League of Mythics

Gregory Brown
Allen Hughes
Reed Semmel
Paul Velas

An analysis of mythic items in League of Legends

What is League of Legends?

League of Legends is a competitive multiplayer 5v5 game. The object of the game is to destroy the enemy team's base. You select a champion and purchase items in order to make them stronger. Then you duke it out with the other players to see who is the best team.

Image credit: Petar Vukobrat, EsportsTalk

Items

Image credit: leagueoflegends.fandom.com

- As the game progresses, you earn gold to buy items which empowers your champion
- We are focusing on a recent addition to the game: mythic items
- Mythic items grant some of the best powers in the game, which means they are usually purchased first
- You are restricted to only one mythic item at a time

The mythic item “Kraken Slayer”

Our Project Objective

- Riot's claim for introducing mythic items is to increase item diversity in the game
- Riot stated that their primary goal is that "**no [champion] chooses the same mythic in 75%+ of games**"
- In February - 3 months after the introduction of mythic items - 88% of champions hit that goal
- 157 champions + 23 mythic items = choices = **data**!
- We want to explore the choices players make in regard to which mythic item they choose on champions

Source: https://www.leagueoflegends.com/en-us/news/dev/quick-gameplay-thoughts-feb-26/

Data Collection

Riot Games API

- The Riot API is freely available
- Contains information about individual matches and players
- Has a rather low rate limit (50 req/min)
    - Distribute collection across all team members

Collection Overview

- We used 4 endpoints to get the data we wanted
    - League entries: Returns a list of players at a given rank and division (Gold 2, Diamond 1, etc.)
    - Summoners: Returns account information from a SummonerId. We need the PUUID for an account for the endpoint that has our data
    - Match by PUUID: Returns a list of match ids for a PUUID. We chose the 25 latest ranked matches
    - Match: Returns the desired game statistics for a given match id

Collection Process

- The collector script was set up to collect data for a range of ranks
- We used 10% of the league entries for rank Gold 4 and up (represents top 40% of players)
    - Split up the entries across ourselves evenly so we would get a wide range of ranks
    - Only went through about half of the entries in 3 days before we decided we had enough data
- The API is not very reliable (prone to 429s and 503s). Making the script fault-tolerant was a must
- Uploaded match data (simple json response) to a shared mongo collection

What data did we collect?

- The match endpoint gives statistics about the match after it ends
- Contains basic metadata such as game version and a list of all 10 participants
- Each participant entry contains data such as which champion they played, what items they bought, number of kills/deaths/assists, whether they won or lost, etc.
- Collected 426k matches, or 4.26M participants
- Exported data to a SQLite table with one row per participant for analysis
    - Later aggregated to champion-mythic composites to make analysis easier and faster

Data Analysis

How do mythics impact the course of the game?

champion	mythic	Wins	Games	Average Winrate
All	None	96707	289459	0.334095675035152
All	All	2032263	3968491	0.512099687261481

