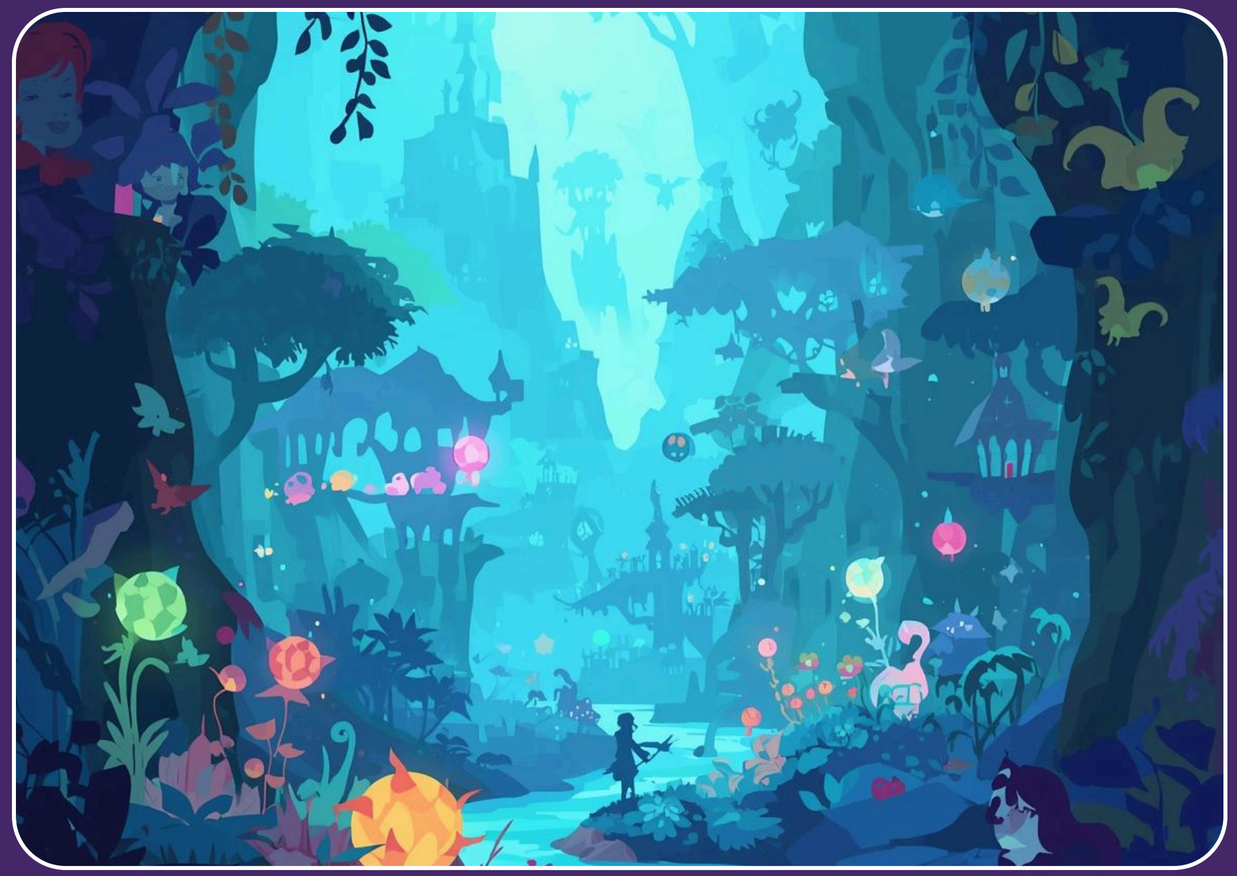

A Statistical and Temporal Analysis of Gacha Mechanics in Wuthering Waves Using Featured Resonator Convene Records: An Exploratory Single-Account Analysis

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Study Overview

Research Objectives and Significance Explained

This exploratory study aims to analyze gacha mechanics by examining a single account's detailed pull records, offering empirical insights into player behavior and game dynamics.

Dataset Overview

Insights into the research dataset characteristics

The study analyzes a total of **582 pulls** over **97 days**, focusing exclusively on the **Featured Resonator banner** and capturing distinct pull behaviors across **24 active days**.

