

Comprehensive Analysis of Valorant Agent Performance: Outliers, Correlations and Game Balance

IE6600 – Computation and Visualization for Analytics Final Report

Group Number 14

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Problem statement

Valorant, a tactical first-person shooter crafted by Riot Games, stands renowned for its strategic gameplay, diverse agent selection, and emphasis on precision in competitive multiplayer settings. The dynamic landscape of Valorant agents presents a challenge in understanding the correlation between various performance metrics, identifying outliers, and ensuring a balanced representation of agent roles. Key questions arise regarding the intricate relationships among different agents' metrics, the presence of outliers in each metric category, and the overall balance within distinct agent roles. To address these challenges, a comprehensive analysis is essential, providing insights into the nuanced dynamics of agent performance. This research aims to explore the correlation patterns, pinpoint outliers, and assess the equilibrium in agent roles, contributing to an enhanced understanding of the game's competitive balance and potential areas for adjustments or optimizations in agent design.

Data Description

This analysis draws insights from a dataset meticulously compiled by blitz.gg, a reputable Valorant statistics website. The dataset encapsulates critical performance metrics for each agent, including Kill-Death Ratio (KD), Kills, Deaths, Assists, win rate, pick rate, and Average Combat Score(ACS). Derived from various in-game actions, ACS is a composite score reflecting Damage dealt, Kills based on enemies alive, multi-kills, and Non-Damaging assists. The dataset also provides essential context with details on match count, agent roles, and a breakdown of individual abilities.

The metrics that we have used are mentioned below:

ACS: Average Combat Score, calculated using various metrics such as Damage dealt, Kills based on enemies alive, multi-kills, and Non-Damaging assist.

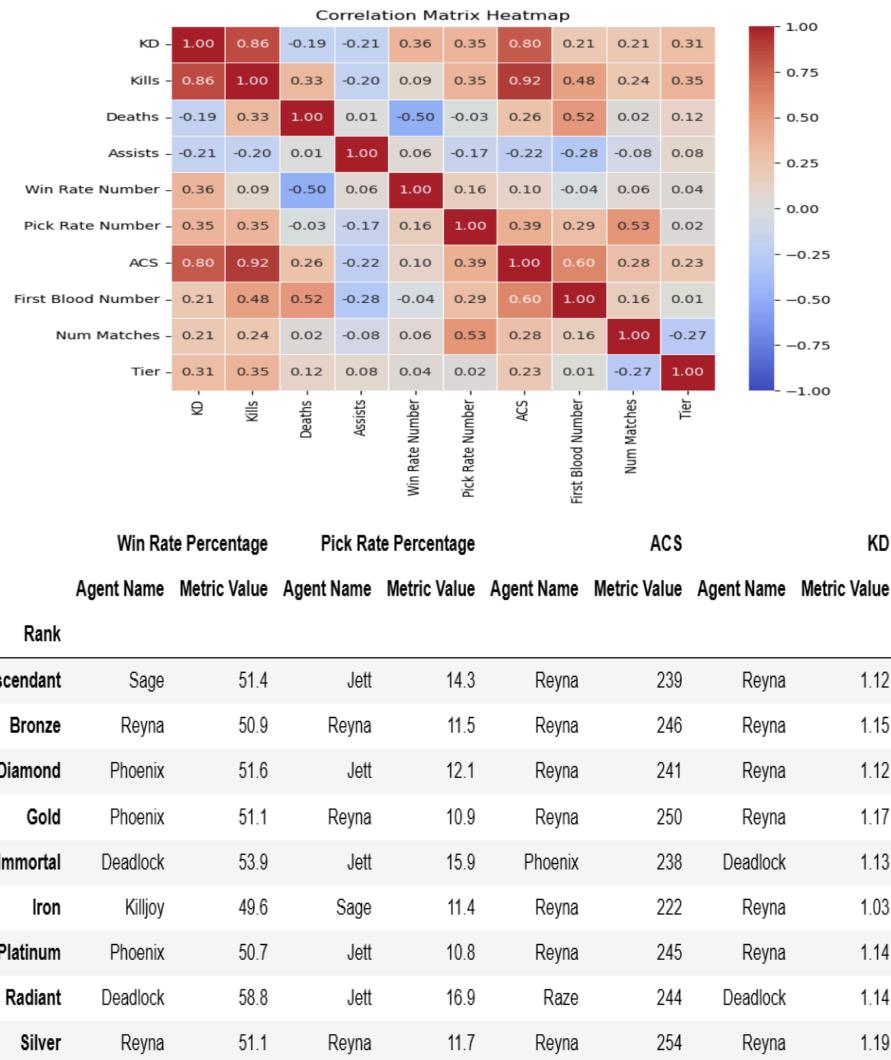
KD: Kill to Death Ratio, Number of Kills/Number of Deaths

