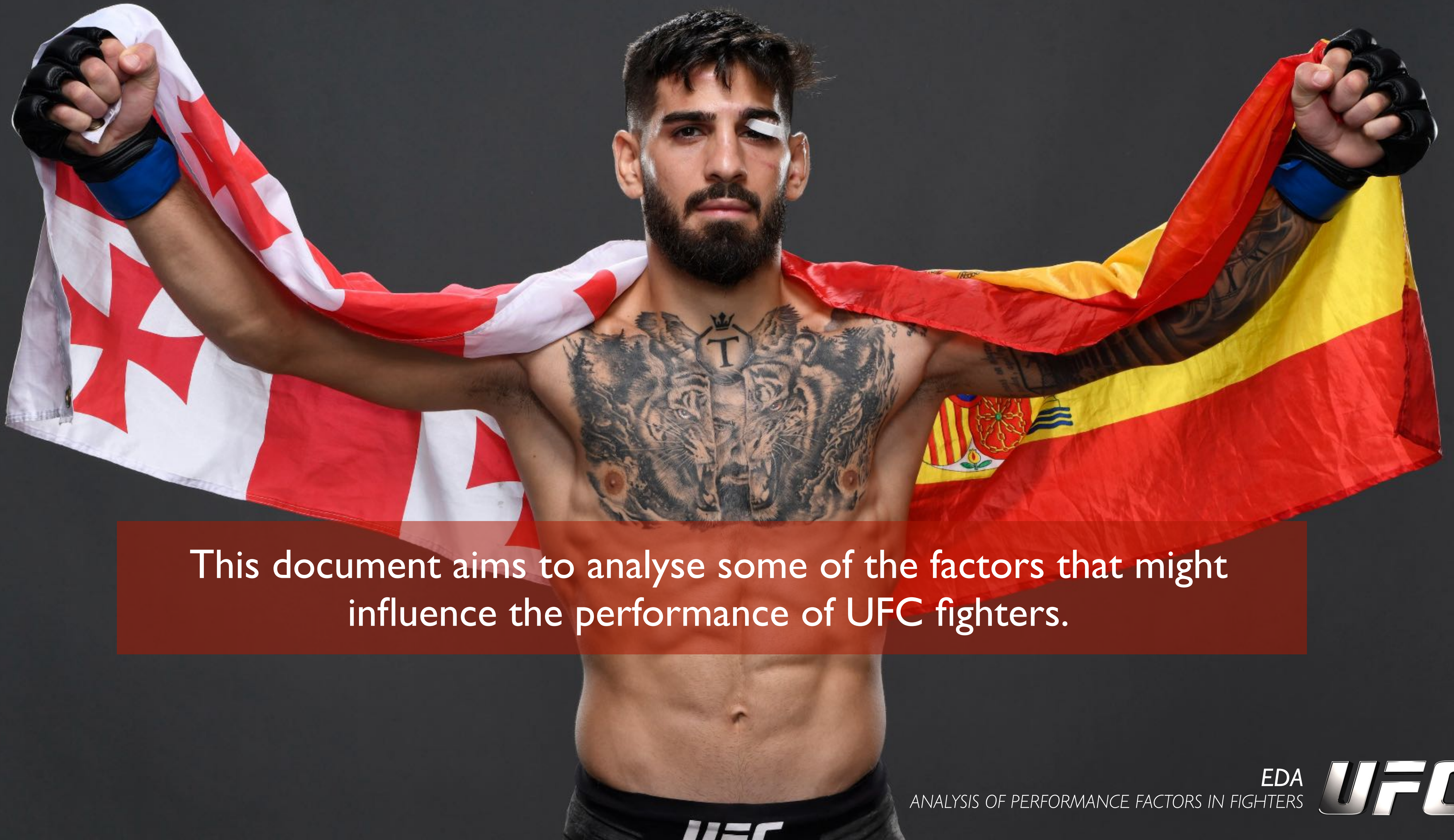


EDA

ANALYSIS OF PERFORMANCE FACTORS IN UFC FIGHTERS





This document aims to analyse some of the factors that might influence the performance of UFC fighters.

In this study, we will attempt to obtain answers to 4 main questions:



1. We will attempt to prove or refute with data whether certain physical characteristics such as height, weight, or reach are related to performance.



2. We will try to determine which type of guard among the most commonly used (Orthodox, Southpaw, and Switch) achieves the highest number of victories.



3. We will examine the data to see if a fighter's age is directly related to their number of victories or defeats.



4. We will compare strikers with grapplers to see if strikers are more successful than those who focus on takedowns and submissions.

Hypothesis I

We will attempt to prove or refute with data whether certain physical characteristics such as height, weight, or reach are related to performance.

Correlations Between Physical Characteristics and Performance

Height and Reach (0.89): There is a strong positive correlation between height and reach. This indicates that, in general, taller fighters tend to have a greater reach, which is expected.

Weight and Reach (0.75): There is a strong positive correlation between weight and reach. Fighters with higher weight tend to have a greater reach.

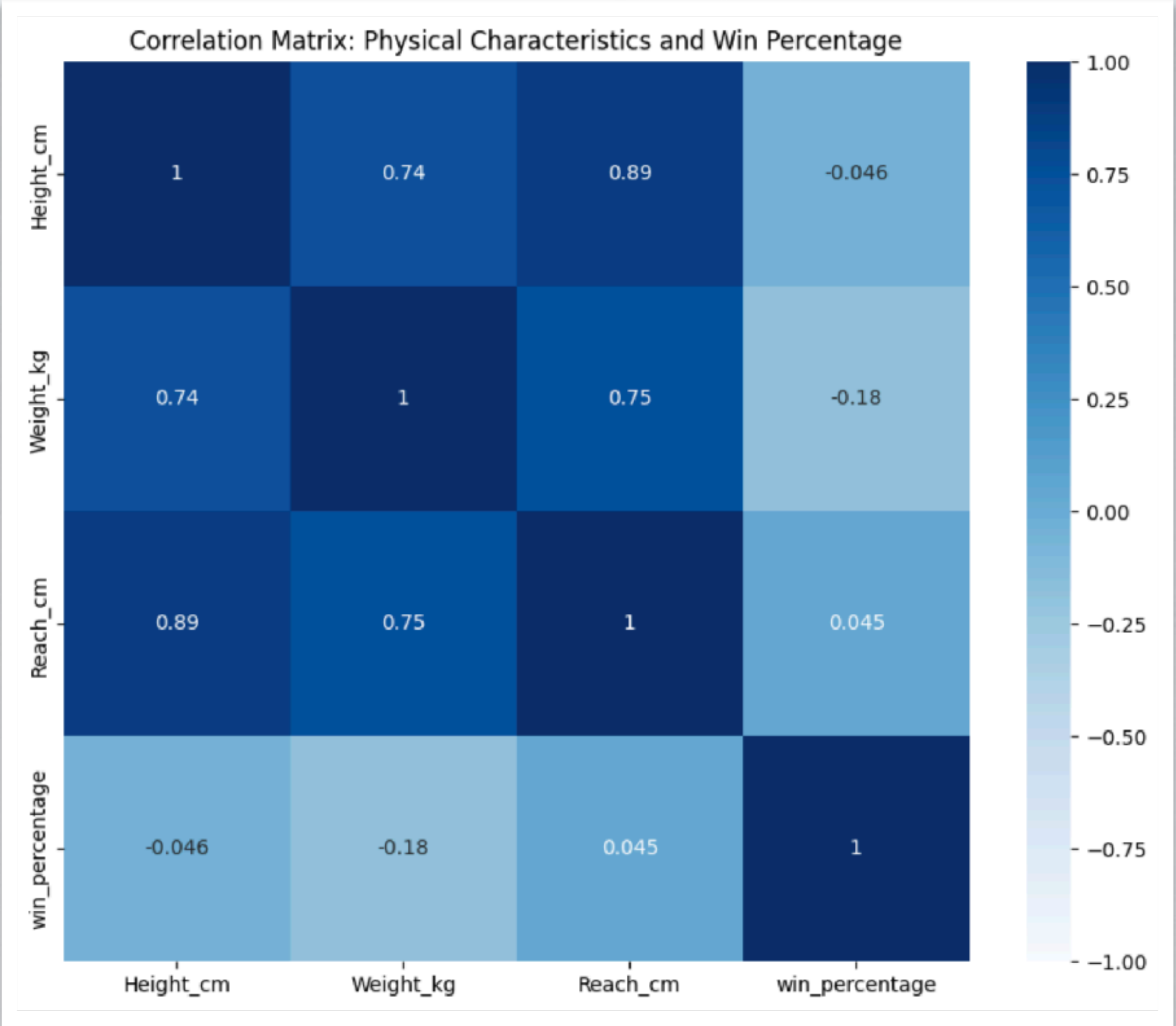
Height and Weight (0.74): There is a strong positive correlation between height and weight. This suggests that taller fighters also tend to weigh more.

