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# Designing The Perfect Queue Line

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## ABSTRACT

This research paper examines the factors influencing rider satisfaction in theme park queue lines, with a focus on Disney World's Magic Kingdom. This study analyzes survey responses from 61 participants to investigate the relationship between queue quality and overall attraction quality, as well as the importance of various factors in queue selection. Results indicate that rider comfort is the most critical variable, followed by temperature/weather conditions and seating/shade availability. Factors such as interactive elements and nearby amenities were found to be less important. Attractions with higher overall ride ratings also received higher overall queue ratings, highlighting the strong correlation between queue and ride experiences. Thematic content analysis of open-ended responses revealed common themes, including the importance of comfort, theming, entertainment, and efficient loading in a perfect queue. Furthermore, the study emphasizes the significance of maintaining and improving queue elements such as climate control, interactive features, and accurate wait time signage. The findings suggest that prioritizing rider comfort, incorporating interactive and age-appropriate entertainment, and optimizing queue design for efficiency are crucial for enhancing visitor satisfaction. Future research directions include comparative studies across different theme parks and longitudinal studies to track changes in queue design and visitor satisfaction over time.

## Introduction

Picture this: you're in a magical land where everything seems possible, and you're eager to jump on your favorite ride. But suddenly, the reality of waiting in line hits you - standing in a sea of people, exposed to the blazing sun, feeling like a part of a human herd.

It's a common experience in theme parks that attract tens of thousands of visitors each day, but what if I told you that the queue line experience could be just as engaging as the ride itself (Walsken)? In this research paper, I will delve into the world of queue line design and explore the questions: How does theme park queue line design affect rider satisfaction levels in Disney World's Magic Kingdom? And what makes the "Perfect" queue line?

I will use Disney World's Magic Kingdom to uncover the secrets behind queues that keep guests engaged and entertained before the ride even begins. By analyzing individual attraction designs, theming, crowd control, and more, I aim to discover how theme park queue line design affects rider satisfaction levels. I invite you to join me on this exciting journey into the heart of theme park magic.

## Literature Review

### Purpose

First, what is a queue? In relation to a theme park attraction, a queue line is a designated area for future riders of an attraction to wait (Queue Lines). Queue lines are a critical component of theme park attractions, as they can consume a significant amount of riders' time and directly impact their overall satisfaction with the experience (Eagleman). Unfortunately, many of these lines suffer from poor design, leading to decreased rider satisfaction and a lengthened

perception of waiting time. As management expert and researcher David Maister observes, "Waiting is frustrating, demoralizing, agonizing, aggravating, annoying, time-consuming, and incredibly expensive." (Maister). Despite exceptional service, customers may ultimately judge their entire service as unsatisfactory because of inadequate queue experience. Queues must be optimized to enhance the guest experience (Kumar). Therefore, the objective of this research project is to improve the queue line experience in theme parks by exploring how queue line design in Disney World's Magic Kingdom affects rider satisfaction and determining the most important variables to prioritize in queue design. By identifying and analyzing the critical components of queue line design, including theming, entertainment, crowd control, and more, this research paper aims to provide insights into how theme parks can enhance guest experience and maximize guest satisfaction.

## Research Question

How does theme park queue line design affect rider satisfaction levels in Disney World's Magic Kingdom? What makes the "Perfect" queue line?

## Line of Reasoning

When Disneyland first opened its gates in 1955, it ushered in a new era of theme park attractions that blended the experience of movies with physical reality. Disney parks not only require design effort into the attractions themselves, but require many pragmatic considerations such as eating, parking, restroom availability, and most of all… queue lines (Cortes). While Disneyland was initially successful, the queue lines were poor, long, and hot. Designers did not anticipate the extremely high ridership of its attractions, leading to a lack of preparation and lack of sufficient amenities when it came to queues (Nelson).