PICK RATE: (Number of Rounds with the Agent/Total Number of Rounds)*100

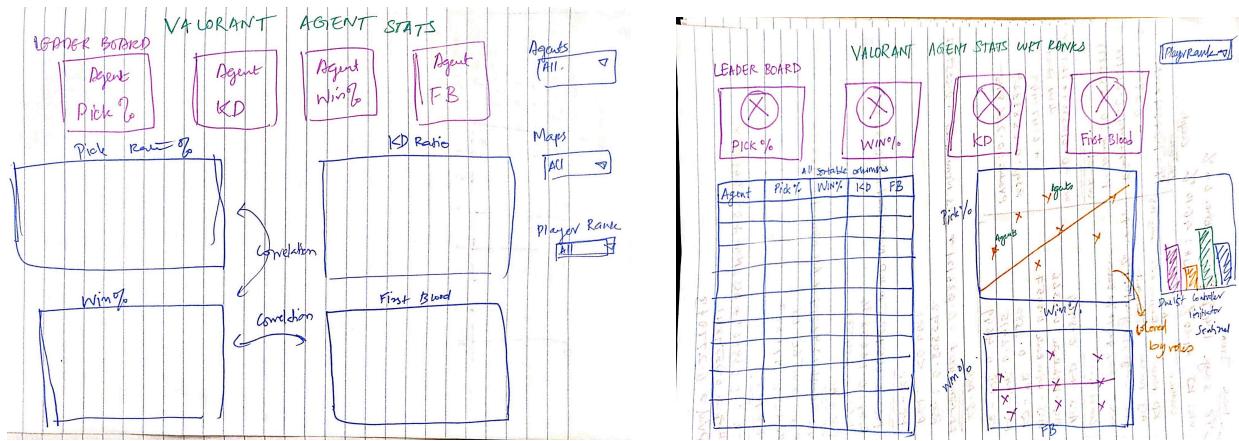
WIN RATE: (Number of Rounds won with the Agent/Total Number of Rounds)*100, by considering the games where the agent is picked by only one team.

Design Process

To overcome the challenge of using outdated Kaggle datasets, we employed data scraping from statistics websites, conducting Exploratory Data Analysis (EDA) in Python. Tableau was chosen for visualization creation, utilizing Python's .corr() function for metric correlations. A thorough analysis identified top and bottom-performing agents for each metric and rank. KD and ACS were normalized for correlation, considering pick and win rates as percentages between 0 and 1.