Correlations with Win Percentage

Height and Win Percentage (0.048): There is a very low and negative correlation between height and win percentage. This suggests that height does not have a significant impact on performance in terms of victories.

Weight and Win Percentage (0.19): The correlation between weight and win percentage is also very low and negative. This indicates that weight does not have a significant impact on performance in terms of victories either.

Reach and Win Percentage (0.045): The correlation between reach and win percentage is low and positive. Although it is slightly higher than the correlation with height and weight, it is still low, suggesting that reach has minimal impact on victories.

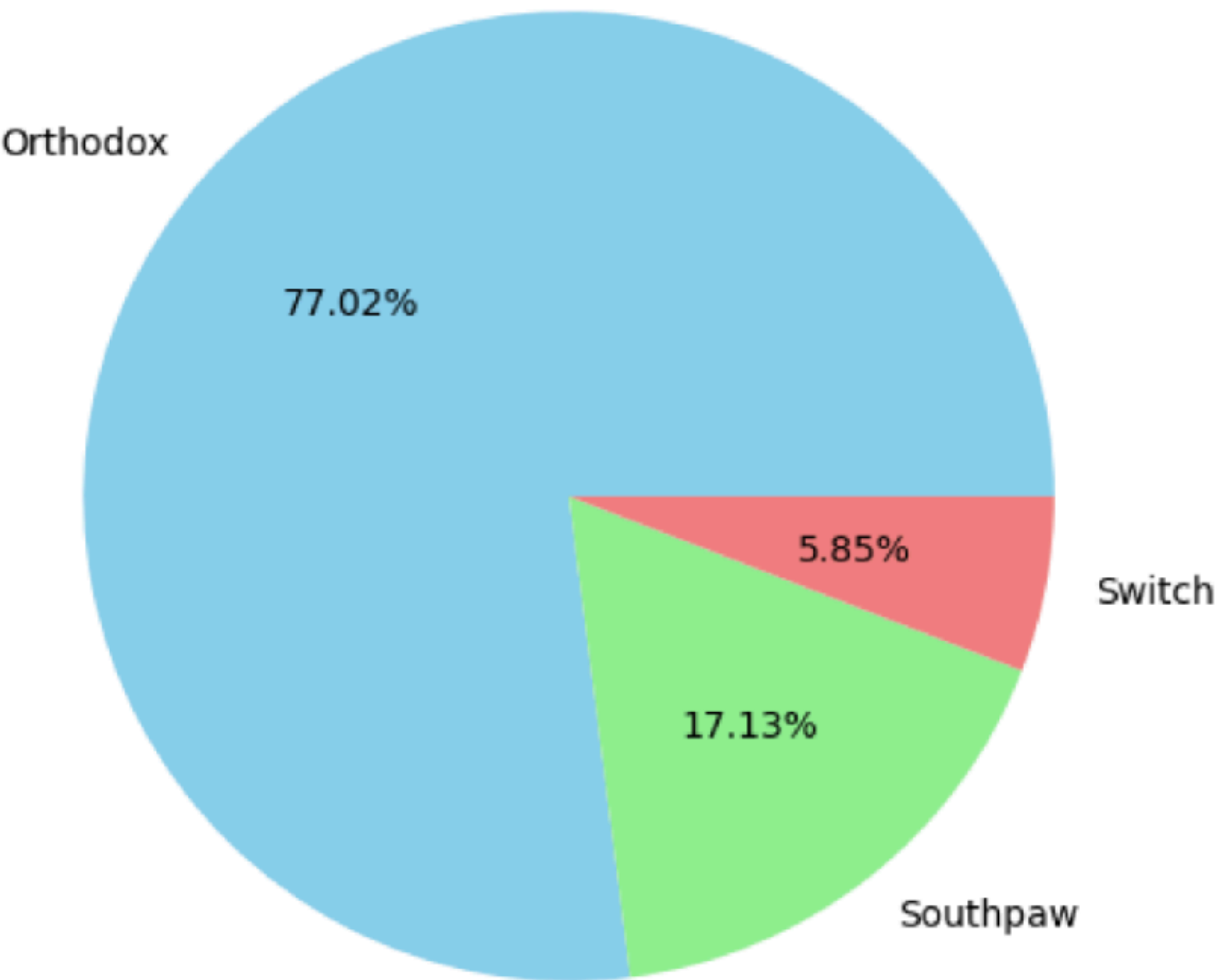


Hypothesis 2

We will try to determine which type of guard among the most commonly used (Orthodox, Southpaw, and Switch) achieves the highest number of victories.

Hypothesis 2: Stance Type and Performance

Usage percentage by stance type



These are the usage percentages of different stances among UFC fighters, excluding the less commonly used stances (Open Stance and Sideways) due to lack of representativeness in the data.