Research Methods

Analyzing Gacha Mechanics Through Data

This study employs a comprehensive **analytic approach** involving data cleaning, feature extraction, exploratory data analysis, and statistical inference to thoroughly assess gacha mechanics.

Core Metrics

Key Statistics of the Dataset

This dataset consists of **582 total pulls**, with **93,120 Astrites** spent and **9 five-star pulls** obtained, providing ample data for preliminary analysis of gacha mechanics.

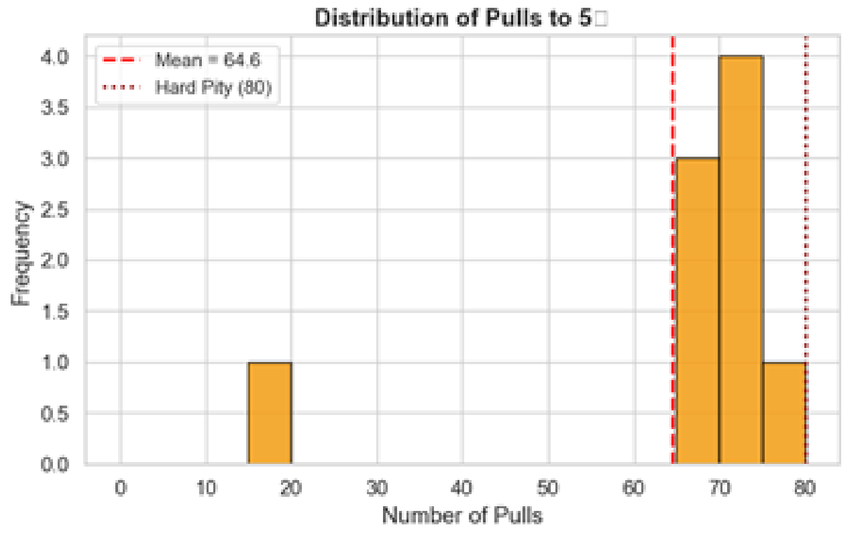
Table 3. Core Pull Metrics

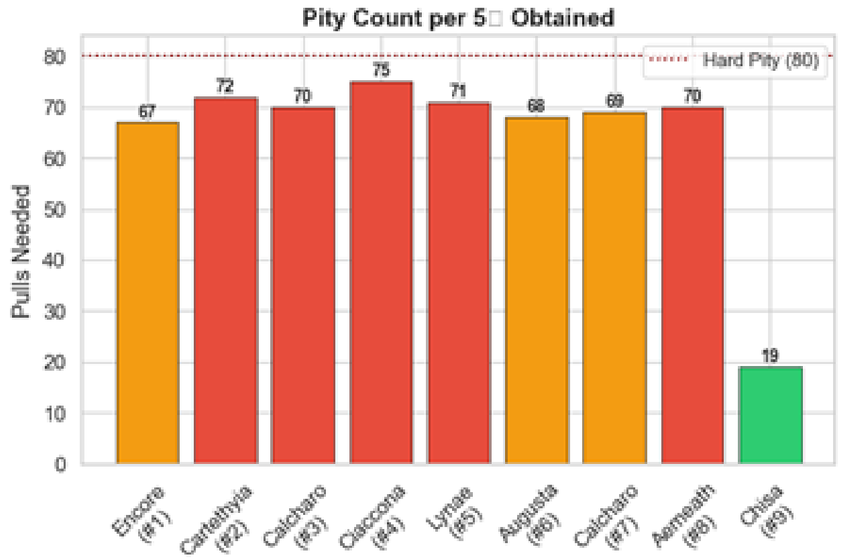
Metric	Value
Total Pulls	582
Total Astrites Spent (160 per pull)	93, 120
Total 5 Star	9
Total 4 Star	69
5 Star Ratio	1.55%
4 Star Ratio	11.86%

5-Star Pull Statistics

Analysis of 5-Star Pull Patterns

The dataset reveals a mean pity of 64.56 pulls for 5-star drops, with a range of 19 to 75 pulls, indicating consistent mechanics without hard-pity breaches.





4-Star Pulls

Overview of 4-Star Pull Statistics

A total of 69 four-star pulls were recorded, yielding a **4-star pull ratio** of 11.86%. Most four-star outcomes occurred within the expected range of 7.42 pulls.

