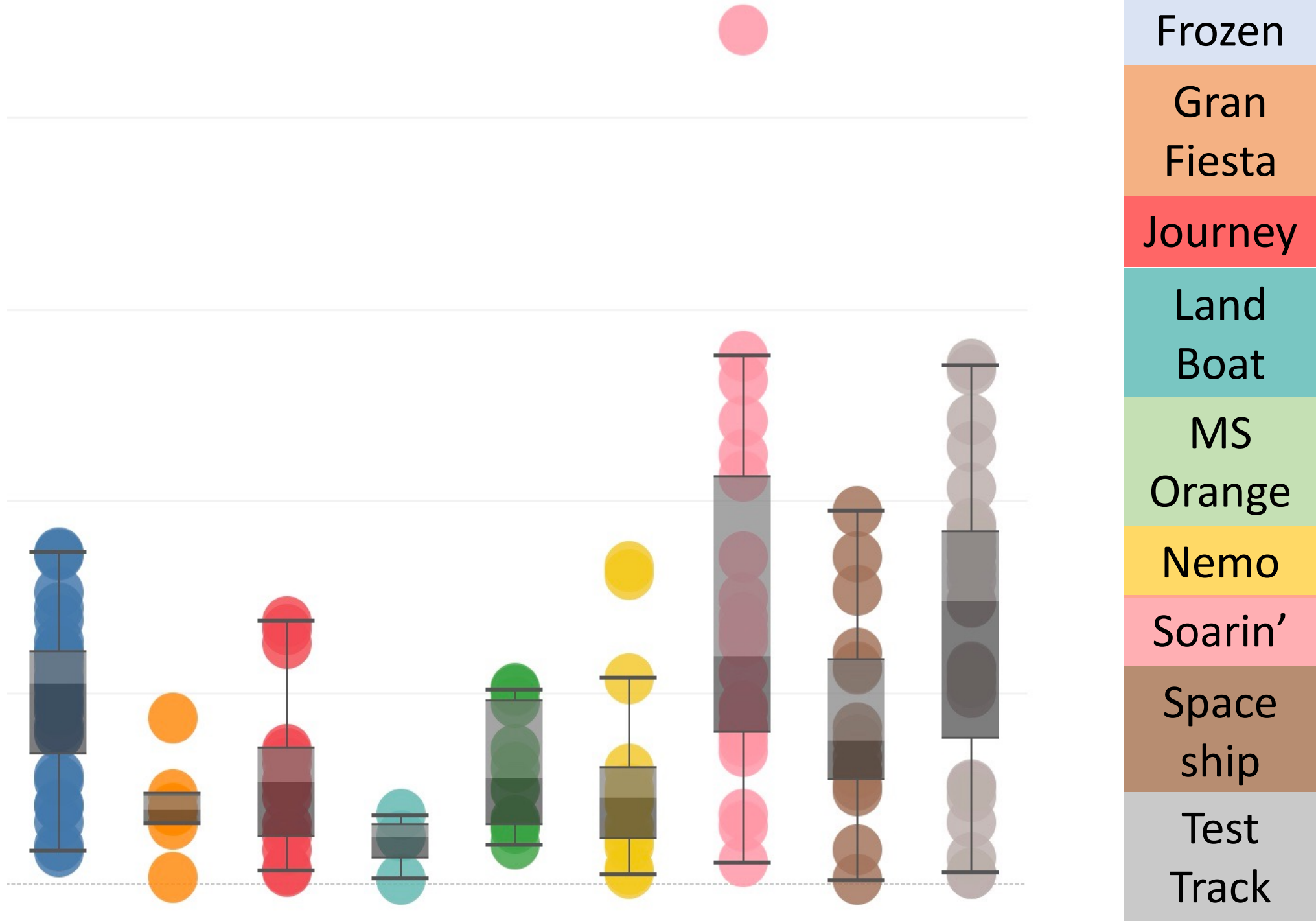
# Understanding Our Data

	Attraction 2	Attraction 3	Observations
9:30am	16.67%	33.33%	<p>After a closure in Attraction 1:</p> <ul style="list-style-type: none"><li>Attraction 2's percent of park guests increase by 13.33% 15 minutes after the closure.</li><li>Attraction 3's percent of park guests increase by 46.67% immediately after the closure.</li></ul>
9:45am	20%	80%	
10:00am	30%	50%	