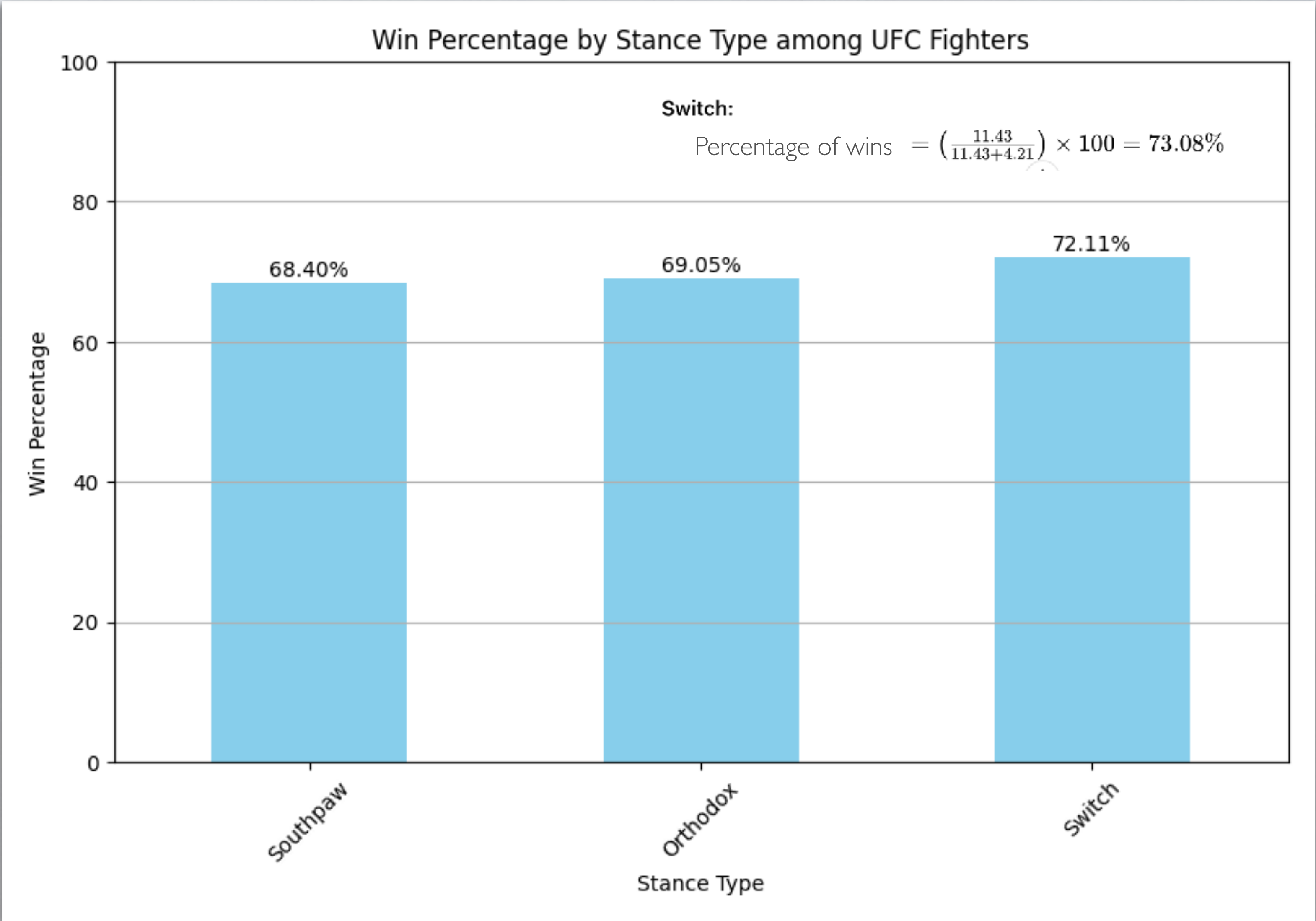


Win Percentage by Stance Type

Southpaw and **Orthodox** have relatively high win percentages. This indicates that these stances are quite effective and popular among successful fighters.

However, **Switch** appears to be the most effective, with the highest win percentage at 73.08%. This suggests that fighters using this stance tend to be more successful.

The high effectiveness of the Switch stance could be due to its versatility, allowing fighters to dynamically switch between Orthodox and Southpaw during the fight, which can confuse the opponent and create more attack opportunities.

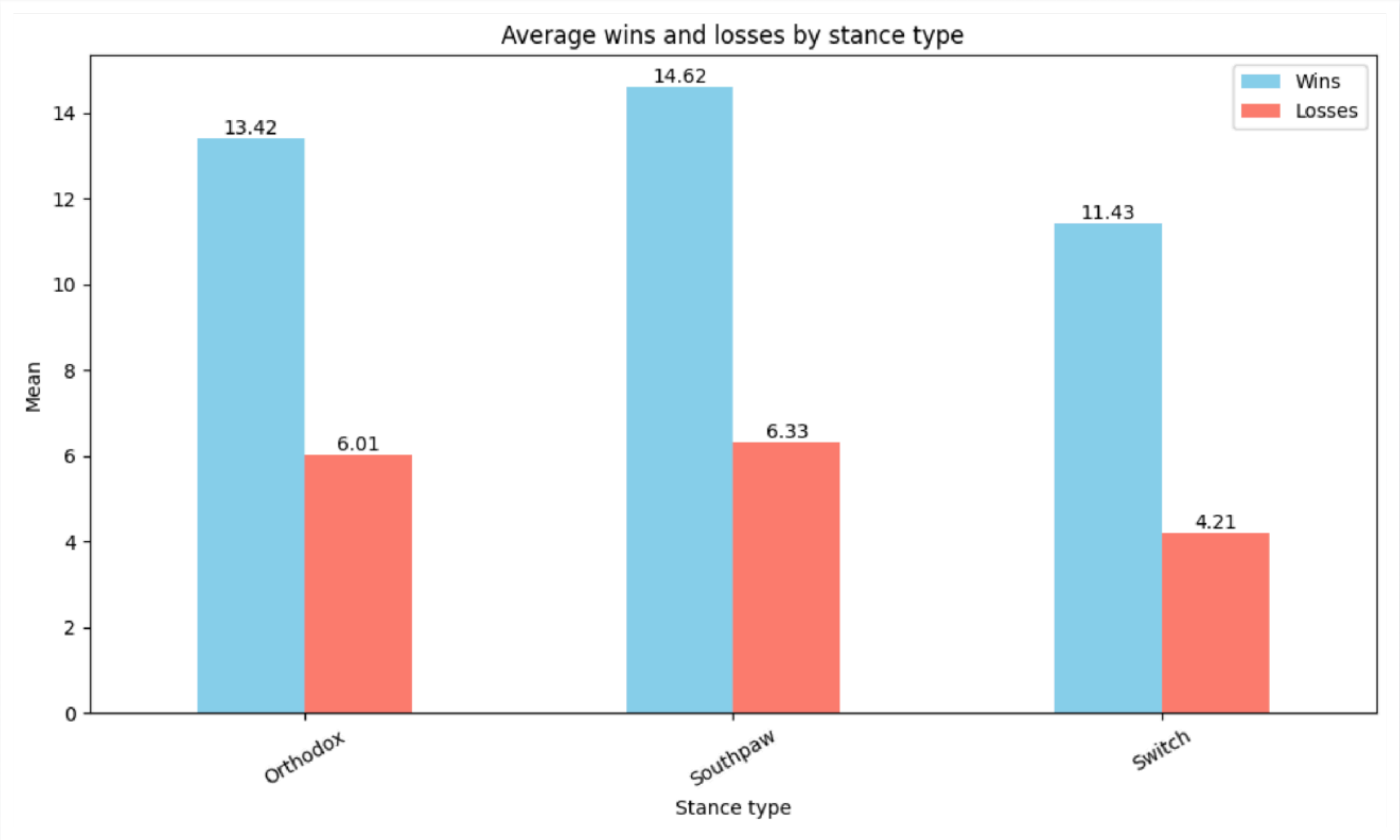


Average Wins and Losses by Stance Type

In this graph, we see that Southpaw shows a relatively high number of wins compared to losses, suggesting that this stance may be more effective.

Although Orthodox has a good number of wins, it also shows a significant number of losses, indicating that while it is widely used, it is not necessarily the most effective.

Switch has a good number of wins, but also a considerable proportion of losses, similar to Orthodox. This might suggest that although it can be a versatile stance, its effectiveness depends heavily on the fighter.



Hypothesis 2: Stance Type and Performance

Number of Wins
by Stance Type

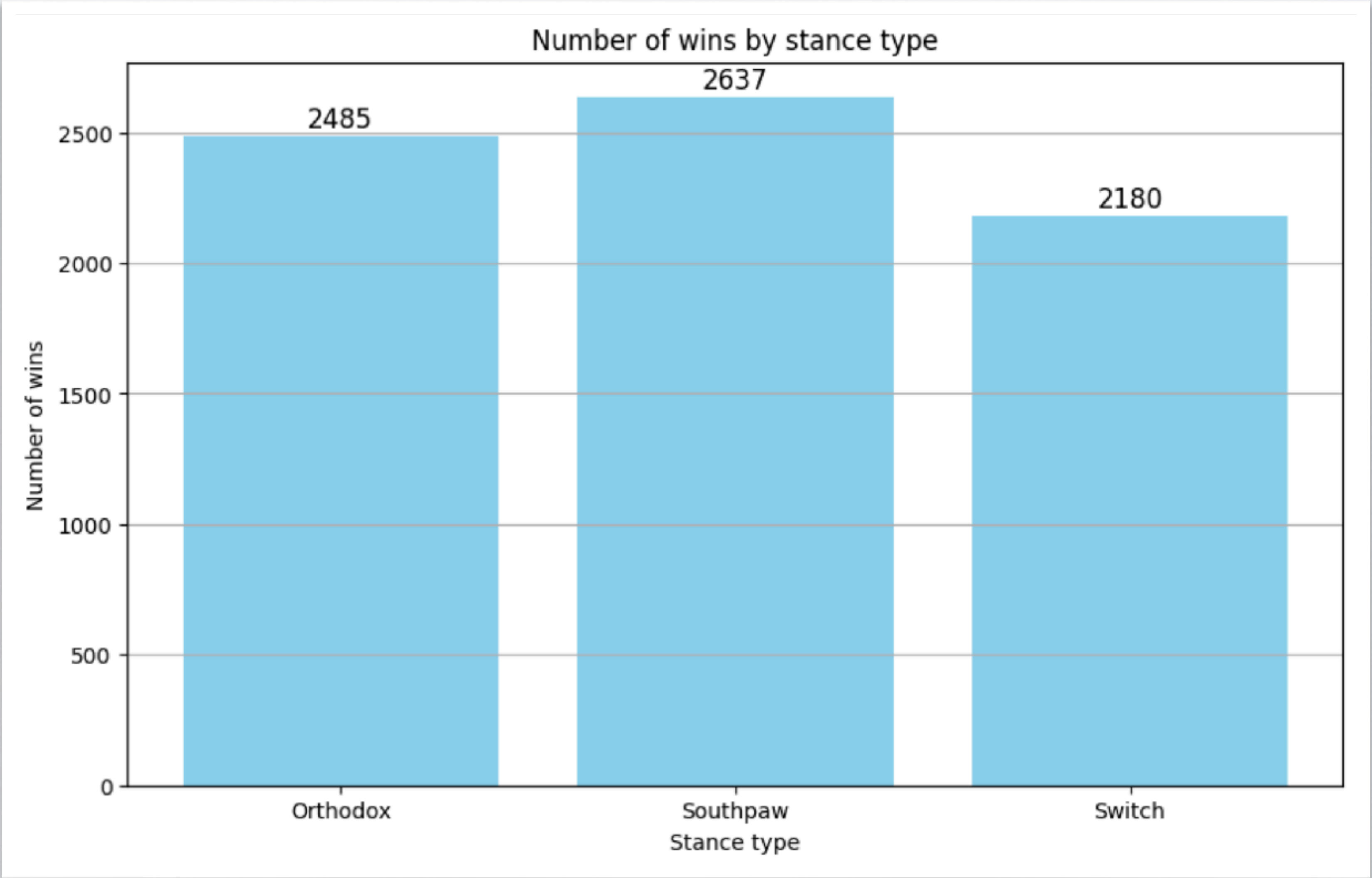
To ensure that the comparison between these three stances was fair and equitable, I decided to make the calculation using the same number of fighters for each stance.