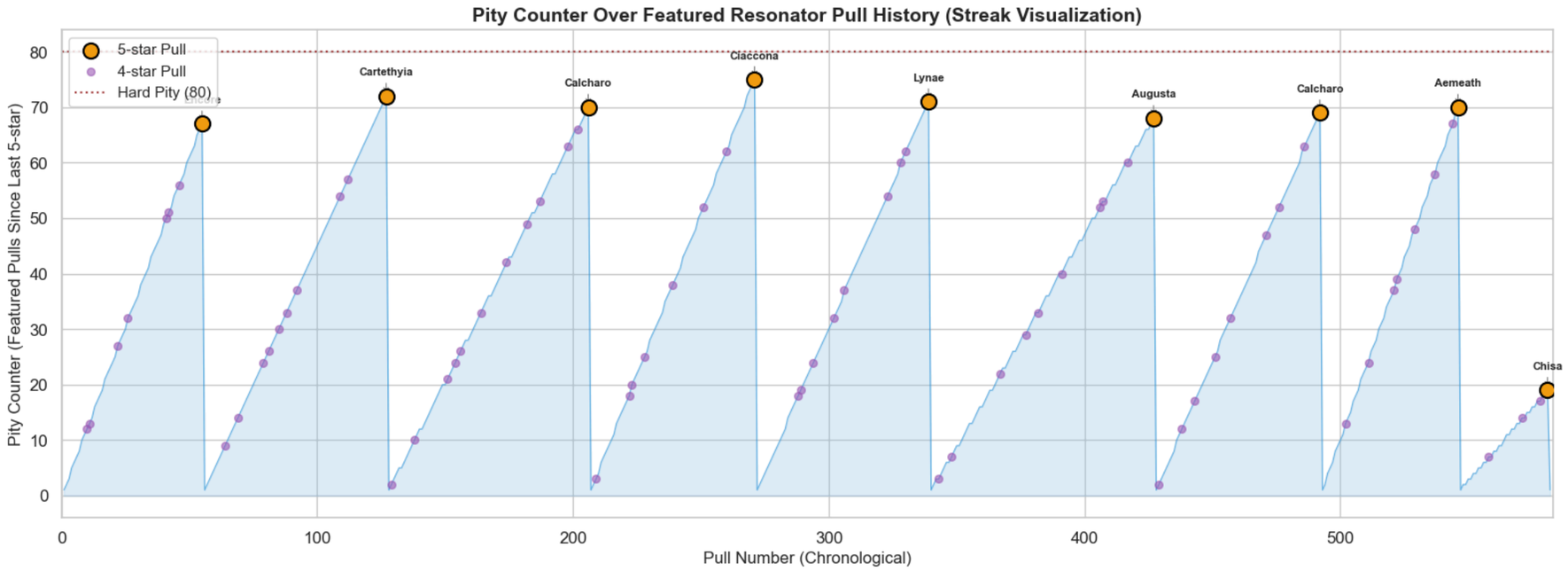
Table 5. Four-Star Summary Metrics

Metric	Value
Total Pulls	582
Total Astrites Spent (160 per pull)	93, 120
Total 4 Star	69
4 Star Ratio	11.86%

Pull Patterns

Analyzing Temporal Trends and Streaks

This section explores the **timing of pulls** and associated streak behaviors, revealing how player habits and pity mechanics influence overall gacha outcomes and success rates.