Percentage of Ridership

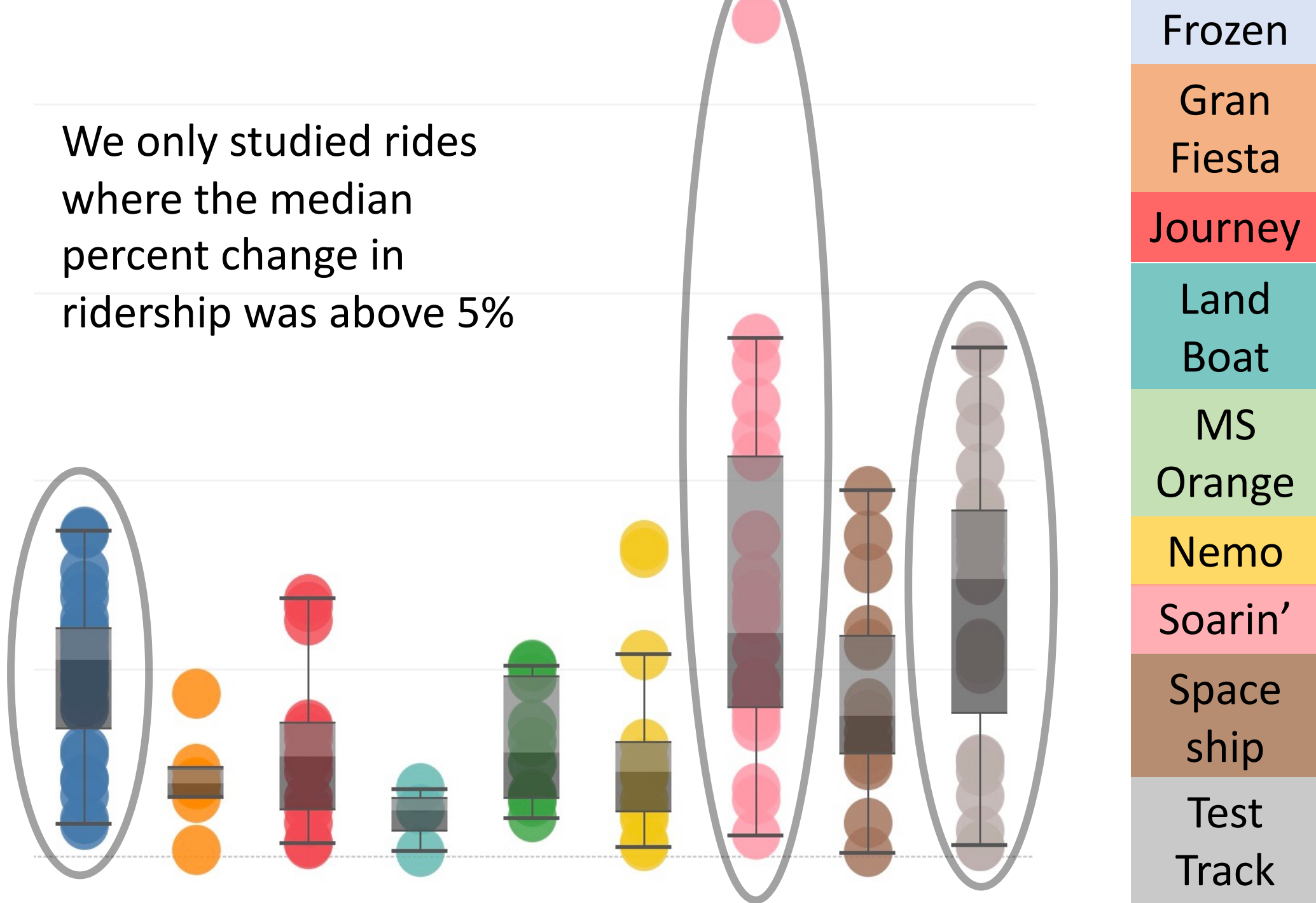


# Maximum Percentage Difference After Remy Outage



# Maximum Percentage Difference After Remy Outage

We only studied rides where the median