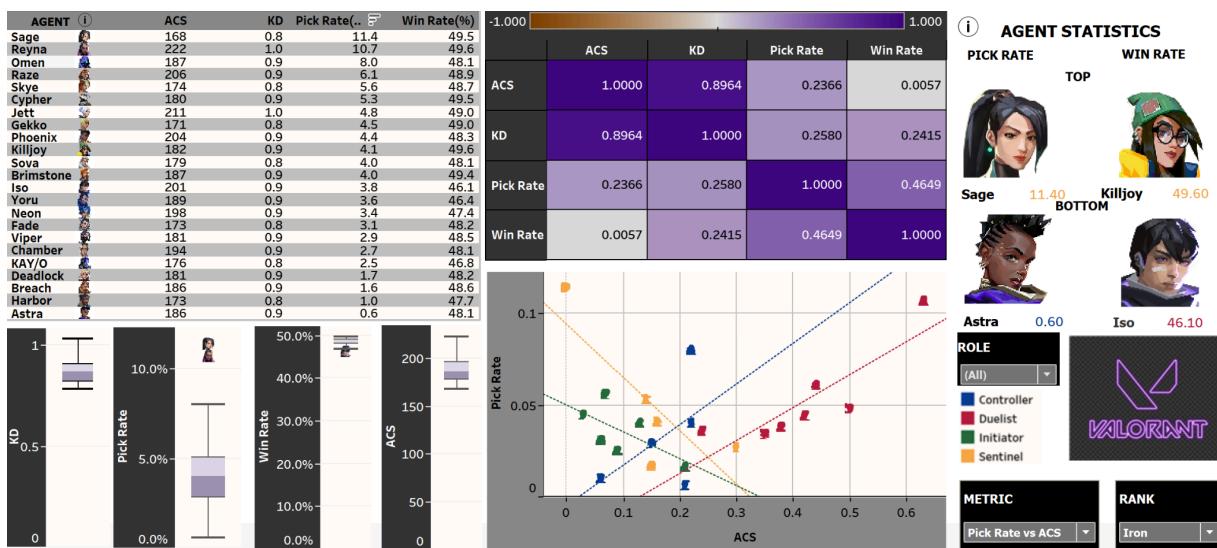


Initial Sketches



Final Dashboard

Agent icons were integrated using Tableau's image role and shapes feature. The dashboard includes filters for agent role, player rank, and scatterplot pick. A tooltip feature displays agent abilities upon hovering. This comprehensive approach enables nuanced analysis, identifying top and bottom-performing agents for each metric and rank.



An in-depth analysis of Valorant agent metrics was performed, offering a nuanced perspective on game balance within the Iron rank. The dashboard serves as a powerful tool, capable of dissecting agent performance across roles and ranks. However, to maintain focus and provide a comprehensive overview, we have centered our analysis on the Iron rank. This deliberate choice enables a meticulous exploration of correlations, outliers, and role equilibrium within this specific player tier.

Key insights

Agent Statistics:

AGENT	ACS	KD	Pick Rate(..)	Win Rate(%)
Sage	168	0.8	11.4	49.5
Reyna	222	1.0	10.7	49.6
Omen	187	0.9	8.0	48.1
Raze	206	0.9	6.1	48.9
Skye	174	0.8	5.6	48.7
Cypher	180	0.9	5.3	49.5
Jett	211	1.0	4.8	49.0
Gekko	171	0.8	4.5	49.0
Phoenix	204	0.9	4.4	48.3
Killjoy	182	0.9	4.1	49.6
Sova	179	0.8	4.0	48.1
Brimstone	187	0.9	4.0	49.4
Iso	201	0.9	3.8	46.1
Yoru	189	0.9	3.6	46.4
Neon	198	0.9	3.4	47.4
Fade	173	0.8	3.1	48.2
Viper	181	0.9	2.9	48.5
Chamber	194	0.9	2.7	48.1
KAY/O	176	0.8	2.5	46.8
Deadlock	181	0.9	1.7	48.2
Breach	186	0.9	1.6	48.6
Harbor	173	0.8	1.0	47.7
Astra	186	0.9	0.6	48.1