This boom in ridership directly led to the revolutionization of queue lines. To address this problem, Disney introduced a new type of queue line called the "switchback". This design consisted of several short-looking lines that folded around each other to pack a lot of lines into a small area of physical space, making the wait time feel shorter and allowing guests to "intermingle" with one another. Despite waiting the same, long, amount of time, the experience of waiting in line made guests happier because of its disguised length and provided opportunities to socialize with other guests (Cortes). Following the introduction of switchback queues, Disney's Imagineers continued their queue innovations within Disneyland and their planned creation of a second resort, Walt Disney World. They began to improve the queue experience by moving many lines indoors, introducing signs with estimated wait times, and most importantly, reimagining them as not a "pre-experience" but as part of the ride experience itself. Queues in attractions such as the Haunted Mansion in the Magic Kingdom were designed to include portions with show theming and story elements… Today, as guests enter the queue, they are transported to an outdoor cemetery with a musical mausoleum[Fig.1], a bubbling crypt[Fig.2], and seemingly alive gravestones[Fig.3] before moving to an indoor pre-show area where the story of the ride is introduced. As guests move through the indoor portion of the queue line, they encounter a series of themed scenes that are meant to build on the story and increase their anticipation for the ride itself (Perlmutter). This is an example of how queue lines can be reimagined as part of the ride experience itself.

As technology progressed, so did the available technologies for queue lines. Today in many theme parks you will come across rides with audiovisual elements incorporated into the queue experience such as TV screens, environmental or themed audio, and interactive "hands-on" elements of the physical ride. The advancement of technology in queue lines has also resulted in changes to their physical design. Queue designs have evolved to place greater emphasis on indoor spaces, while the traditional switchback style has given way to a new layout that prevents guests from seeing the entire line at once. This design features multiple sections, each with switchback elements but separated from each other. "It's only when that point is reached that visitors discover another part of the line, perhaps denser. They at least feel that they have reached a milestone." (Corrado).


***Fig 1.***

**Fig *2*.**


**Fig *3*.**

The configuration and functionality of queues are frequently evolving, but the one element that remains consistent is the existence of a queue itself. Although it would be ideal if theme park rides could accommodate tens of thousands of guests per hour, it is highly improbable that such technology will emerge anytime soon (Levine). The potential future of virtual queues in theme parks could revolutionize the waiting experience for visitors by eliminating the need for physical queues and allowing guests to enjoy other attractions while they wait, however, the implementation of virtual queues requires a significant investment in technology and infrastructure, which may not be practical for many parks (Virtual Queuing). Despite the limitations of virtual queues in certain types of attractions, such as roller coasters, physical queues may be necessary for safety reasons. Waits of uncertain length feel longer than certain ones and increasing the certainty in their investment will increase their perception of time (Cope).

Throughout the world of amusement parks, you will see thousands of designs of queue lines. Theme Park fatigue may be a significant factor in the perception of the wait time while standing in any queue line, but designing and optimizing queue spaces remarkably increases guest satisfaction levels, making these upgrades worthwhile (Daniels). While each queue is unique, there are common factors that theme parks choose to include and exclude from their design, and to what extent do these factors affect rider satisfaction?

## The Gap

There is a lack of adequate research that establishes a connection between rider satisfaction and queue line design. While studies like Ellen C. Daniels' and others' have attempted to find a correlation between perceived wait time and queue design, there has been no significant data collection on what riders truly want to experience in a queue. This study aims to investigate the impact of various factors within the queue line to optimize the overall ride experience. With this data, theme parks and attraction designers can create queue lines that engage and entertain riders, making the ride experience more enjoyable and increasing rider satisfaction. There is a large community of theme park enthusiasts online, and a questionnaire to survey theme park enthusiasts and their satisfaction with different attractions and their lines could help gather this information. Disney is renowned for its guest experience in the theme park industry, and the Walt Disney World traveler community presents an untapped opportunity to gather valuable insights regarding the preferences and dislikes of riders regarding queue design elements.

## Assumptions, Hypotheses & Definitions

For a proper investigation into the factors affecting rider satisfaction in queue lines, we must assume that the physical and psychological design of the queue line itself has a correlated effect on the experience itself. Past studies have

shown an effect on perceived wait time… with “results show[ing] some significance (p-value of 0.025) between the design efforts and shorter wait times perceived” (Daniels) and this same study concluded that “designing and optimizing queue spaces remarkably increases guest satisfaction levels, making these upgrades worthwhile”, but this study also experienced skewed data with the findings that as the day goes on, riders seem to perceive longer wait times. I predict that the 3 most important factors when it comes to rider comfort and shortness of perceived wait are 1. Entertainment, 2. Environment, and 3. Comfort. I anticipate that the incorporation of interactive elements, such as mobile games, trivia, live actor interactions, and "hands-on" activities like projection and water features, will enhance the overall ride experience and keep riders occupied during potentially long waits. I predict that riders appreciate queue lines with immersive theming and storytelling, achieved with environmental audio, themed props, themed music/dialogue, and live pre-shows. Finally, I anticipate that riders favor queue lines that offer comfort features like proper climate control, water fountains, restroom availability, and internet connectivity to allow them to enjoy themselves during the wait.