percent change in ridership was above 5%



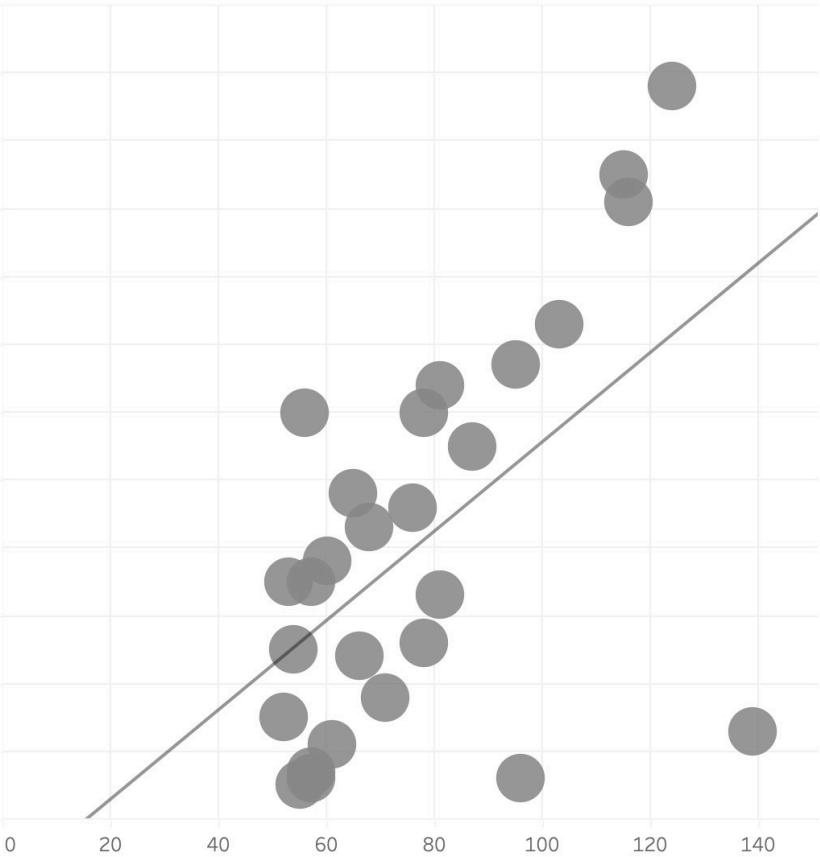
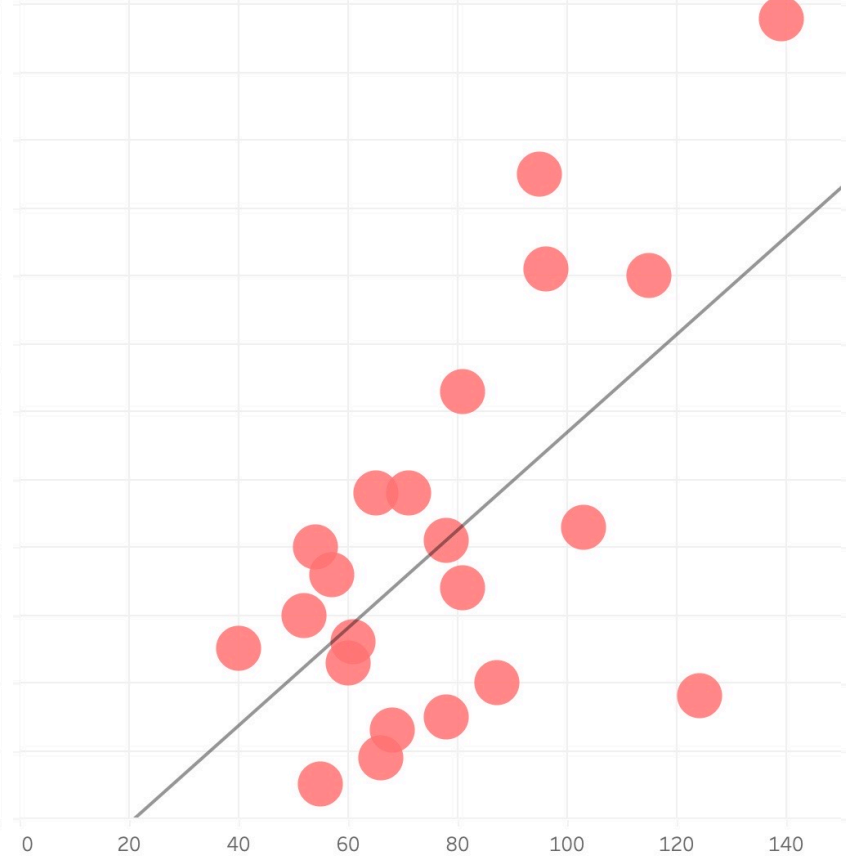
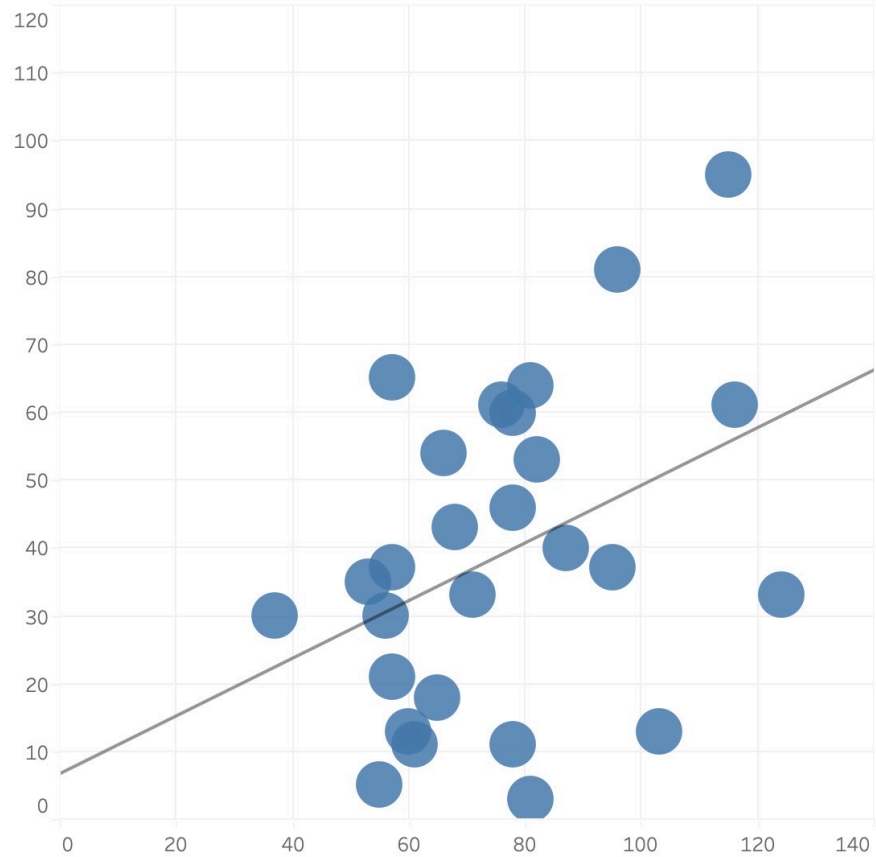


# Maximum Increase in Ridership

Frozen

Soarin'