PICK RATE

TOP

WIN RATE

TOP

Sage 11.40 BOTTOM

Astra 0.60

Killjoy 49.60

Iso 46.10

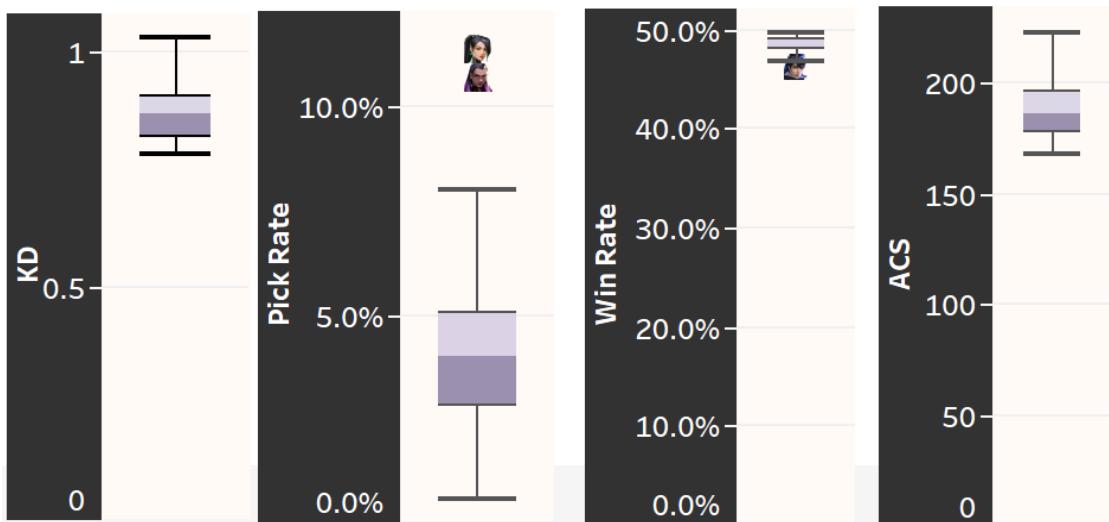
Sage stands out with the highest pick rate at 11.4%, closely followed by Reyna at 10.7%. Conversely, Astra has the lowest pick rate at 0.60%. The top performers in terms of win rates are Reyna and KillJoy, both boasting an impressive 49.6%, while Iso trails slightly with a win rate of 46.1%. In the Kill-Death (KD) ratio category, Reyna and Jett lead with the highest KD at 1, while agents like Sage, Sova, Skye, Fade, Gekko, Harbor, and KAY/O exhibit the lowest KD at 0.8. Additionally, Reyna demonstrates the highest Average Combat Score (ACS) at 222, while Sage records the lowest at 168.

Correlation between performance metrics:

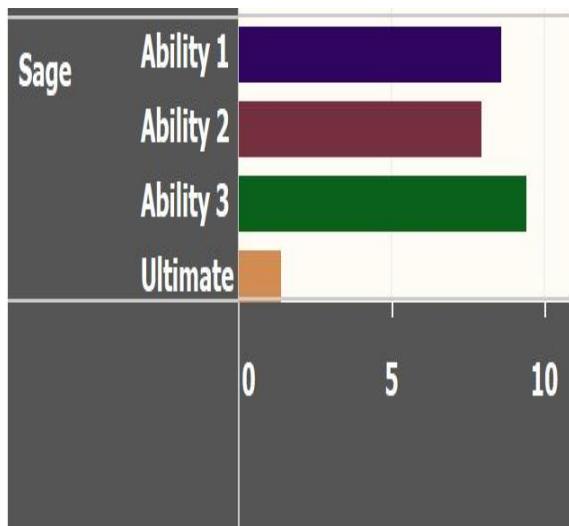
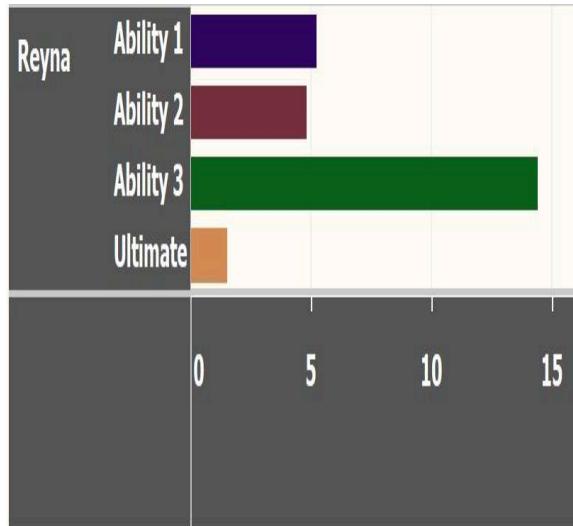
	ACS	KD	Pick Rate	Win Rate
ACS	1.0000	0.8964	0.2366	0.0057
KD	0.8964	1.0000	0.2580	0.2415
Pick Rate	0.2366	0.2580	1.0000	0.4649
Win Rate	0.0057	0.2415	0.4649	1.0000