## Methods

To acquire data, I used a mixed methods approach that involved distributing surveys to guests of Disney World's Magic Kingdom and conducting free-response interview-type questions. Disney World’s Magic Kingdom was chosen as a dataset park as, according to the AECOM Global Attractions Attendance Report, it is the most visited theme park in the world (AECOM). I chose a survey as part of the method because it allowed me to reach more people from different areas than conducting interviews alone would have. This made the results of the study more applicable to the entirety of theme park tourists. The target population of this survey consists of adults who have visited Walt Disney World Magic Kingdom Park in the past 3 years during their stay and experienced at least 3 attractions. Due to the rapidly changing landscape of Walt Disney World, participants had to visit in the past three years since there have been no major refurbishments regarding queue line design after this point in time. To receive the most responses and thus have the most accurate data, I contacted representatives at many Disney/Theme Park sites and shared the survey with social media groups filled with members of our target population. Polls were posted by admins to “Disney Parks Addict”, an informational YouTube channel and Twitter feed about Disney Park News and updates, “The Disney Blog”, a blog based on Twitter and Facebook covering “the galaxy of Disney news”, and to a group of Disney College Program (DCP) Members. It was also promoted on Reddit on the subreddits r/DisneyParks and r/DisneyWorld.

This investigation, like one created by Ellen C. Daniels in “Theme Park Queue Line Perception.”, collected data from riders of the most popular attractions (within Disney’s Magic Kingdom). The most popular “dataset attractions” were chosen by wait time. “Queue Times” is a website that holds historical records of wait time data scraped from Disney’s Official Park applications. With a database spanning back to 2014, Queue Times is one of the largest datasets of waiting times in the world, and using their “Average wait time by ride (all time)” statistic I determined to use Seven Dwarfs Mine Train, Peter Pan's Flight, Space Mountain, Splash Mountain, The Jungle Cruise, Big Thunder Mountain Railroad, The Haunted Mansion, Buzz Lightyear's Space Ranger Spin, The Many Adventures of Winnie the Pooh, Astro Orbiter, and Tomorrowland Speedway as the 11 “dataset attractions” (Queue Times). The longer average duration of wait time gave guests time to experience the design elements and environment as well as determine their attitude and satisfaction level with the experience overall, and this dataset provides a wide variety of queue experiences, from opening day attractions such as The Jungle Cruise to 2014’s Seven Dwarf’s Mine Train. While Ellen C. Daniels in her 2017 study observed all 40 attractions at the Walt Disney Magic Kingdom park and the wait times during 80 days of typical park operations and chose the 10 queues that continuously showed the longest waits, this larger dataset of 8 years of data for my study provides a more accurate gauge of popularity, accounting for any errors that could result from seasonal attraction popularity during Daniels’ observation time varying from general attraction popularity.

When users opened the survey, it began by collecting optional age demographic information. This was not used in any calculations of results; it was only a reference for the distribution of results throughout age groups. The questionnaire then prompted participants to select the attractions they have ridden (out of the 11 dataset attractions). After collecting optional age & demographic information, the questionnaire prompted users to fill out optional questions about their visit regarding their residential status (current Florida resident, past Florida Resident, non-Florida resident) and party size (1, 2-5, and 6+).

The first round of General Queue Line questions was regarding participants' general visit. These questions provide the most insight into the queueing attitudes of park visitors and use a Likert scale of 1-7 to determine the importance of various factors when determining what attractions to queue in. General Questions include:
How important was the wait time for you when deciding which attractions to visit? How important was the design and theme of a queue line in affecting your enjoyment of an attraction? How important were interactive elements, such as games or videos, in determining the queue lines you waited in? How important was seating or shade in determining the queue lines you waited in? How important was the overall atmosphere of a queue line in contributing to your overall enjoyment of an attraction? How important to you was the presence of unique or immersive experiences in determining a queue line to wait in? (Such as a pre-show) How important were distraction elements like music or entertainment while waiting in queues? How important was the queue line's location in the park in influencing your decision to wait in line? How important were temperature and weather in affecting your willingness to wait in the queue line? How important was the presence of restrooms or food vending nearby in determining the queue lines you waited in? How important was the availability of Wi-Fi (and or strong Cellular Service)?