Test Track

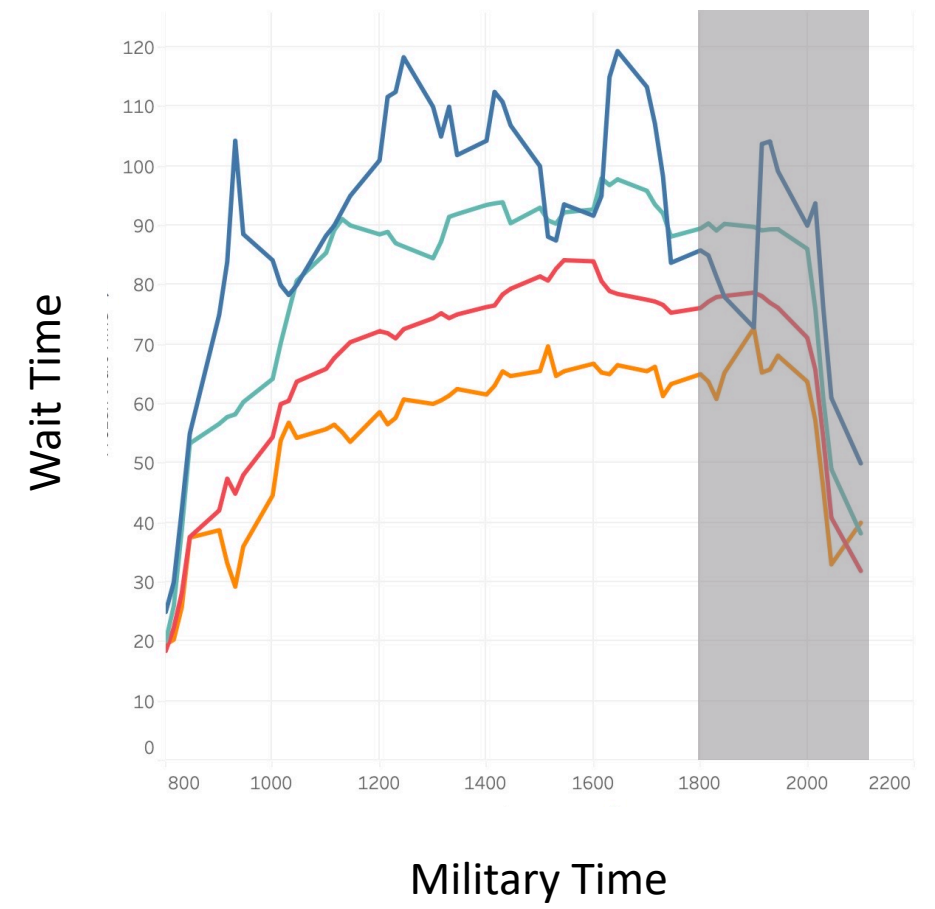
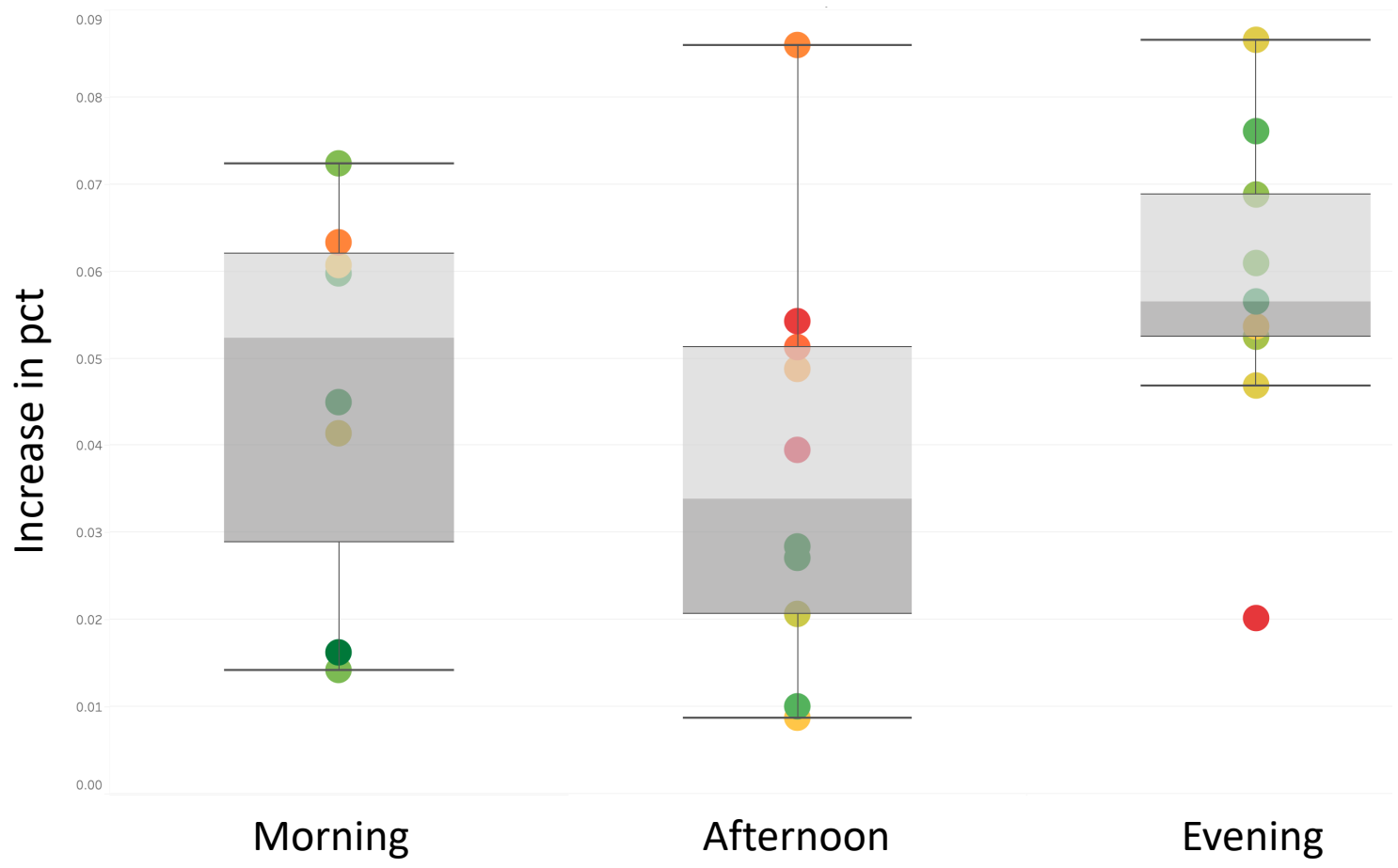
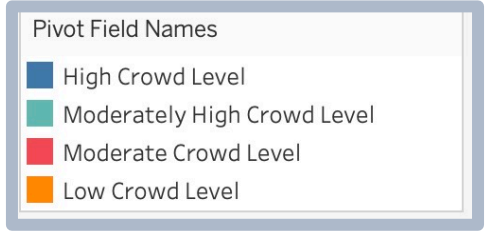
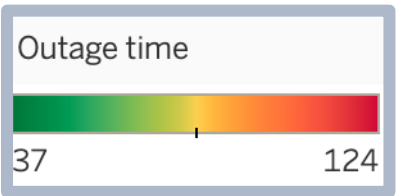