The heatmap reveals a robust positive correlation between ACS and KD (0.8964), suggesting that agents excelling individually also thrive in team play. However, the correlations in metric pairs "Pick Rate - ACS" (0.2366), "Pick Rate - KD" (0.2580), "Win Rate - KD" (0.2415), and "Pick Rate - Win Rate" (0.4649) are weakly positive. Notably, there is nearly no significant correlation observed between Win Rate and ACS (0.0057).

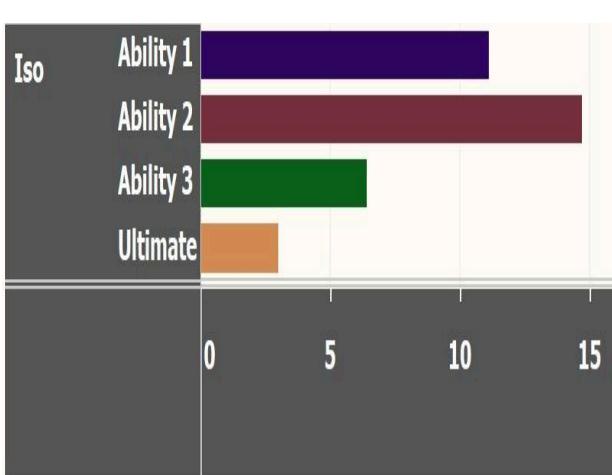
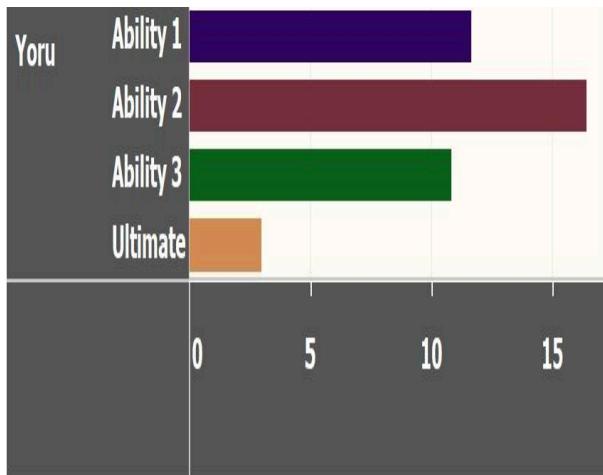
Identifying Outlier Valorant Agents:



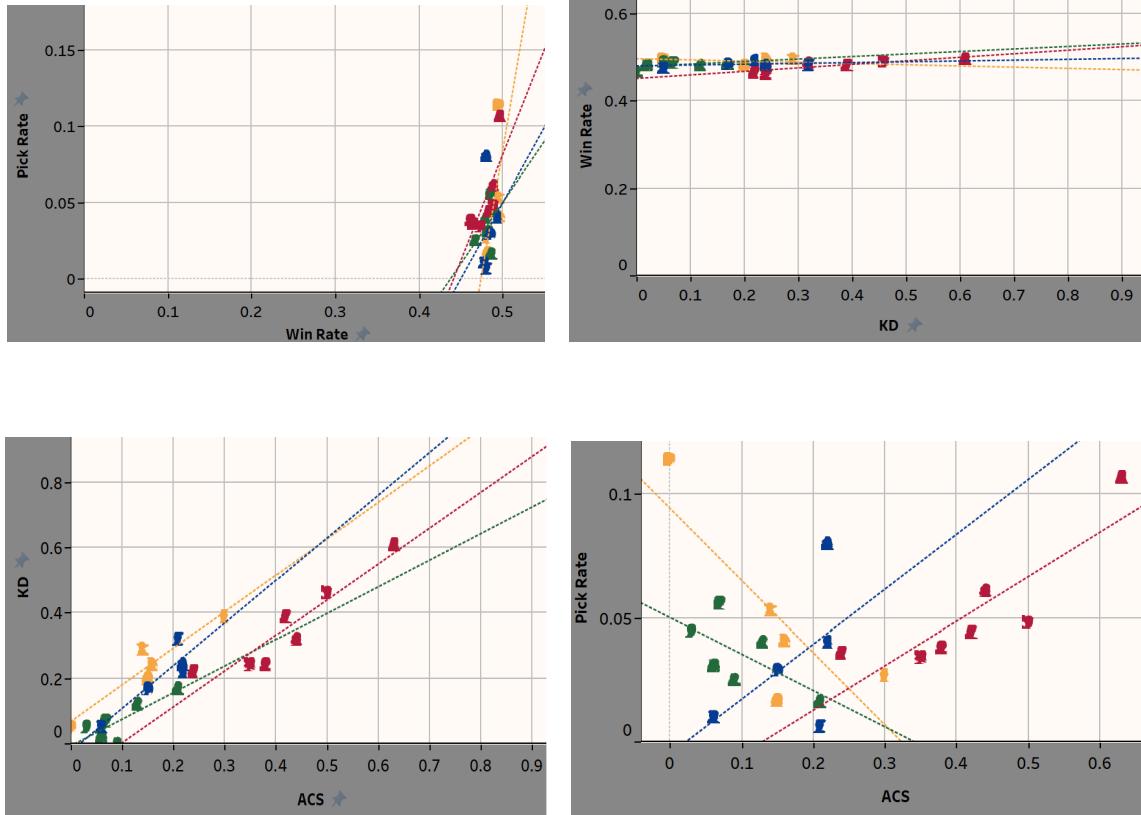
No outliers were identified in KD and ACS metrics. However, Pick Rate reveals two outliers, Sage and Reyna, with rates of 11.4% and 10.7%, respectively. Examining Sage, ranked 3rd in Win Rate at 49.5%, a low KD of 0.8%, and the lowest Average Combat Score (ACS) - 168, suggests a supportive role rather than combat prowess, her abilities seem balanced, even though not apt for gaining kills. Despite being a Pick Rate outlier, Sage is not necessarily overpowered. Reyna, with the highest Win Rate at 49.6%, ACS of 222, and KD of 1, suggests potential overuse or overpowered capabilities. An unbalanced ability usage pattern, particularly a high reliance on Ability 3, further supports this observation.



Win Rate highlights two outliers below the lower whisker - Iso at 46.1% and Yoru at 46.4%. Analyzing Iso, with a near-average pick rate of 3.8%, an above-average KD of 0.9%, and a 5th rank in ACS at 201 among 23 agents, suggests a balanced performance. The lower Win Rate may be influenced by other factors as the examined metrics show consistent performance. Iso's abilities, however, seem unbalanced, particularly with a high reliance on Ability 1. Yoru, with a pick rate below average at 3.6%, an above-average KD of 0.9%, and ACS at 194, might be underutilized but not necessarily underpowered. Yoru's abilities appear balanced.



Agent Role Analysis:



There aren't any significant clusters in the scatter plots , agent roles appear to be balanced. Duelists slightly lead in KD and ACS, consistent with their designed role to frag/kill, as their abilities are more offensive and less supportive. No agent role dominates in terms of Pick Rate and Win Rate.