Hypothesis Testing

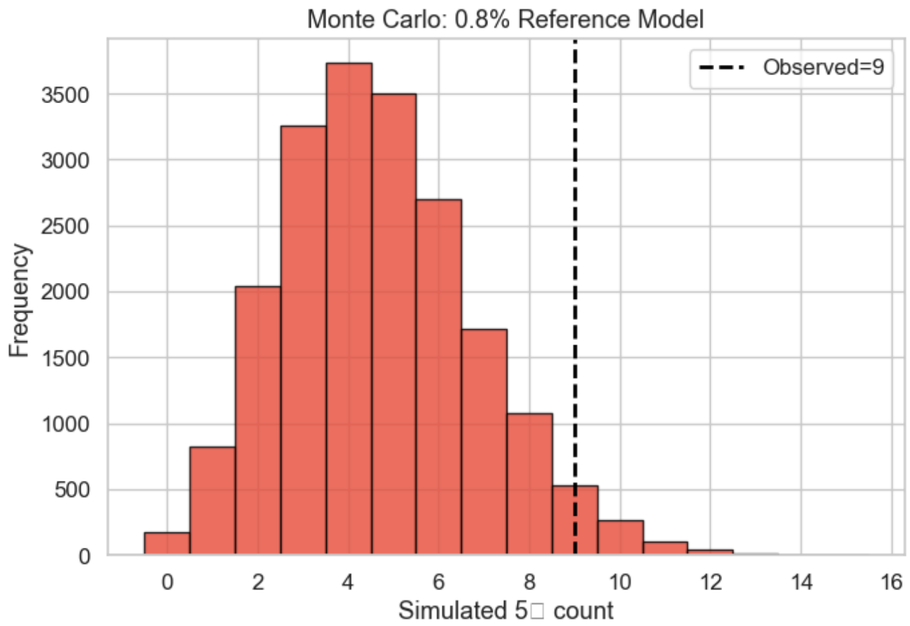
Statistical test results and interpretations

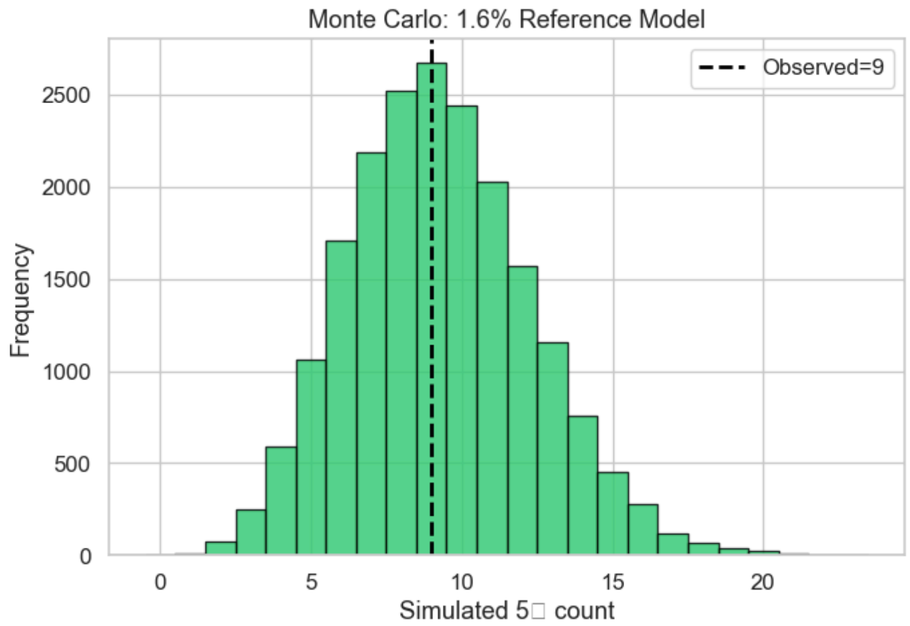
The analysis revealed a borderline significance with a p-value of 0.0566, indicating potential effects while cautioning against overinterpretation due to a limited sample size.

Monte Carlo Simulations

Validating findings through statistical modeling

Monte Carlo simulations were employed to model pull distributions, confirming stability in results. Robustness checks demonstrate consistent outcomes across various assumptions, validating the analytical approach taken.





Findings Overview

Insights into Gacha Mechanics Behavior

The late-cycle clustering observed indicates that pity mechanics significantly influence player pull outcomes, suggesting strategic implications for both developers and players in understanding gacha systems.

Limitations

Exploring study constraints and caveats

This research is limited by its single-account dataset, low frequency of rare events, and reliance on model assumptions, potentially affecting generalizability and inference strength.

Future Research

Expanding the Study of Gacha Mechanics

Gathering multi-account datasets and incorporating qualitative player behavior insights will enhance the robustness and applicability of findings across diverse gaming environments.

Conclusion

Key insights and implications of research

This study highlights the structured **pity effects** in gacha mechanics, enhancing understanding for both academic inquiry and player experiences while emphasizing statistical methods' importance in gaming analytics.

Thank You