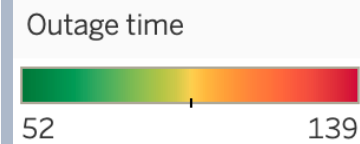
Length of Remy Outage

# Investigating Impact of Time of Day

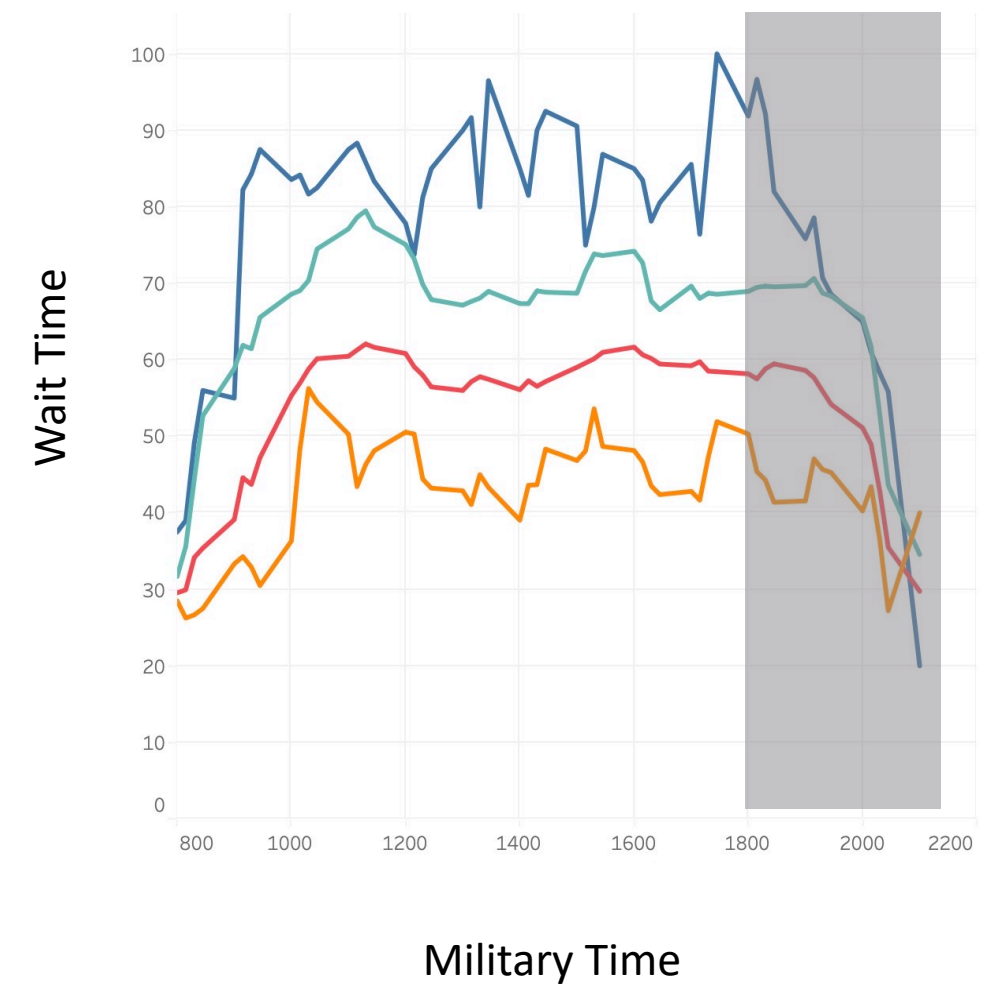
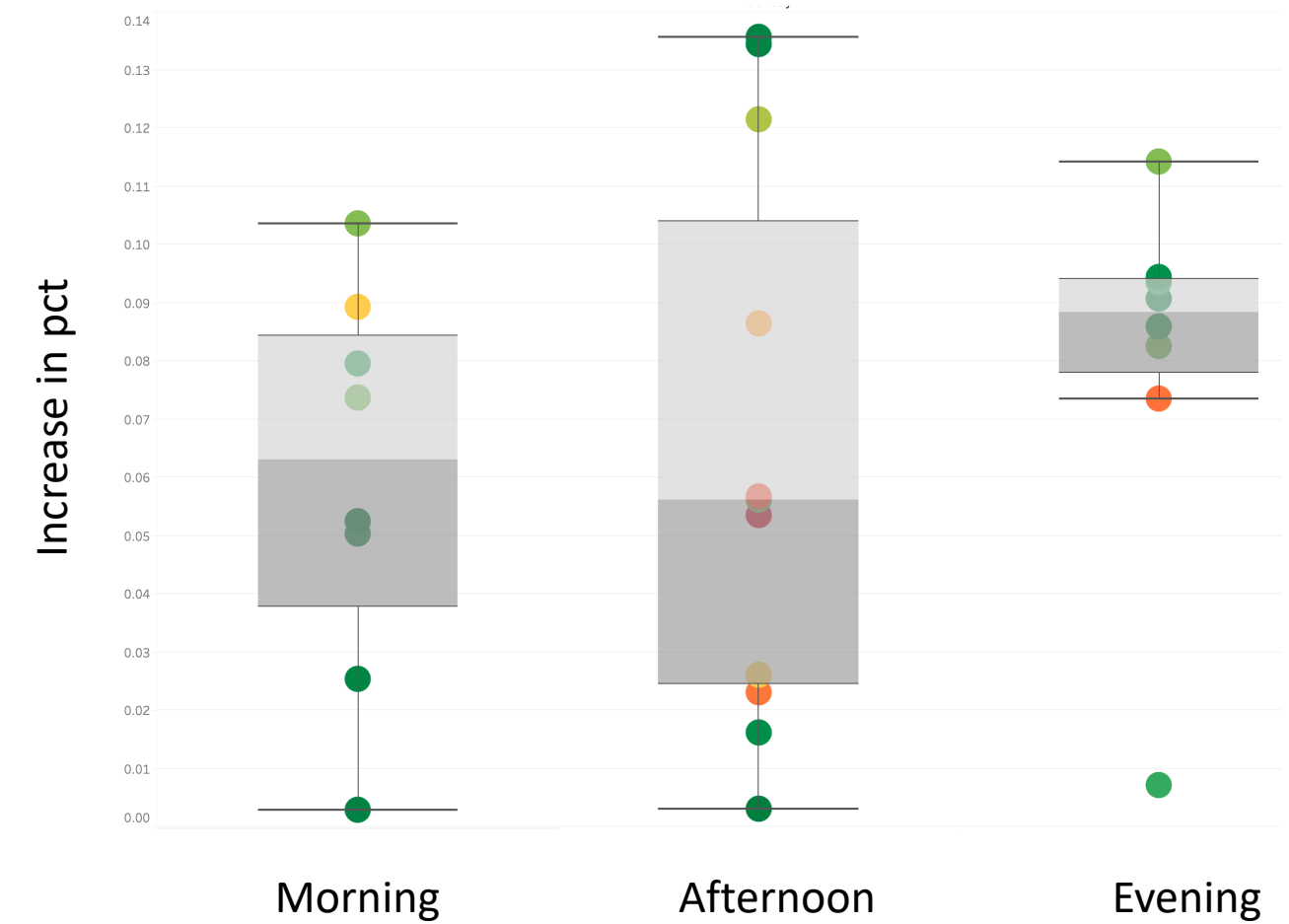
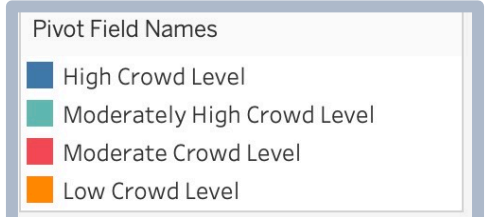
- We wanted to see if the intensity of this impact changed based on what time Remy went down
- We divided our data into three time periods: morning, afternoon, and evening and looked to see if the increase in percentage differed by time period
- We were specifically interested in studying Frozen, Test Track, and Soarin', as the data suggest that these rides are most impacted by Remy downtime