wins	games	winrate
23847	71648	0.332835529254131
39251	107426	0.36537709679221

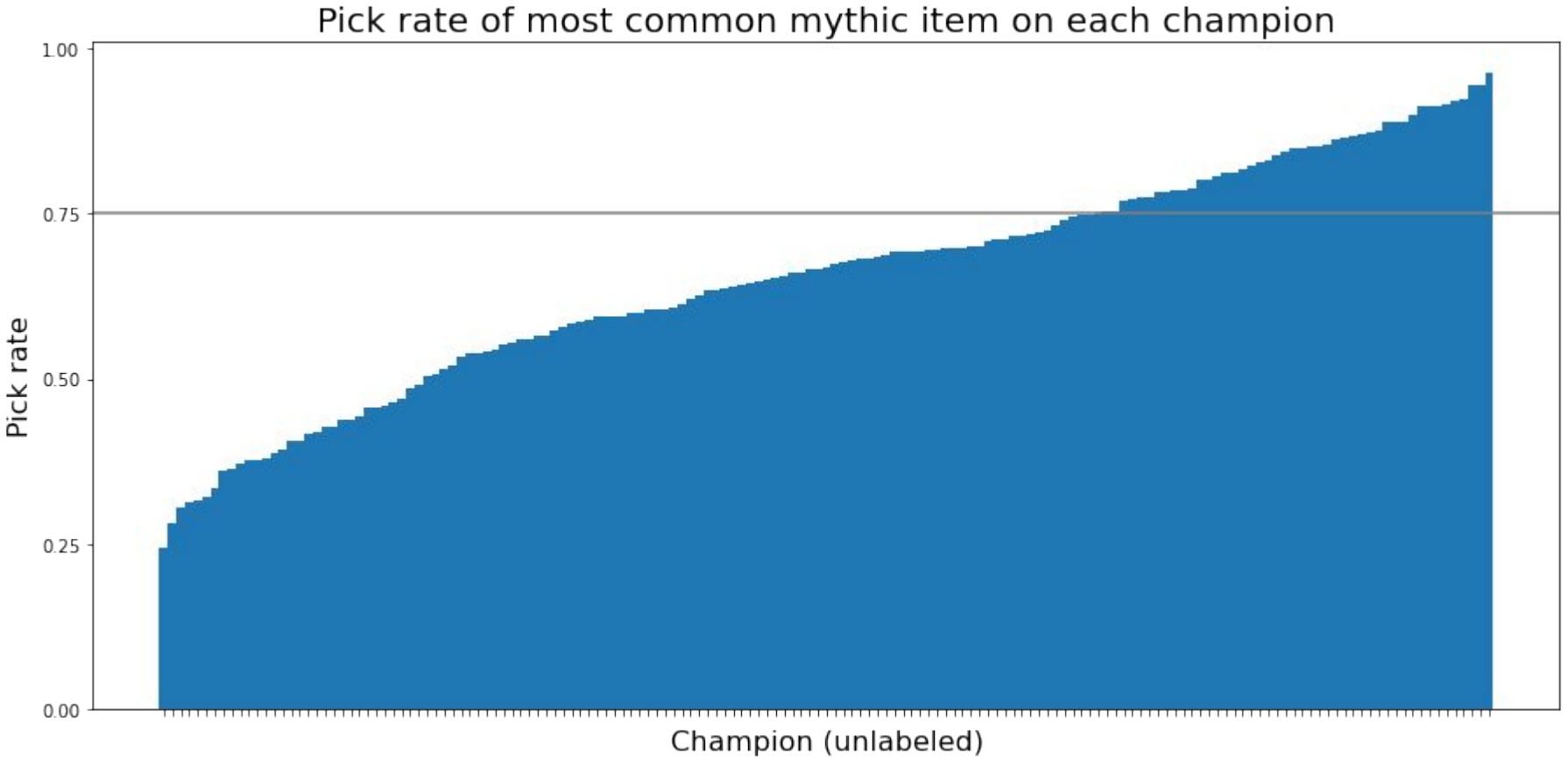
First, we took a look at whether the possession of, or lack thereof, might be a predictor of the outcome of a game, to see if they really did have an impact.

Table of unfiltered winrate of all games without a Mythic vs all games where the player in question purchased a Mythic.

Basic filter of Gold Spent > 500 on the bottom row, with the top row combining it with the additional filter of Total Damage Dealt > 300, both to weed out leavers, griefers, and AFK players.