First, I tried to find out which stance had the fewest records in the dataset and saw that it was Switch with 192 fighters. Therefore, I decided to select 190 fighters from each of the other two stances (Orthodox and Southpaw) to equalize the number of records per stance and thus compare them on equal terms.

I found that the win percentage by stance type hardly varied when using 3200 fighters or 570 (190 per stance).

However, when shifting the perspective from win percentage to the total number of wins by stance type, certain differences became apparent.

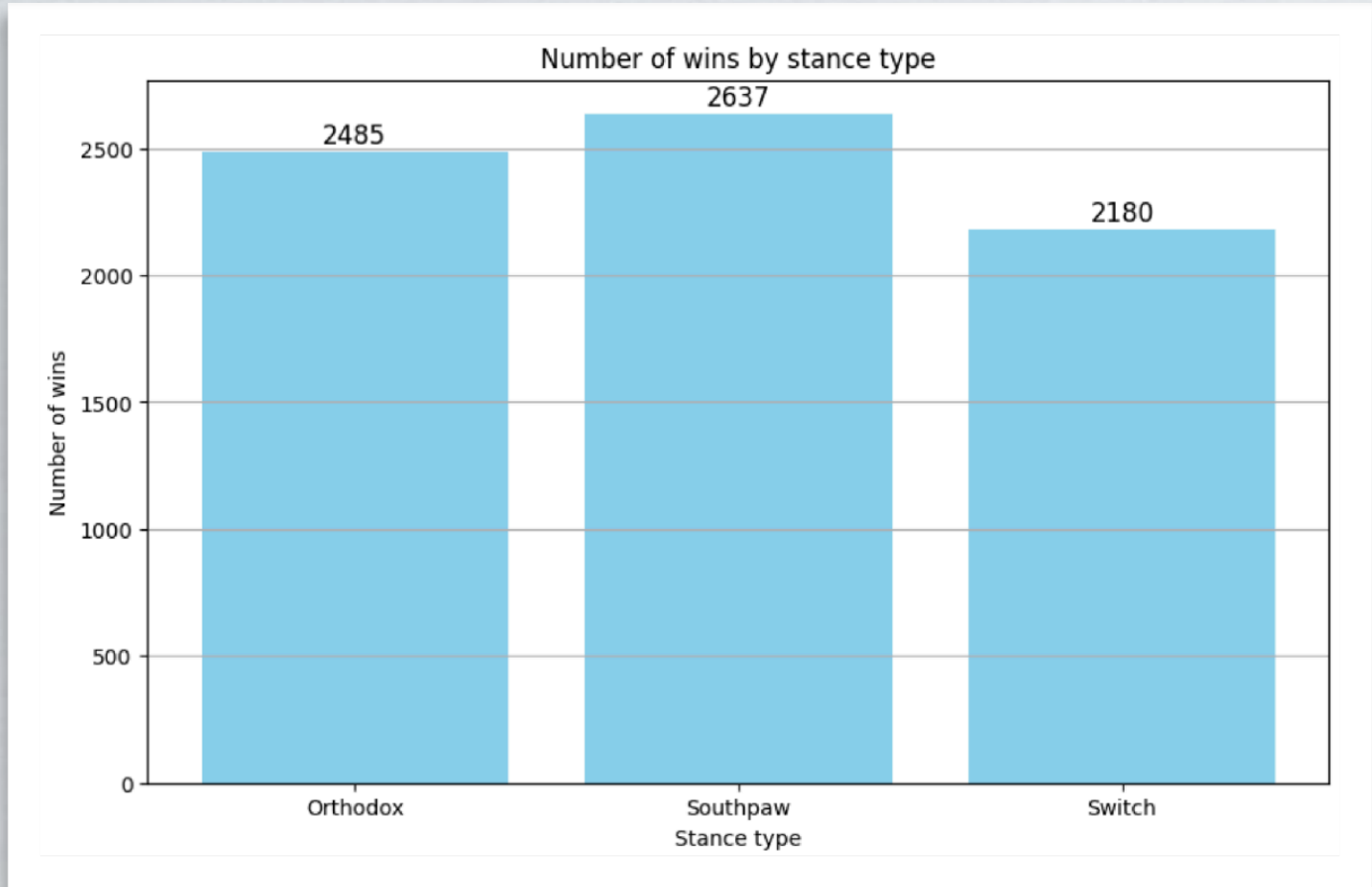
In this case, we see that Southpaw, despite being significantly less used than Orthodox (as seen in the first graph), has the highest number of wins.



* This graph was calculated from a sample of 190 fighters for each stance type, 570 in total.