# Time of Day: Frozen





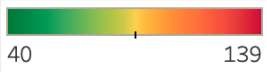
# Time of Day: Test Track





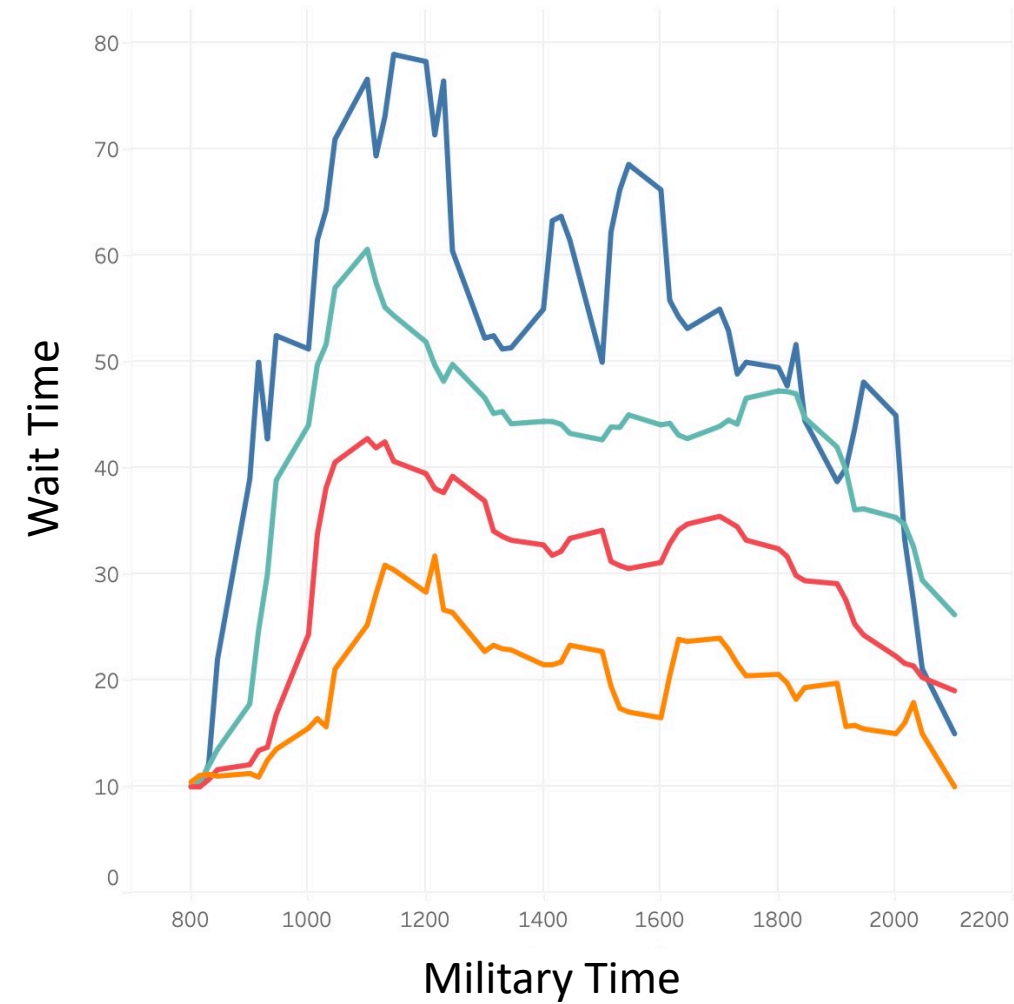
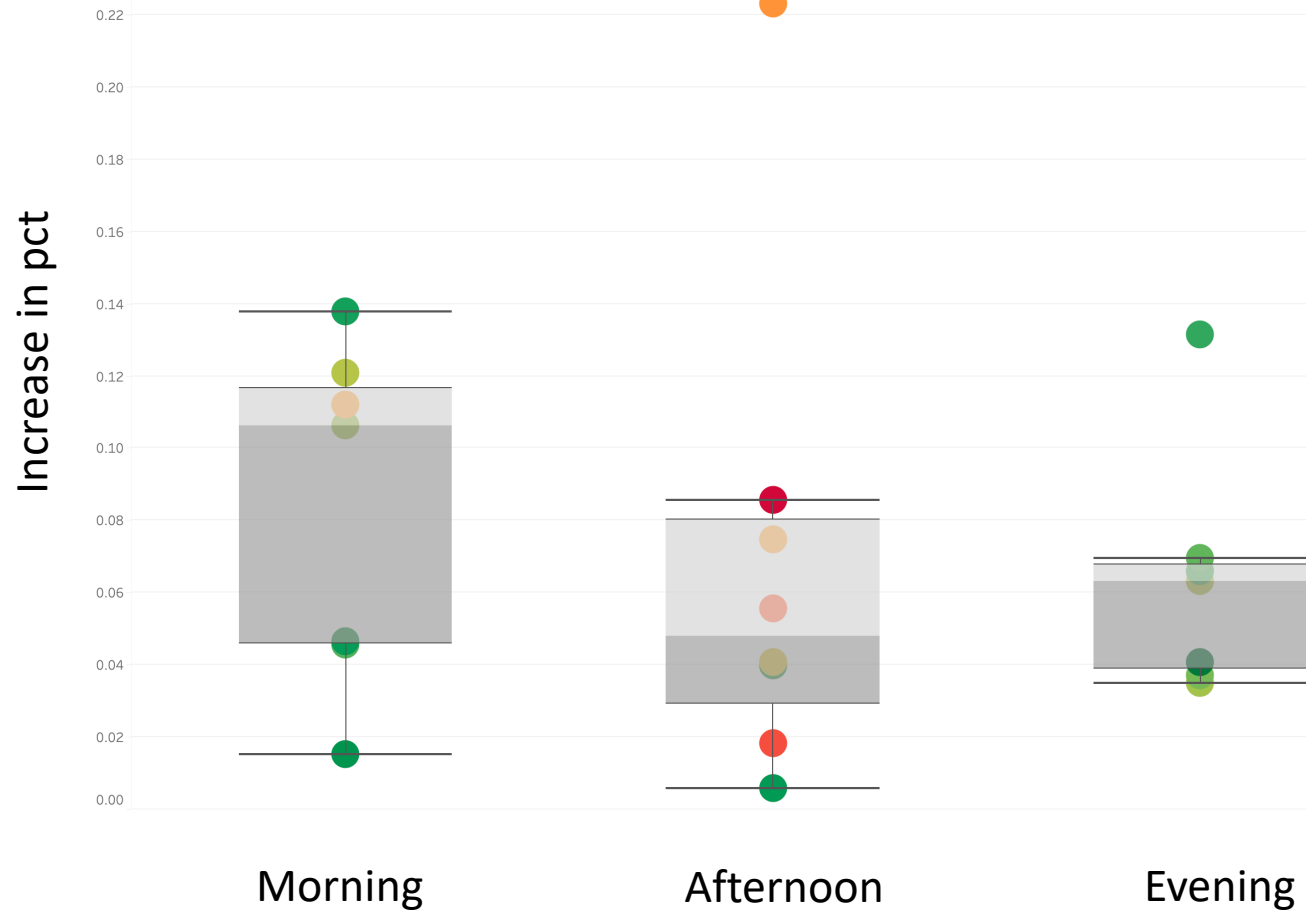
# Time of Day: Soarin'