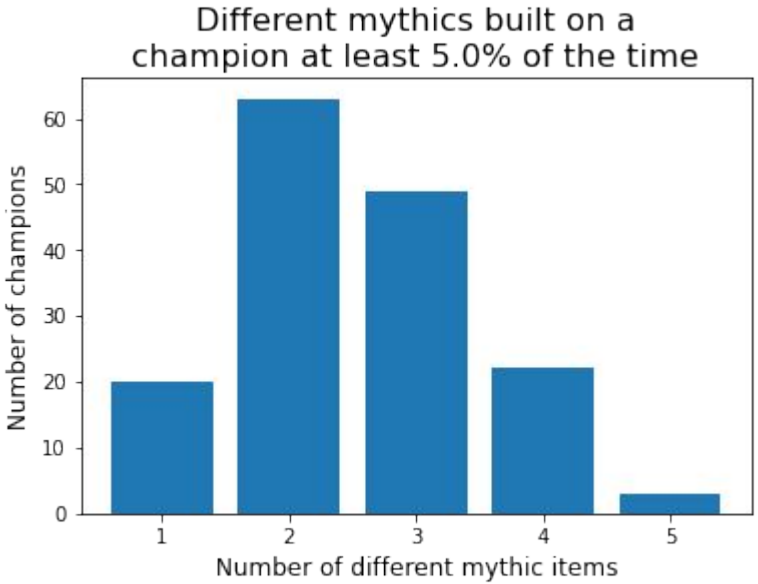
Overall diversity

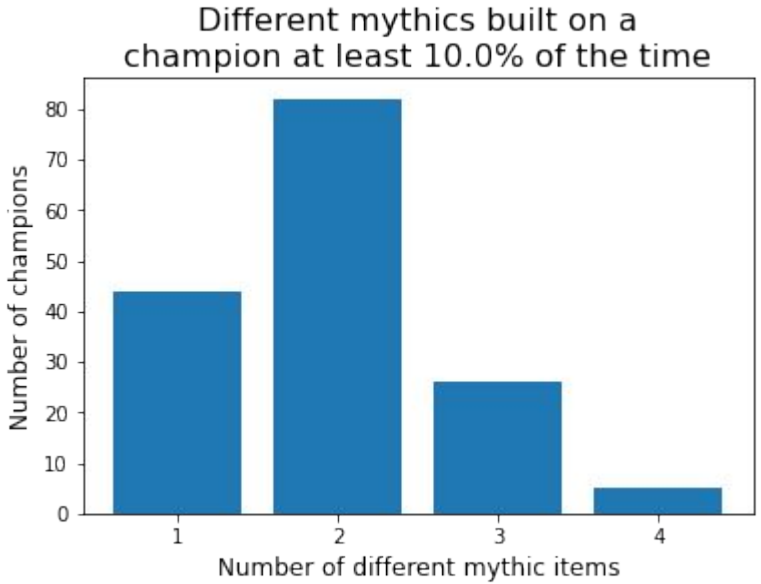
- First, we will be looking at all champions as a whole
- Then we will look into the details of a few interesting groups



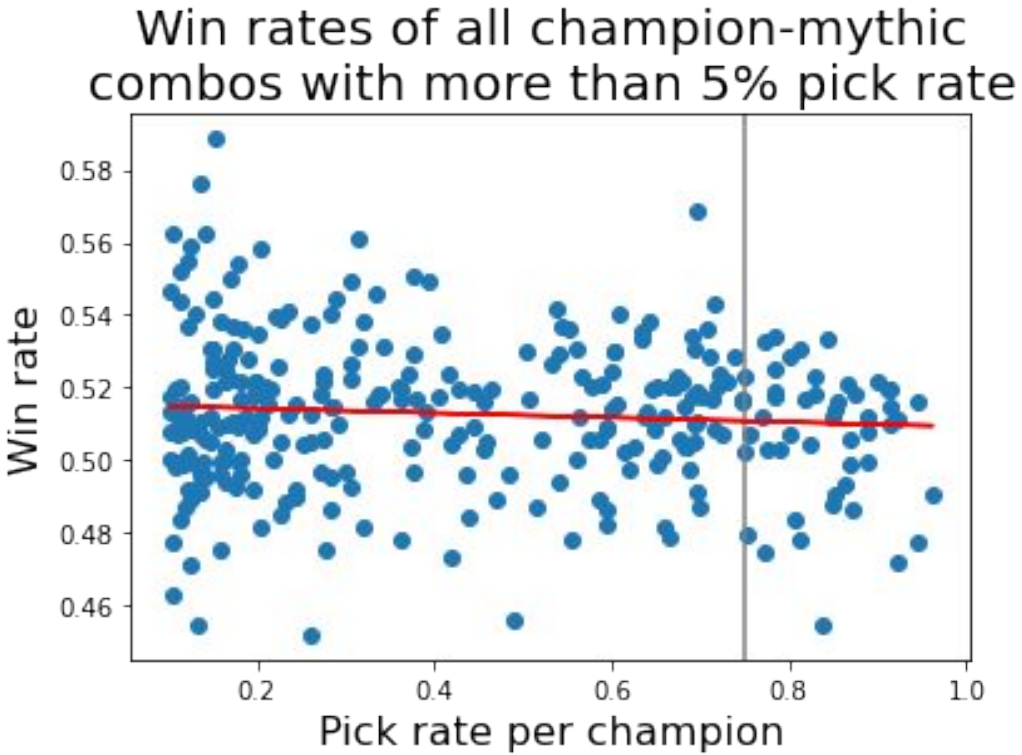
Riot’s goal summarized in one graph. Only 71% of champions met the goal.