After gathering general visit information on queue line attitudes, participants were prompted to select attractions from the list (of "dataset attractions") that they visited during their most recent visit. Participants were told to "only select attractions that [they] remember clearly and if [they] used Fast pass or Genie+ during [their] visit, still answer the questions regarding whatever part of the queue they experienced". The theming, comfort, and "experience" design of WDW Queue Lines has not changed since the transition from the Fast Pass system to Genie+, and due to the Fast Pass and Genie+ plus lines being attached to the standby lines, the experience in one would be extremely similar to the other aside from the difference in wait time. For each attraction selected, there was an additional questionnaire attraction page created with questions specifically for the attraction itself. The attraction-based questions prompted users to rate:

1. Overall Queue Rating
2. Entertainment (interactive elements, theming, decor)
3. Comfort (Shade, Seating, Accessibility)
4. Efficiency/Crowd Control (Signage, Queue Layout)
5. Ambiance (music, scent, overall mood of the crowd)
6. Overall Ride Rating

Finally, survey participants were asked the "final question"... "If you were visiting a theme park and you had to wait in a line for 30 minutes, explain the "perfect" queue line. What do you see? What do you hear? What do you smell? What is there for you to do? Where are you located?". This question was optional, as it took a while to answer, but the responses received would be very strong in content and contain much insight into what riders "want" in a queue.

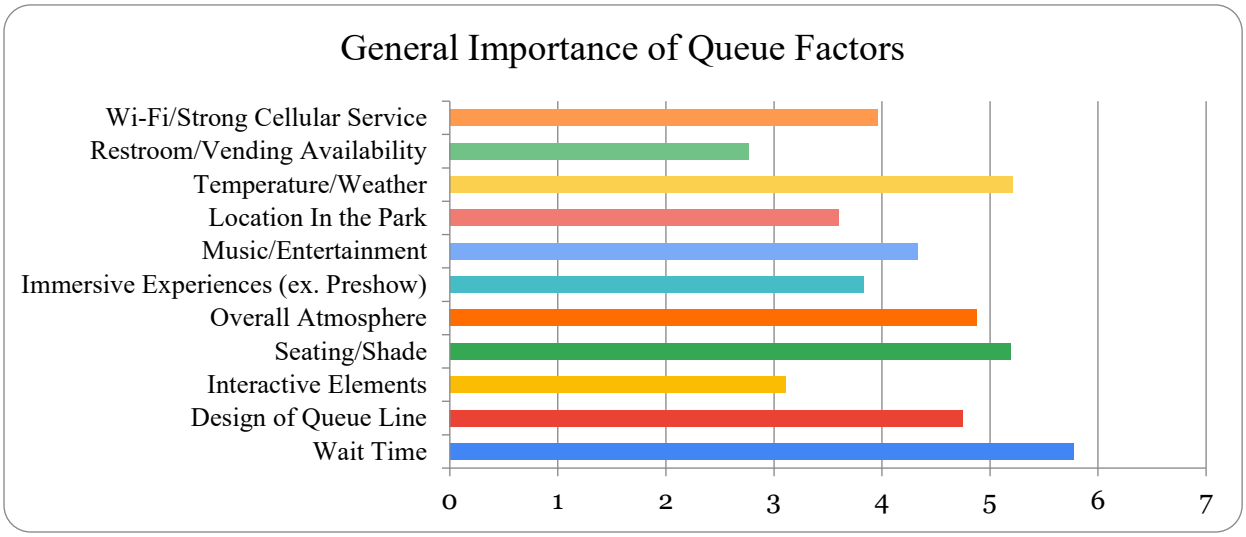
## Results

Sixty-one survey responses found a direct relation between the perceived quality of a queue and the perceived quality of the overall attraction. General Question statistics found that the most critical variables in determining what queue to stand in, aside from wait time, are the variables that most affect rider comfort, with the least important being the

presence of interactive elements and nearby restroom/vending availability. Attraction Based statistics found a strong correlation between the overall ride rating and overall queue rating (R2 value of 0.935) and also found that the strongest factor in correlation to the overall ride rating is the Ambiance/Environment rating (R2 value of 0.953). Open-ended free-response questions show much insight into what the riders themselves value in an attraction queue and performing thematic content analysis identified 10 common and important themes prevalent in rider responses for general queue line questions, with the most frequently referenced theme being that of comfort in a line due to proper climate control. Attraction-based free-response questions show that the most important factors for a perfect theme park line are rider comfort, theming, entertainment, and efficient loading, further echoing results found in earlier parts of the study.