Outage time

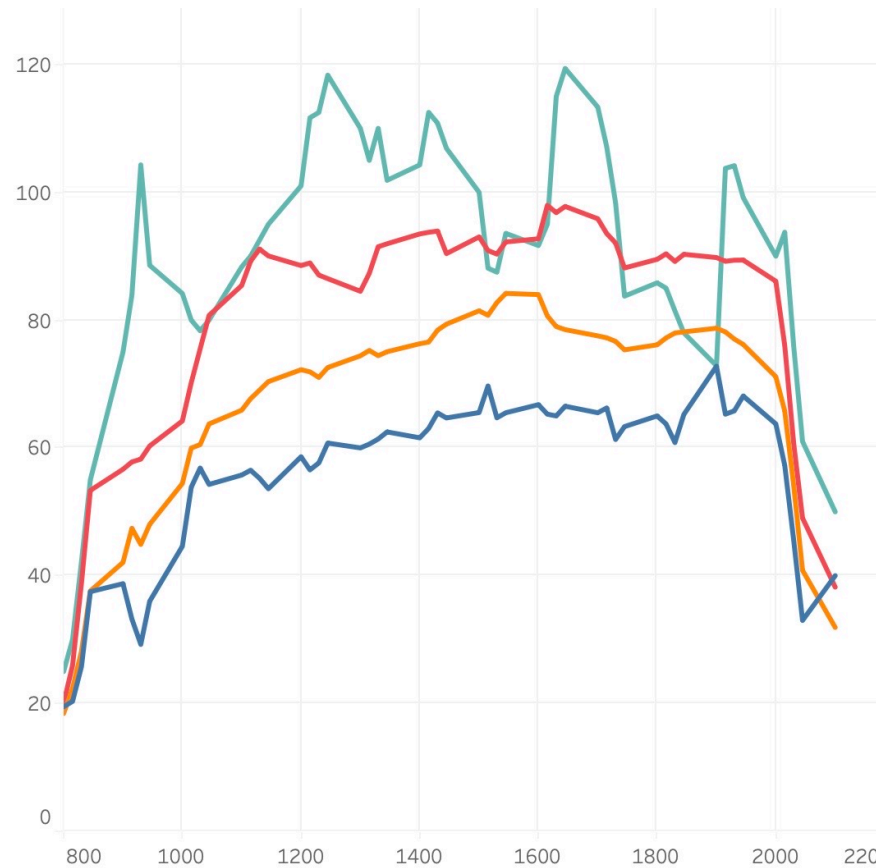


Pivot Field Names

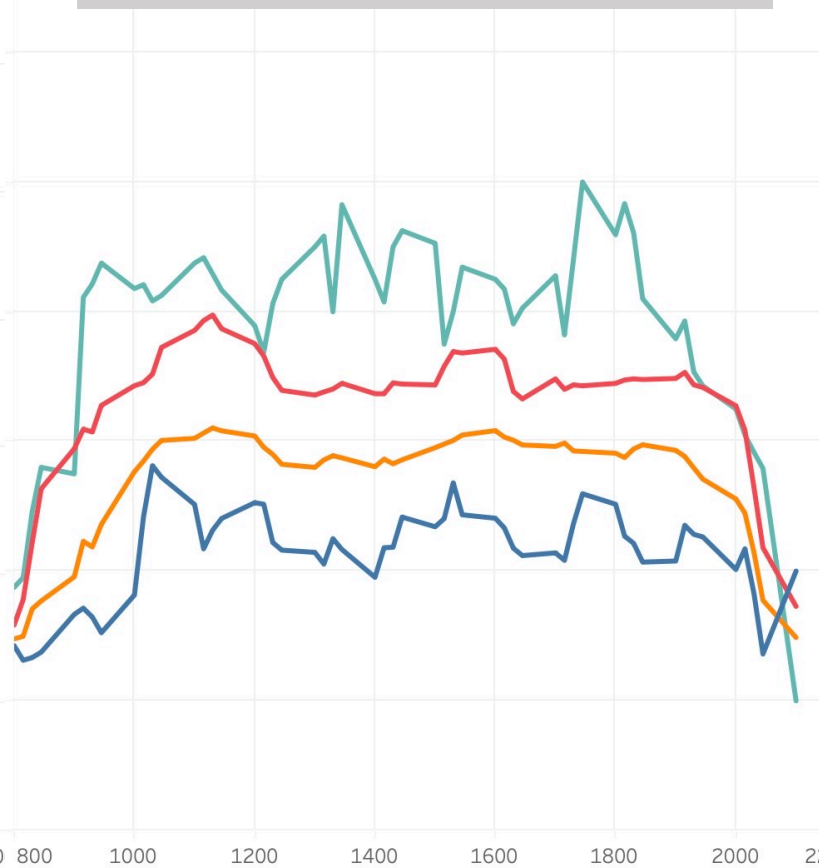
- High Crowd Level
- Moderately High Crowd Level
- Moderate Crowd Level
- Low Crowd Level



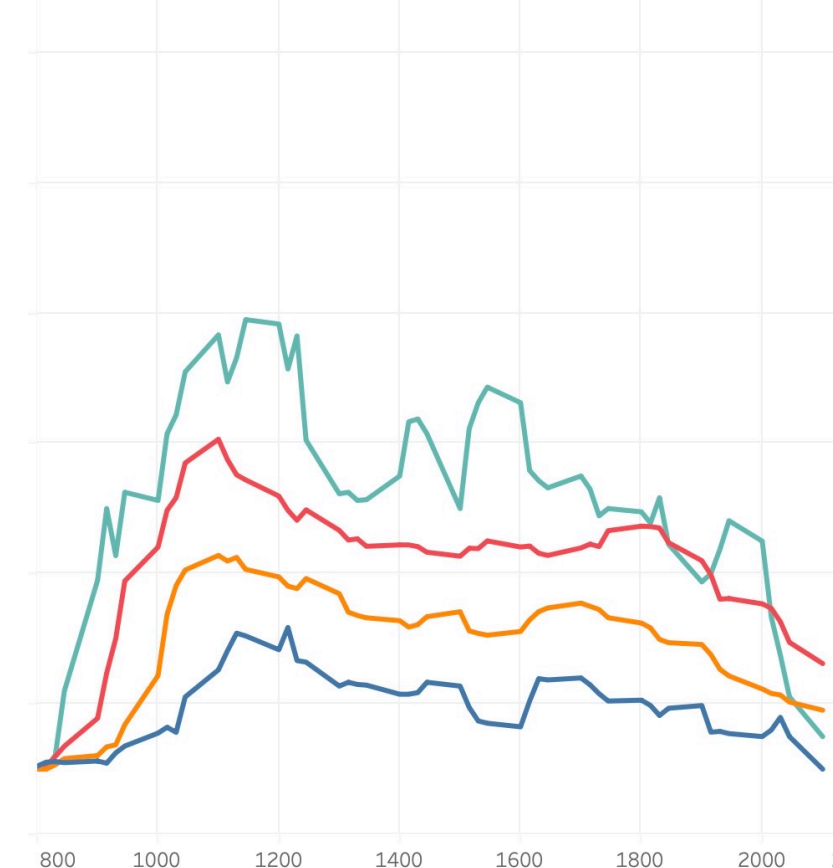
Frozen



Test Track



Soarin'



# Limitations of our Data

- We don't know how quickly the My Disney Experience app updates
- Disney may artificially inflate posted wait times to divert people to specific rides
- The dates we were able to study were limited, as in order to study the impacts of Remy's downtime, we could only consider cases where Remy was the only ride down
- We assumed that rides were operating at full capacity unless they were fully down

## Future Directions



What other ride closures affect wait times?



How can we better quantify the effect of a closure?



How does crowd level contribute to the effect of downtime?



# Thank You!

Dr. Liz Bouzarth  
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Dr. Kevin Hutson

The Furman  
Math  
Department

Touring Plans