How many choices do champions have?





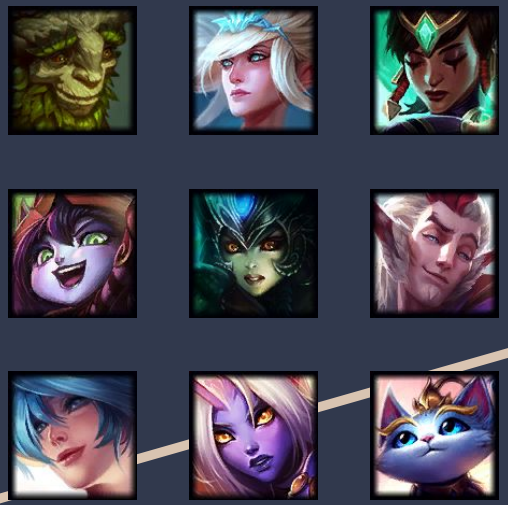
Does pick rate correlate with win rate?



What is going on at a deeper level?

We will now look a few groups of champions in detail to see if we can gain any insights to the player’s choices

Enchanter Champions

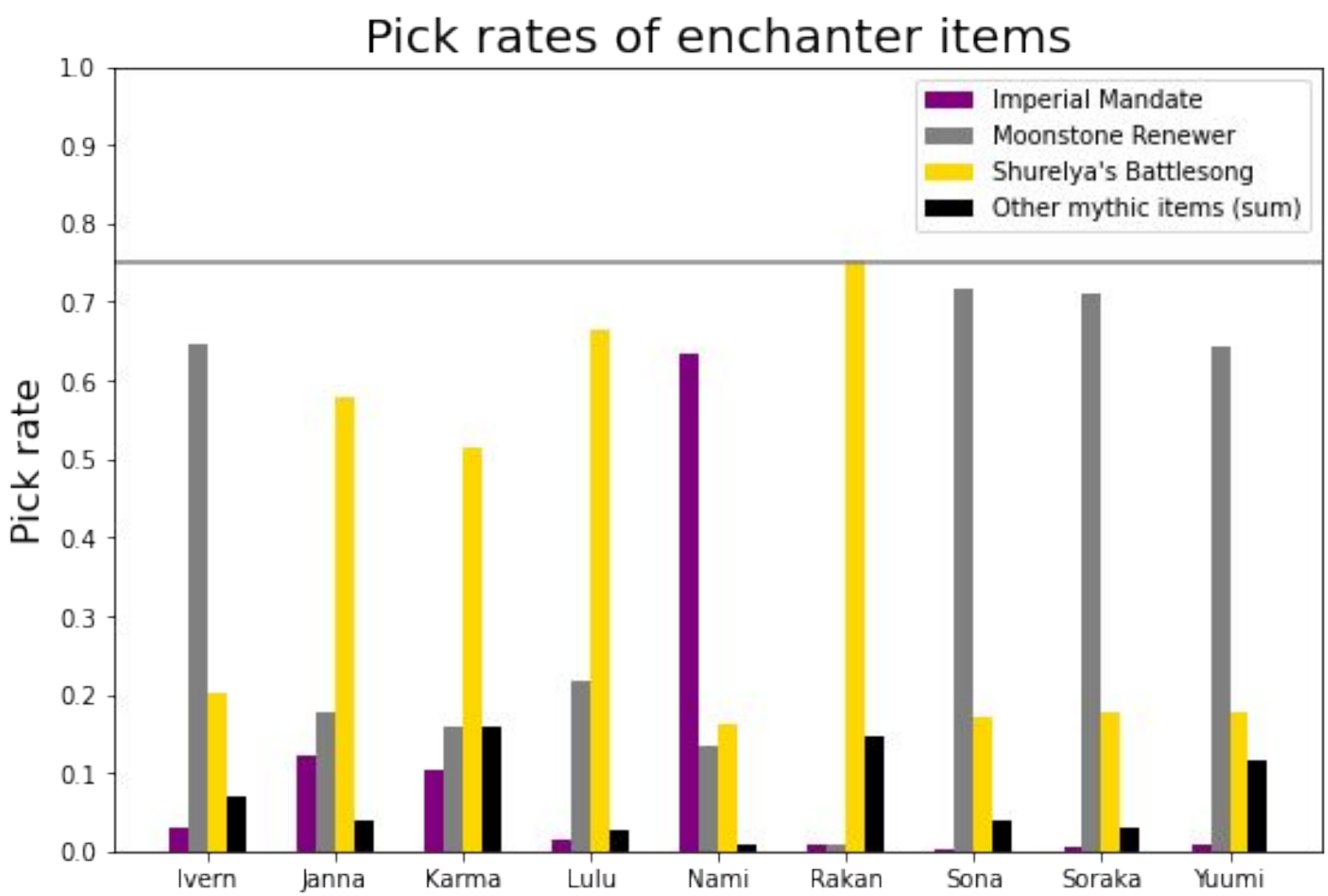


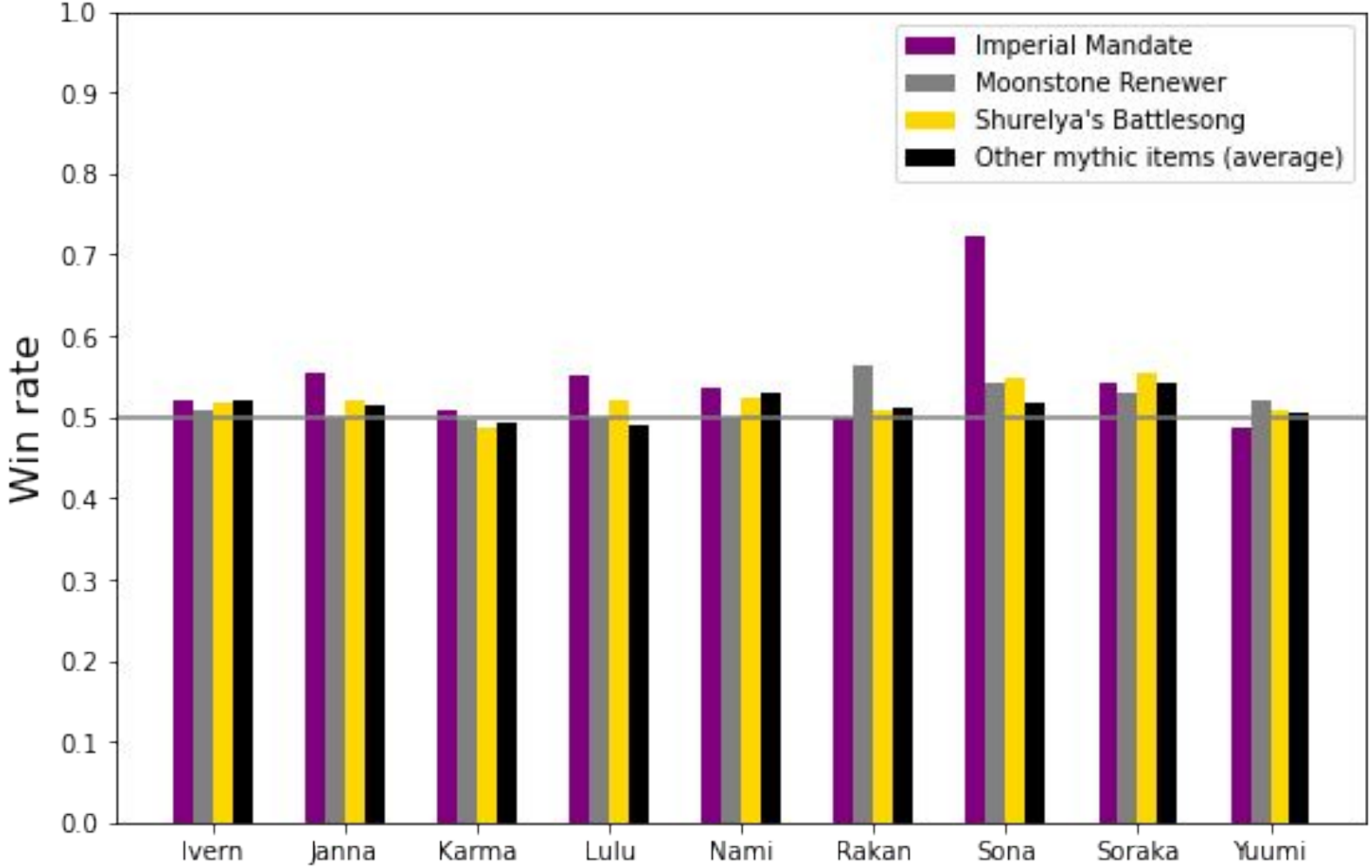
- Enchanters provide value to the team by healing and empowering their allies
- They have 3 mythic items tailored to them:

Moonstone Renewer: Increases healing and shielding power while in extended combat

Shurelya's Battlesong: Empowering an ally gives both of you a temporary speed boost

Imperial Mandate: Impairing an enemy marks them for a short time, and an ally can attack them to detonate the mark to deal bonus damage


Pick rates of enchanter items
Pick rate
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Imperial Mandate
Moonstone Renewer
Shurelya's Battlesong
Other mythic items (sum)
Ivern
Janna
Karma
Lulu
Nami
Rakan
Sona
Soraka
Yuumi


Win rates of enchanter items
Win rate
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Imperial Mandate
Moonstone Renewer
Shurelya's Battlesong
Other mythic items (average)
Ivern
Janna
Karma
Lulu
Nami
Rakan
Sona
Soraka
Yuumi

Mythic Diversity in Mid Lane

	champion	mythic	gamesMid
1	Katarina	All	28683
2	Leblanc	All	31505
3	Sylas	All	30080
4	Vex	All	27651
5	Yasuo	All	48431
6	Yone	All	41847
7	Zed	All	34667

- For our analysis of mythic diversity in mid lane, we chose to analyze the top 5 champions played in mid lane and their commonly built items, those champions being: Yasuo, Yone, Zed, Leblanc, and Sylas.
- Yasuo chose Immortal Shieldbow in over 91% of matches played mid.
- Yone chose Immortal Shieldbow in over 92% of matches played mid.
- Zed chose Duskblade of Draktharr in over 44% and Eclipse in 37%.
- Leblanc chose Luden's Tempest in over 89% of games.
- Clearly, champions in the midlane lack diversity in their individual picks, ie one item is clearly better for them. However, due to midlanes diversity in characters chosen, as a whole the role has a wide variety of mythics chosen

Mythic Diversity in Jungle

	champion	gamesJungle
1	Ekko	32170
2	Graves	46723
3	Kayn	54940
4	Khazix	44634
5	LeeSin	46538
6	MasterYi	32362
7	Viego	36761
8	XinZhao	30904

- Another one of the most popular roles, Jungle, also has a wide variety of champions played, I decided to also look at this role to explore mythic diversity among Jungle champions as a whole
- The champion Kayn had a 71% playrate with the item Goredrinker
- The champion Lee Sin chooses the item Goredrinker over 81% of the time while playing Jungle
- The champion Viego chooses DS only 60% of the time, with the remainder of his choices being spread out among other items.

Mythic Diversity in Jungle cont

	champion	gamesJungle
1	Ekko	32170
2	Graves	46723
3	Kayn	54940
4	Khazix	44634
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6	MasterYi	32362
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- Graves is another champion who reflects riots claim with his pickrate of his main item Immortal Shieldbow being just 55%.
- Khazix is another example of a champion similar to Kayn, with his pickrate of Duskblade being 68%, while he does have an item that can be considered a “main” item, he still fits riots claim of mythic diversity.

Conclusions and Learning Outcomes

- Riot failed to meet their goal on item diversity and has actually gotten worse since their blog post in February
- The choice for mythic diversity is there for players to choose, but they insist on building the same items most of the time
- Changing the items to incentivize them is difficult since they are already strong choices; improving them could make them too strong
- Writing distributed, fault-tolerant systems
- Lots of SQL