## General Questions

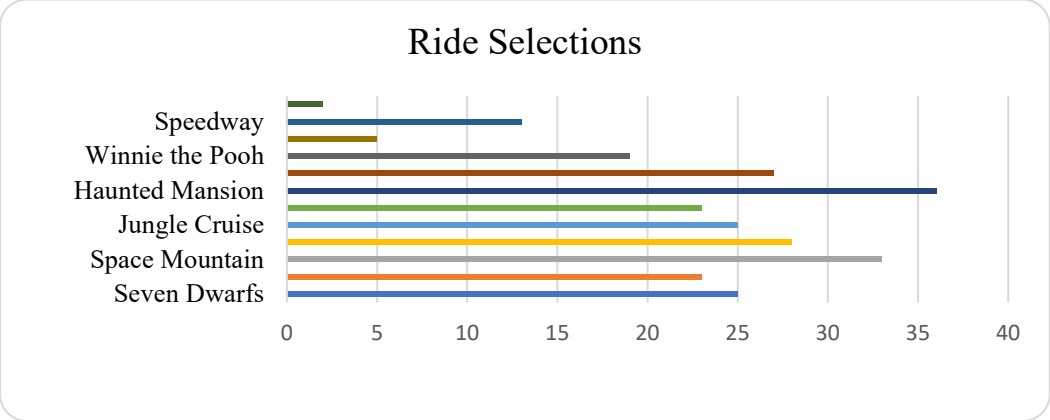
"General questions" show remarkable insight into the factors behind attraction selection. These general questions were asked on a Likert scale of 1-7 of importance. The mean values of each factor were then weighted and placed onto a chart for easy comparison. Results show that, contrary to the hypothesis, the most important factors when it comes to determining which queue to stand in are the factors that affect rider comfort, rather than rider entertainment. It makes logical sense that the most crucial factor in "picking a queue" is wait time. It's not only that a long wait time can be discouraging for riders with busy schedules and a long "to-do list", but on the other side of things, a short wait time can be extremely appealing and even draw riders to a potentially lower quality attraction.




The second most important factor reported by participants was the presence of good temperature/good weather in the queue, with seating and shade taking a close third. The least essential factor reported by participants was the availability of nearby restrooms/food, with interactive elements being a very close contender for last place.

## Attraction-Based Statistics

Below are the statistics regarding the number of times each attraction was selected on the "Attractions Visited" page.




As explained in the methods section, each attraction selected generated a page of attraction-based questions—each consisting of 2 categories. Category one, "queue factors" had users rate the Queue Entertainment, Queue Comfort, Queue Efficiency/Crowd Control, and Queue Ambience on a Likert scale of 1-7. Along with these "queue factors", there were 2 "general questions" that prompted users to rate the Overall Ride and Overall Queue. The mean values of each attraction-based question page were exported from Qualtrics into a spreadsheet.

| Overall Queue | Entertainment | Comfort | Efficiency/ Crowd Control | Ambience/ Environment | Overall Ride | Attraction Title | Mean of Factors |
|---|---|---|---|---|---|---|---|
| 5.3 | 4.78 | 5.35 | 5.3 | 5.13 | 5.78 | Seven Dwarfs | 5.27 |
| 4.73 | 4 | 4.77 | 4.32 | 4.48 | 5.41 | Peter Pan's Flight | 4.61 |
| 4.9 | 3.97 | 5.38 | 5.24 | 4.9 | 6.07 | Space Mountain | 5.07 |
| 4.96 | 4.16 | 4.28 | 4.64 | 4.48 | 5.64 | Splash Mountain | 4.69 |
| 3.95 | 3.3 | 3.7 | 3.7 | 3.95 | 4.9 | Jungle Cruise | 3.91 |
| 4.5 | 4.33 | 3.94 | 4.33 | 4.06 | 5.56 | Big Thunder | 4.45 |
| 5.39 | 5.19 | 4.84 | 4.9 | 5.58 | 6.26 | Haunted Mansion | 5.36 |
| 4.36 | 4.18 | 4.82 | 4.82 | 4.05 | 5.14 | Buzz Lightyear | 4.56 |
| 5.2 | 5.13 | 5.07 | 5.6 | 4.8 | 5.6 | Winnie the Pooh | 5.23 |
| 1.67 | 1 | 1.33 | 1 | 1.67 | 3 | Astro Orbiter | 1.61 |
| 3.6 | 2.6 | 2.6 | 4.1 | 3 | 4.2 | Speedway | 3.35 |