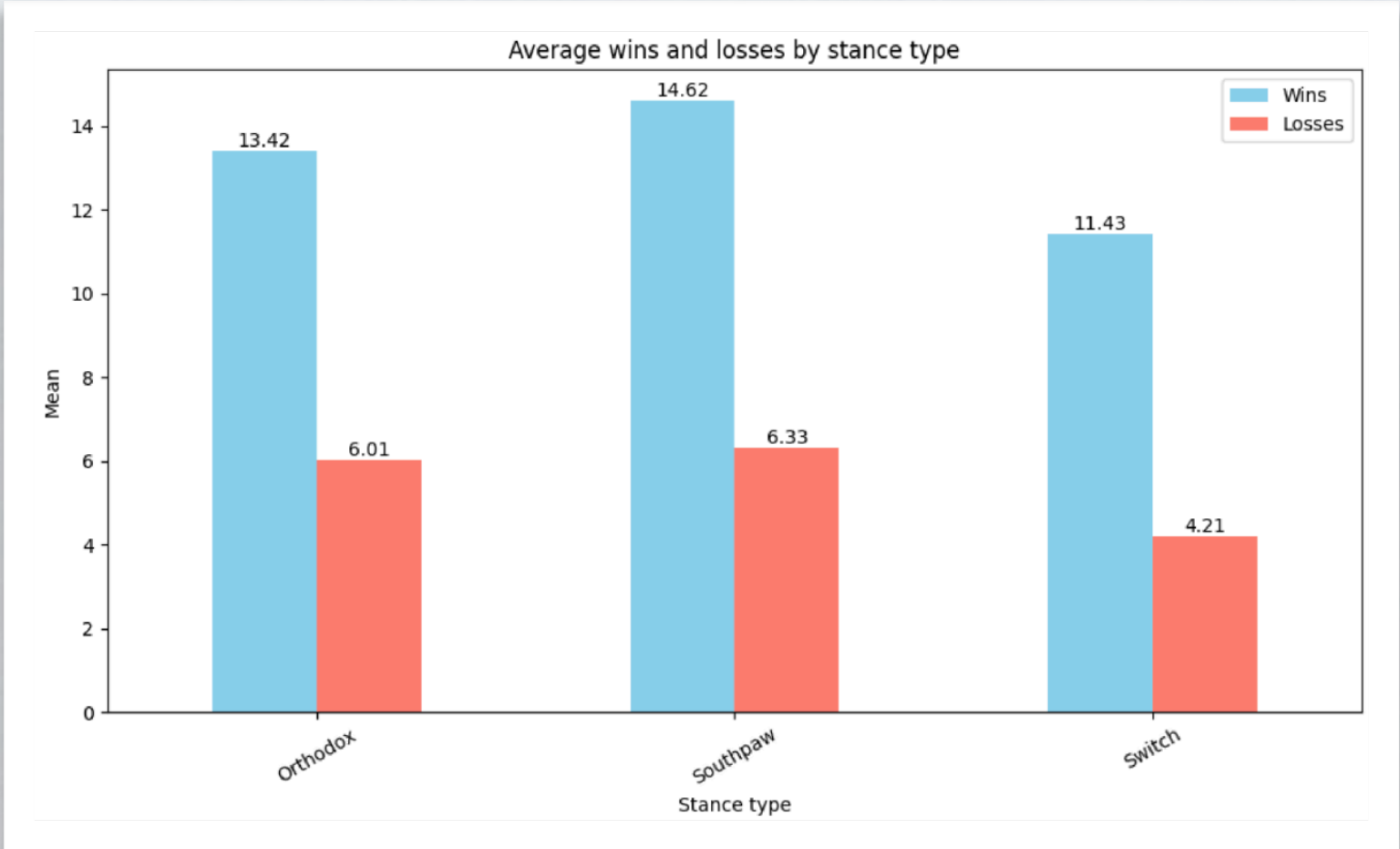
Hypothesis 2: Stance Type and Performance

Based on the analysis of all these data, we can draw several conclusions about the effectiveness of the different stances.



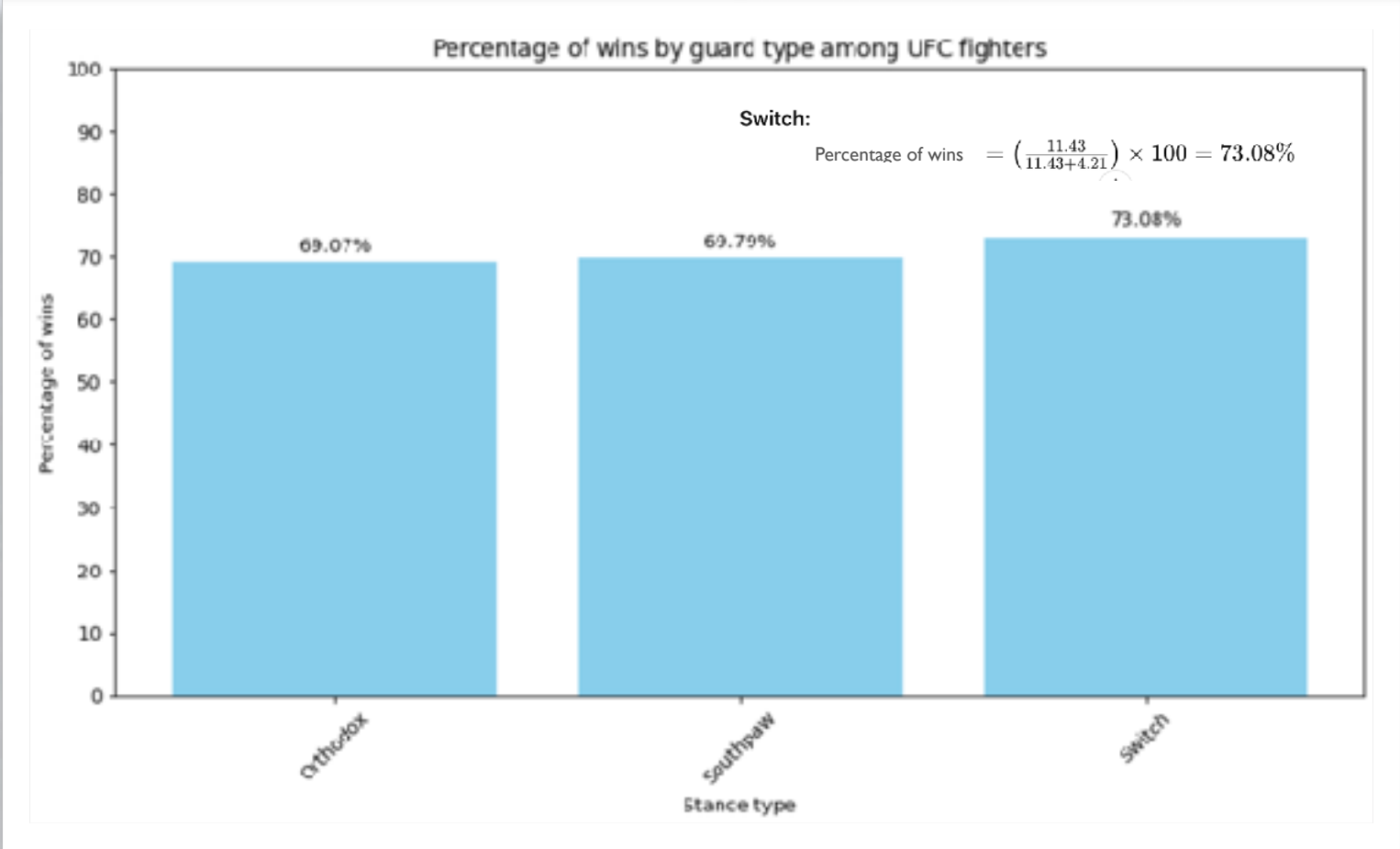
Total Number of Wins:

Southpaw has the highest total number of wins (2637), followed by Orthodox (2485) and Switch (2180). In absolute terms, fighters with a Southpaw stance appear to win more matches.



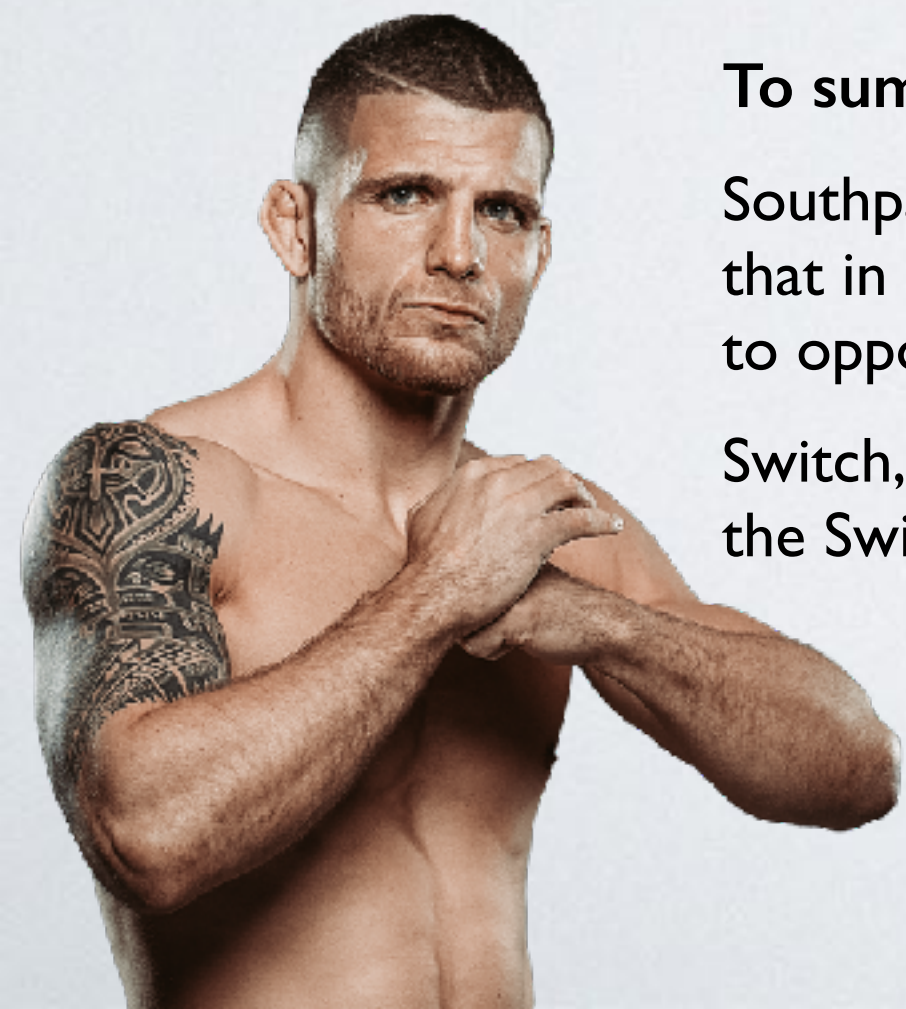
Average Wins and Losses:

Southpaw has the highest average wins (14.62), followed by Orthodox (13.42) and Switch (11.43). This reinforces the idea that the Southpaw stance might be more effective in terms of winning matches.



Win Percentage:

Switch has the highest win percentage (73.08%), followed closely by Southpaw (69.79%) and Orthodox (69.07%). This suggests that, although Switch is less common, fighters who use this stance tend to win a higher proportion of their matches.



To summarise:

Southpaw stands out for having the highest total and average number of wins. This might indicate that in both absolute and average terms, the Southpaw stance is the most effective, possibly due to opponents' lesser familiarity with this style.

Switch, although less common, has the highest win percentage. This suggests that fighters using the Switch stance may have a tactical advantage.

Hypothesis 3

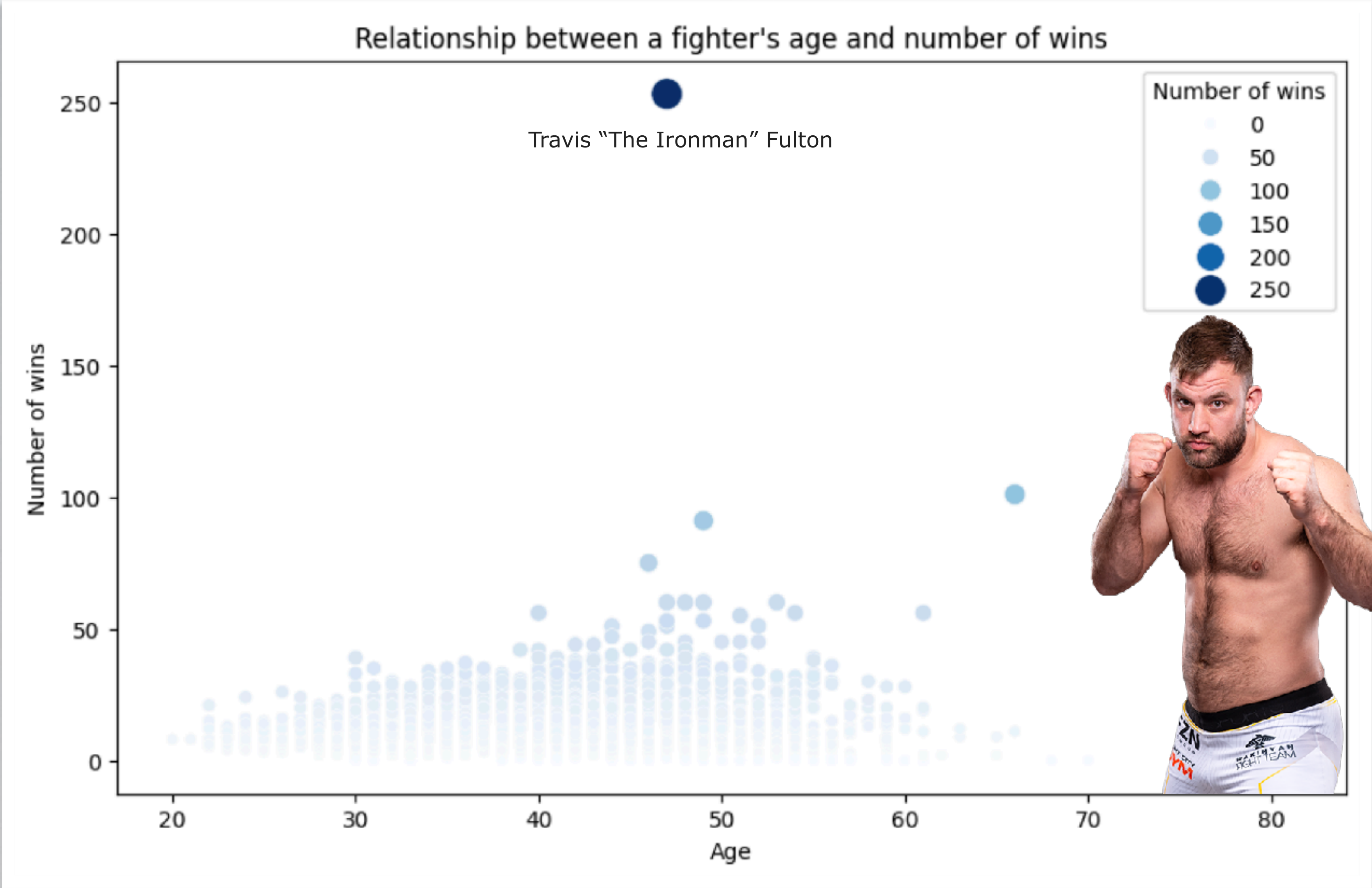
We will examine the data to see if a fighter's age is directly related to their number of victories or defeats.

Age vs number wins

Age and Victories Distribution:
Most fighters are in the age range of 20 to 60 years.
The majority have between 0 and 50 victories.

Highest Number of Victories:
There is one fighter in the 50-55 age range who stands out with around 250 victories. His name is Travis “The Ironman” Fulton, and he has had an exceptionally long and successful career.

General Pattern:
The concentration of points is in the 30 to 50 years range, indicating that most fighters are active and winning fights during these years.



Hypothesis 3: Age and Performance

There is no clear and strong correlation visible in the graph indicating that age is directly related to a higher number of victories. Young and middle-aged fighters have a wide range of victory counts.