For each attraction, the mean of all queue factor ratings was calculated. To verify and identify internal consistency between the ratings of the "queue factors" and the overall queue rating, this mean of all queue factor ratings was graphed against the overall queue rating. With an $R^2$ value of 0.983, and a slope of almost exactly 1.0, there is

clear internal consistency between participants' ratings of the overall queue and their ratings on the queue factors. This is encouraging and shows that users were being honest in their answer selection and were not randomly selecting values. It also shows that the queue factors show a clear representation of the overall quality of the queue.

Graphs of Overall Queue Rating vs Individual Factor ratings were created, and each one showed a strong correlation. The $R^2$ values for each factor concerning the overall queue rating are provided in this table.

| **Factor** | **Ambiance/Environment** | **Queue Efficiency** | **Entertainment** | **Ambiance/Comfort** |
|---|---|---|---|---|
| $R^2$ Value | 0.947 | 0.896 | 0.933 | 0.869 |

## Open-Ended Free-Response Questions

The final question of the survey asked participants "If you were visiting a theme park and you had to wait in a line for 30 minutes, explain the "perfect" queue line. What do you see? What do you hear? What do you smell? What is there for you to do? Where are you located?". This question was optional, as it took a while to answer, but the responses received were very strong in content and contained much insight into what riders "want" in a queue. Along with this final question, for each attraction page of questions, there was an optional question that asked participants "Are there any improvements or changes you would suggest for the queue line experience?". The combination of these attraction questions and the overarching "what is the perfect queue" question gathered many responses.

To properly analyze the content of the free response questions, thematic content analysis was performed on both the attraction-based free response questions and the general free response separately. 10 Common themes identified in the general free-response question include:
*Shade/indoors/air conditioned, Interactive elements, Themed visuals/sounds/smells, Constantly moving queue, Queue management technology, Accessibility for guests with disabilities, Pre-show, Seating, Restrooms/drink stands, Queue wait time displays.*

After these common themes were identified, I then went back through all of the results and tallied the # of times each theme was mentioned. Those results are below.

| Common Theme Identified | Shade/ indoors/ air conditioned | Interactive elements | Themed visuals/ sounds/ smells | Constantly moving queue | Queue management tech. | Accessibility | Pre-show | Seating | Restrooms/ drink stands | Queue wait time displays |
|---|---|---|---|---|---|---|---|---|---|---|
| Number of mentions | 11 | 10 | 7 | 4 | 4 | 3 | 3 | 2 | 2 | 2 |

Since each attraction varies in design, thematic content analysis proved ineffective on "what would you improve" questions. Instead, I summarized each set of responses for each ride.