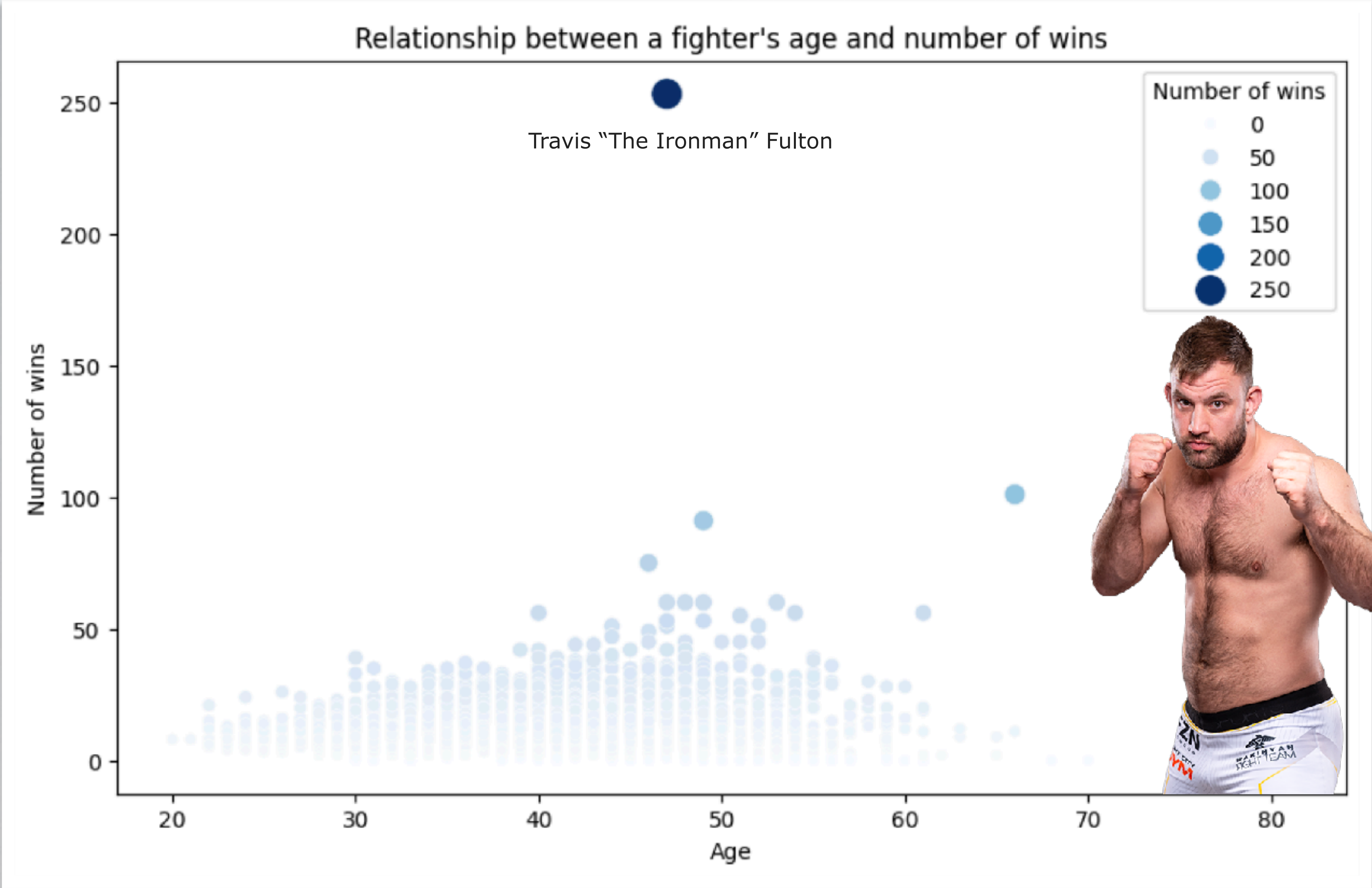
Older Fighters:

Fighters over 60 have a lower number of victories, which is expected due to the decrease in competitive activity as fighters age.

Most fighters seem to have a moderate number of victories throughout their careers, with a concentration in the 30-50 age range.

The correlation between age and the number of victories is weak (0.18), as reflected by the lack of a defined pattern and the dispersion of points across the graph.

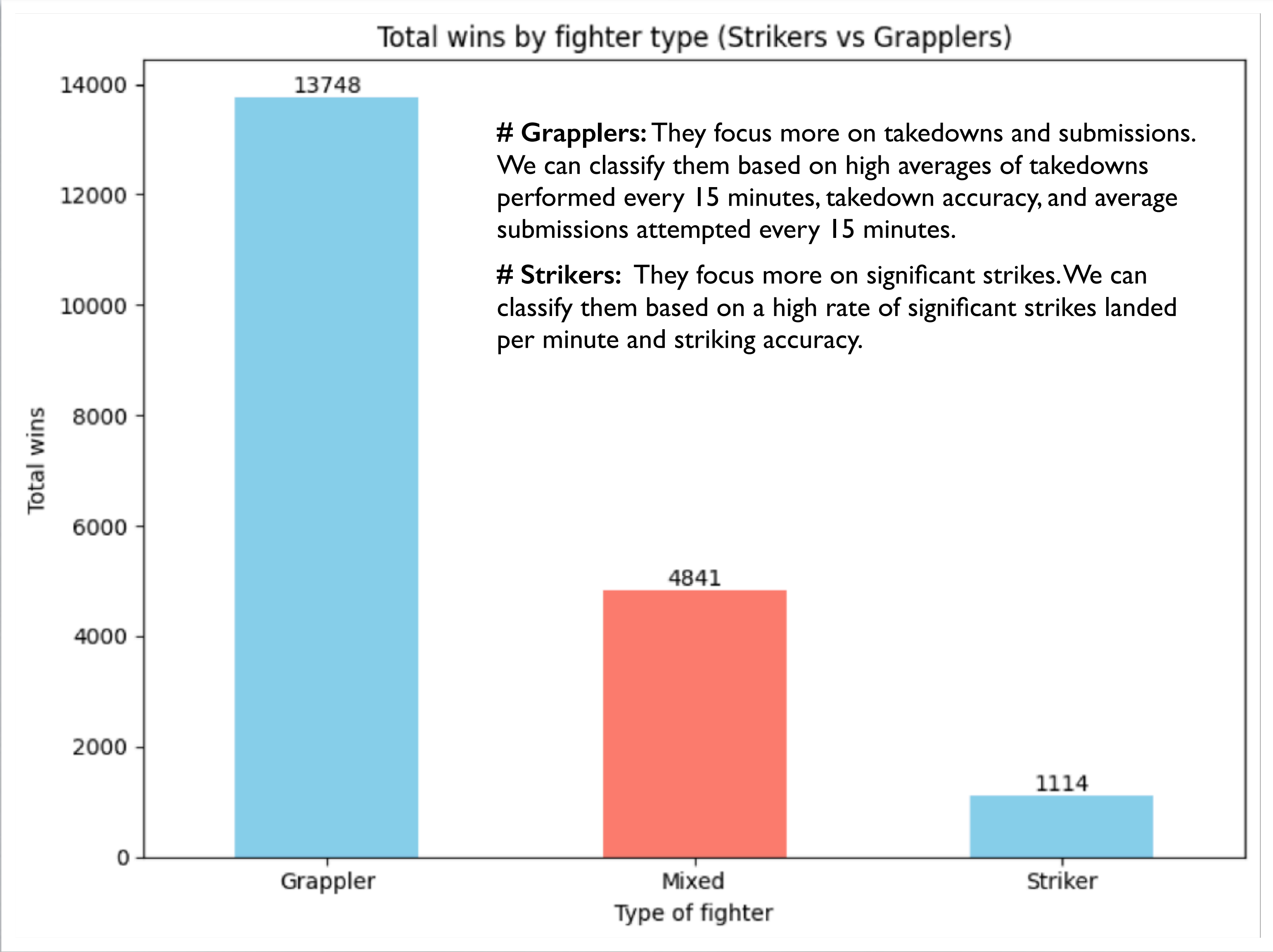
There is no strong relationship between these two variables. Fighters can be successful regardless of their age, although very young and very old fighters tend to have fewer victories on average.



Hypothesis 4

We will compare strikers with grapplers to see if strikers are more successful than those who focus on takedowns and submissions.

Hypothesis 4: performance of strikers vs grapplers



Dominance of grapplers

Grapplers have, by far, the highest number of total victories. This suggests that fighters who specialise in grappling techniques (close combat, submissions, takedowns) tend to be more successful in terms of total victories.

Mixed fighters (combining grappling and striking techniques) have a good number of victories, but significantly fewer than pure grapplers. While being a versatile fighter is advantageous, specialisation in grappling provides a greater advantage.

While striking is important, it is clear that the ability to manage and control an opponent on the ground has a stronger correlation with victories.

Importance of Grappling in MMA

The dominance of victories by grapplers can be attributed to the effectiveness of submission techniques and ground control, which are fundamental in mixed martial arts (MMA). Grappling skills allow fighters to control the pace of the fight and finish bouts through submissions.