## Attraction-based FRQs Findings

1. Seven Dwarf's Mine Train - Multiple responses suggested adding more shade or a climate-controlled queue to make waiting more comfortable. Surprisingly there was no comment on the interactivity of the ride.
2. Peter Pan's Flight - Takeaways show that it is a slow loader resulting in slow moving queues. The queue is always overflowing, and it's cramped and slow-moving, especially with lightning lane guests taking up a lot of the capacity. A virtual queue on busy days was suggested to improve the experience for everyone.
3. Space Mountain - The takeaways for queue design based on the responses are to consider rider comfort, provide wait time signage, bring in more light, keep the queue length manageable, add interactivity and show elements, and provide shelter from the elements while keeping the queue interesting.
4. Splash Mountain - The takeaways for Splash Mountain's queue design are to provide more shelter and theming in outdoor sections, improve climate control in tighter spaces, and update the queue to provide more comfort and theming.
5. The Jungle Cruise - The takeaways for Jungle Cruise's queue design are to make the queue wider and less winding, reduce false expectations of reaching the ride, provide more entertainment, and improve shelter from the elements.
6. Big Thunder Mountain - The takeaways for Big Thunder Mountain's queue design are to improve shelter by providing more shade, streamline the loading process to make it more efficient and less crowded, repair any broken interactive elements, and remove or update items that are no longer functional. Additionally, the wait time should be more accurately stated to manage rider expectations.
7. The Haunted Mansion - The main takeaways for The Haunted Mansion's queue design are to improve the outdoor portion for protection against natural elements and manage expectations around crowded spaces in consideration of the current climate. The responses are mixed regarding the effectiveness of the existing interactive features, with some riders finding them enjoyable and others finding them pointless. The graveyard section is a highlight for some, while others feel that the queue loses its haunted mansion feel when the overflow queue wraps around the water.
8. Buzz Lightyear's Space Ranger Spin - There weren't as clear takeaways for Space Ranger Spin… Some riders appreciated that most of the line was indoors and moves fast, while others felt that more of the line needs to be indoors and have more theming. There were complaints about the ride breaking down while in line and the noise level being too loud. Additionally, the "show" in the queue was interesting but became repetitive over time to some.
9. The Many Adventures of Winnie the Pooh - The main takeaway for Winnie the Pooh is that the queue is not well-maintained and that it is not appealing to all ages.
10. Astro Orbiter - The main takeaway from Astro Orbiter is that this queue is NOT an example of an ideal queue. It is all outdoors, only switchbacks, no theming. In the words of a participant, "this queue is awful".
11. Tomorrowland Speedway - For Tomorrowland Speedway, the queue is all outside, moves slowly, and lacks protection from the elements. Additionally, the noise and exhaust fumes from the gas cars can be overwhelming. The ride itself is okay, but the queue was basic and unpleasant to many. One positive comment was about the Christmas decorations.

From analyzing the common themes from these attraction-based free response questions, we can see that the most important factors for a perfect theme park line (in order of importance) are rider comfort, theming/entertainment, and efficient loading. A perfect theme park line should have a climate-controlled queue to make waiting more comfortable, and it should be well-maintained with plenty of theming and interactive elements to keep riders entertained. The queue should also be efficiently designed to minimize wait times and meet rider expectations. Additionally, the queue should have sufficient shelter from the elements, especially in outdoor sections, along with accurate wait time

signage to help riders plan their day. To ensure a great experience for all ages, it's important to maintain the queue and provide comfortable seating for those who may need it. Overall, a perfect theme park line should prioritize the rider's experience.

## Discussion

Contrary to the initial hypothesis, this study determined that the "perfect queue line" values rider comfort as the most important factor. As shown in the general questions, attraction-based questions, attraction-based free response questions, and the general free response question, the most important part of a queue is comfort, and many associated takeaways must be considered. Three key points to consider when designing a queue line are:

1) A queue must be comfortable to stand in for long periods. As this study shows, the perceived quality of a queue line has a direct correlation with the perceived quality of the overall attraction, and the perceived quality of the queue is heavily affected by the comfort of the experience. Comfortable queues provide a more pleasant experience for visitors, making the wait time feel less arduous and frustrating. This can help to keep visitors in a positive frame of mind and enhance their overall enjoyment of the attraction. Queue lines that are too hot and too crowded can lead to discomfort, which can negatively impact visitors' experiences. While covering outdoor queues does lessen the problem, as told by a survey respondent concerning Winnie the Pooh, it does not completely solve the problem. "It's always hot in this queue even though it's under cover". More extreme cases of discomfort can be seen in rides such as Tomorrowland Speedway, with guests claiming to be "miserable" due to the "engine noise of the vehicles and the exhaust fumes from the vehicles" (Ex. Survey Response).
2) A queue must be able to entertain. Considering the 4-2-1 rule (4 grandparents, 2 parents, one child), a queue must be able to accommodate all ages. By providing interactive elements, people may feel more connected to the theme or subject matter of the attraction, and this can increase their enjoyment and satisfaction. If queues are only suited to one age group, it can be exclusionary and limit the experience of other visitors. For example, riders of Winnie the Pooh ride in Magic Kingdom claimed, due to its one-age design, that its queue "failed in appealing to all ages like others do". This can lead to negative feelings and a less enjoyable experience for those visitors, which can impact visitors' overall perceptions of the park. Age is not the only important factor when it comes to entertainment, the reliability and long-term functionality of interactive exhibitions within the queue must be suited to the attraction. Many survey respondents had responses along the lines of "Most interactive elements were broken at the last visit" and "There were many items in the queue that look like they used to be interesting but were no longer working" (Ex. Survey Response). To get complete benefit from entertainment installations in queues, they MUST be maintained.
3) The physical design of the queue must be efficient. Theme parks like Disney World's Magic Kingdom have recognized this and have invested a considerable amount of time and resources into designing and optimizing their queue lines. Advancements in layout (the phasing out of switchbacks) and indoor queue designs are promising, but this survey points out key factors in the physical design that are important for a low perceived wait and increased overall ride experience. Unlike The Haunted Mansion, queues must be designed to hold more than their maximum queue capacity. Multiple respondents noted the tendency for this attraction in particular to extend its queue around the waterfront in Magic Kingdom, and this not only crowd walkways but exposes riders to bugs and unprotected outdoor areas. Queues must also be honest. The Jungle Cruise and other rides' endless switchback queues make riders feel like "you're about to get on only to continue off into another part of the line", and this "teasing" of riders can be extremely unrewarding. There must be a balance between switchbacks and varying scenery, and the use of multiple queueing areas as seen in Splash Mountain's queue are examples of this. Splash Mountain is NOT a good example of queue spacing. As noted by survey respondents, the "cave sections", is a "tight space so you're really close to others".

# Conclusion

## Implications

Based on the findings of this study, theme parks, particularly Disney World's Magic Kingdom, could improve rider satisfaction levels by focusing on queue line design, most specifically the points that this study found to most influence rider satisfaction… comfort. The "Perfect" queue line should incorporate several key elements such as comfort (shade and shelter), interactive elements (that are relevant, operational, and that appeal to all ages), clear signage, and entertainment to provide a more enjoyable experience for park-goers while waiting in line. Implementing these elements in the queue line design could potentially increase the satisfaction level within the queue, and eventually, lead to increased rider satisfaction levels overall. Additionally, theme parks should regularly review and update their queue line designs to ensure they are meeting the changing needs and expectations of park-goers. Queues must advance along with technology and design guidelines.

## Limitations

One potential limitation of this study could be the focus on a single theme park, Disney World's Magic Kingdom. This may limit the generalizability of the findings to other theme parks or even other areas within Disney World. Additionally, there could have been variations in rider satisfaction levels based on factors such as age, cultural background, or previous experience with theme parks, which could limit the applicability of the findings to a broader population.

The potential limitation of not accounting for other factors that can influence queue line design decisions is that the study may not provide a complete understanding of how queue line design affects rider satisfaction levels. Failing to consider other factors that can impact queue line design decisions, such as park capacity, ride capacity, and operational efficiency, may limit the applicability of this study's findings to other theme parks or situations where these factors play a more significant role.

## Future Directions

Investigating the effects of technology advancements on queue line layout and visitor experience is one such path. Theme parks may have the chance to use new tools and resources as technology develops to increase the effectiveness of queue lines and visitor happiness. Future studies may investigate the effects of virtual queuing systems or interactive digital displays on wait times, visitor engagement, and general levels of satisfaction.

Examining how cultural variations affect customer preferences for queue line design is another interesting area of future research. Theme parks may run across a wide diversity of cultural tastes and expectations for visitor experiences as they continue to develop internationally. Future research might look at how cultural variations affect how visitors perceive queue line design features including theming, wait times, and crowd control, as well as how theme parks can modify their queue line layouts to account for these variations. Future study can further our understanding of how queue line design affects customer satisfaction levels by examining these and other prospective directions, which will assist theme parks in providing all visitors with the "ideal" queue line experience.

Cost-effectiveness is a crucial subject for future research in the study of the queue line design. Although improving customer experience is the ultimate purpose of the queue line design, this goal cannot be ignored due to the financial ramifications of these designs. Future research might perform cost-benefit analysis on the implementation of various wait line designs and technology, evaluating the necessary financial investment against the possible effects on visitor happiness and park income. The goal of this study may be to pinpoint ways for designing wait lines that are affordable and practical for parks with little funding to use.

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