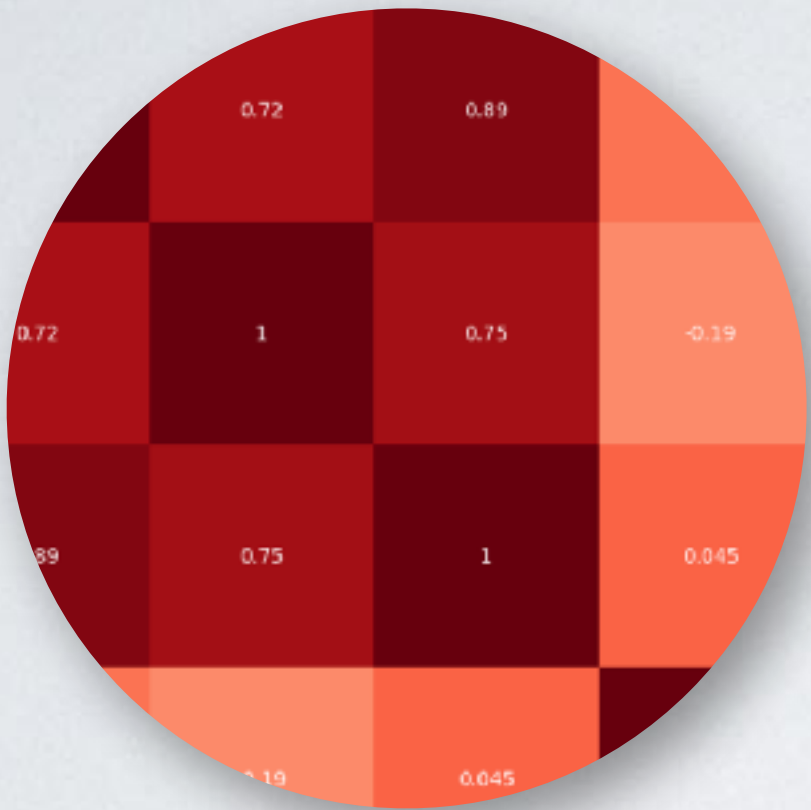
By focusing on taking the fight to the ground, grapplers reduce the risk of being struck forcefully by their opponents.

Fighting against a grappler can be physically and mentally exhausting. Ground fighting requires a high level of endurance and strength and can be frustrating for strikers who prefer to stay standing and strike. The physical and mental fatigue can lead to mistakes by the strikers, which grapplers can exploit to gain the advantage.

In conclusion, grapplers achieve a high number of victories due to their ability to control the fight, finish with submissions, reduce the risk of being struck forcefully, and cause physical and mental exhaustion in their opponents.

Hypothesis 1

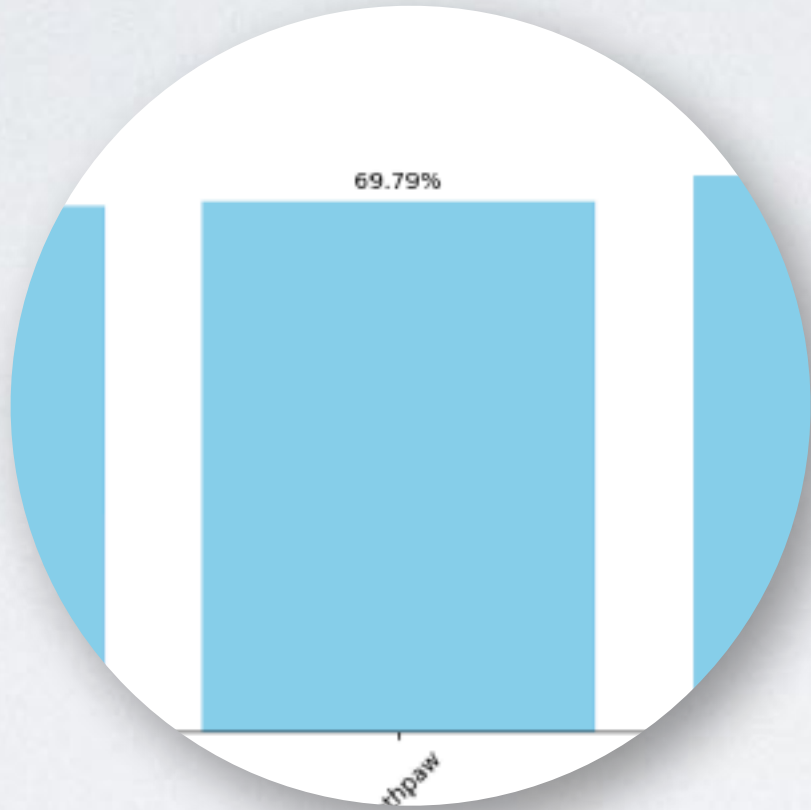
We will attempt to prove or refute with data whether certain physical characteristics such as height, weight, or reach are related to performance.



Physical characteristics such as height, weight, and reach do not seem to have a strong correlation with the win percentage. This suggests that other factors, such as technique, strategy, experience, and physical conditioning, might be more determinant in fighters' performance.

Hypothesis 2

We will try to determine which type of guard among the most commonly used (Orthodox, Southpaw, and Switch) achieves the highest number of victories.



The analysis suggests that the Southpaw stance is the most effective in absolute and average terms, while the Switch stance, although much less common, also shows high effectiveness in terms of win percentage. The Orthodox stance, while effective, is slightly behind compared to Southpaw and Switch.

Hypothesis 3

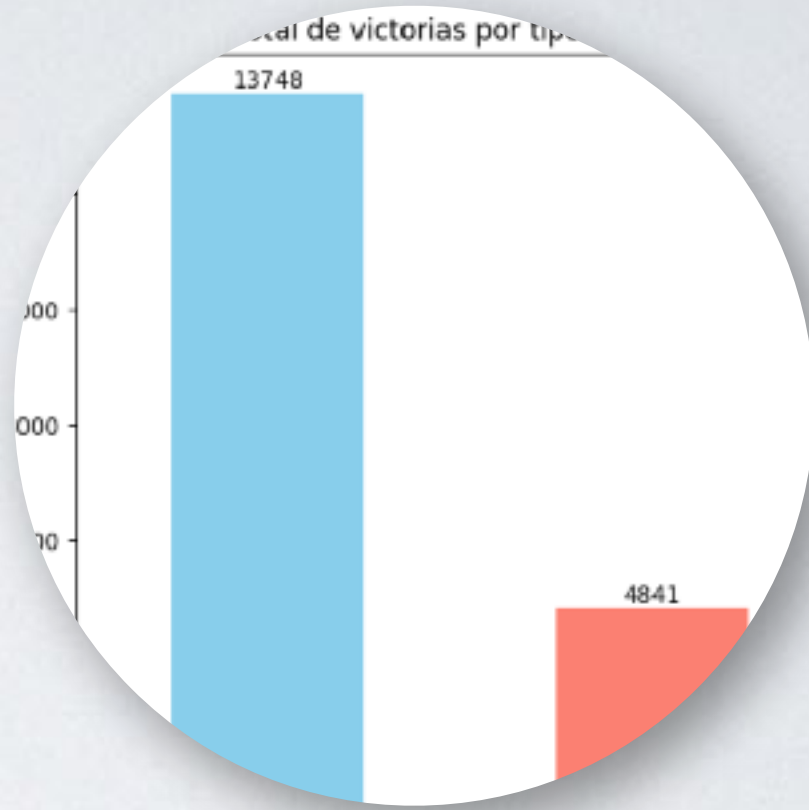
We will examine the data to see if a fighter's age is directly related to their number of victories or defeats.



Regarding age, although fighters peak in activity between 30 and 40 years old, the weak correlation indicates that age alone is not a decisive factor in the number of victories. Overall, these analyses suggest that other factors, possibly technical and strategic, might have a greater influence on the performance of UFC fighters.

Hypothesis 4

We will compare strikers with grapplers to see if strikers are more successful than those who focus on takedowns and submissions.




The analysis reveals that grapplers have a clear advantage in terms of total number of victories in the UFC. Mixed fighters also show good performance, but not as much as pure grapplers. Strikers, on the other hand, have a significantly lower number of victories, suggesting that specialisation in striking is less effective compared to grappling. These findings highlight the importance of grappling in the success of fighters.

Thanks for watching!



 **GitHub:** https://github.com/nacjacds/EDA-UFC_Fighters_performance/tree/main

 **Web:** <https://nachojacquot.com>

 **LinkedIn:** <https://www.linkedin.com/in/jacquot/>