The Analysis of In-Game Volleyball Statistics

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Goal

- My main goal in this project is to find if men and women differ in success across multiple gameday statistics, and if there is an age of player that has the most success with these skills.
- I will evaluate each skill and see if there are observable differences across genders and ages.

The data

- The dataset includes data surrounding beach volleyball in the year 2022.
- This dataset includes data from tournaments held all over the world and gives us information on each player playing in a match.
- It contains information on players such as their name, age, height, and home country, and also their statistics from the match such as kills, aces, digs, blocks, etc.

Predictions

Using my knowledge of the sport, I would assume that aces and kills would differ most between winning and losing teams.

It would also be my assumption that players between the age of 20-30 are most successful with these actions since that is when most people are physically in their best shape.

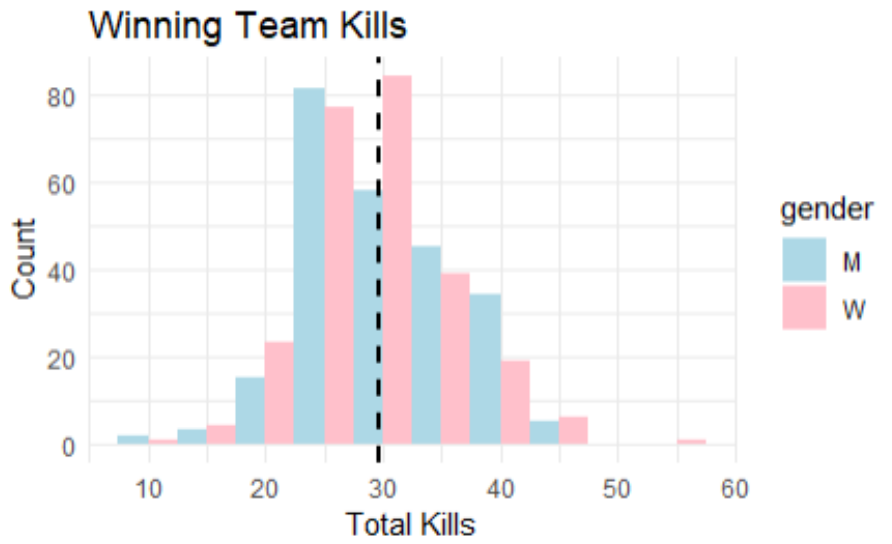
Additionally, I would guess women average more digs and aces in games while men average more kills and blocks.

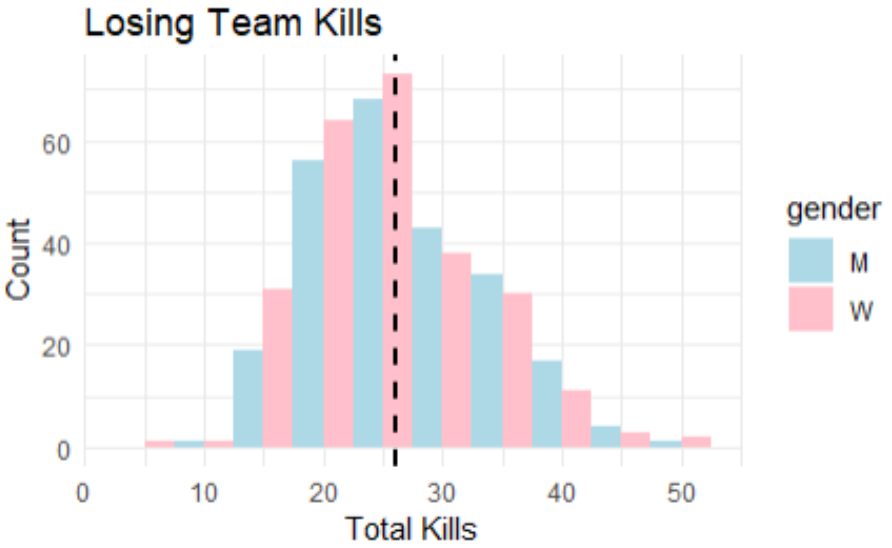
Defining Terms

- **Kill**- An offensive action that results in a point for the attacking team
- **Ace**- A serve that directly results in a point for the serving team
- **Block**- A defensive move at the net to stop or redirect the ball to the opposing team's court
- **Dig**- A defensive move that prevents the ball from touching the ground after an attack from the opposing team

Kills by Gender

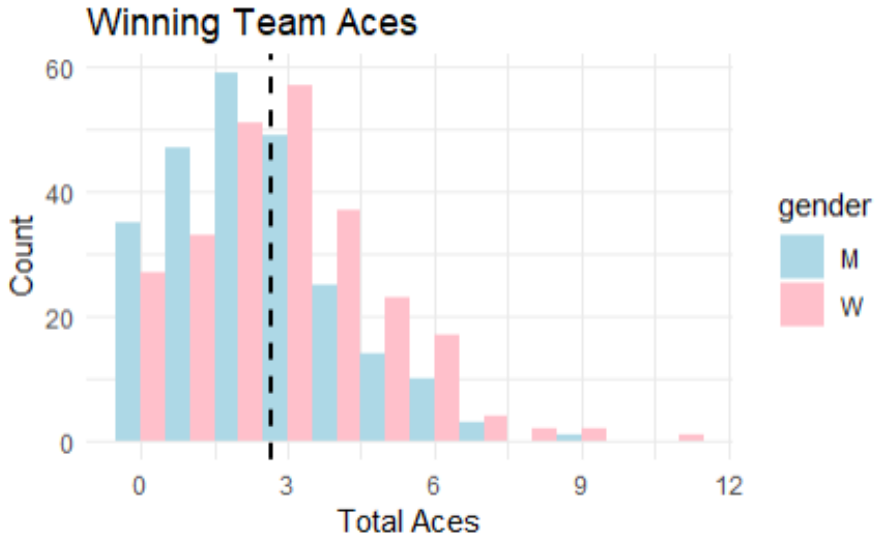
- The null hypothesis is that there is no difference between the mean number of kills for men and women
- Men's matches average 57 kills, while women's average 55 total kills in a match
- The t-test provides a p-value of .05649 and we conclude that the difference in genders is not statistically significant

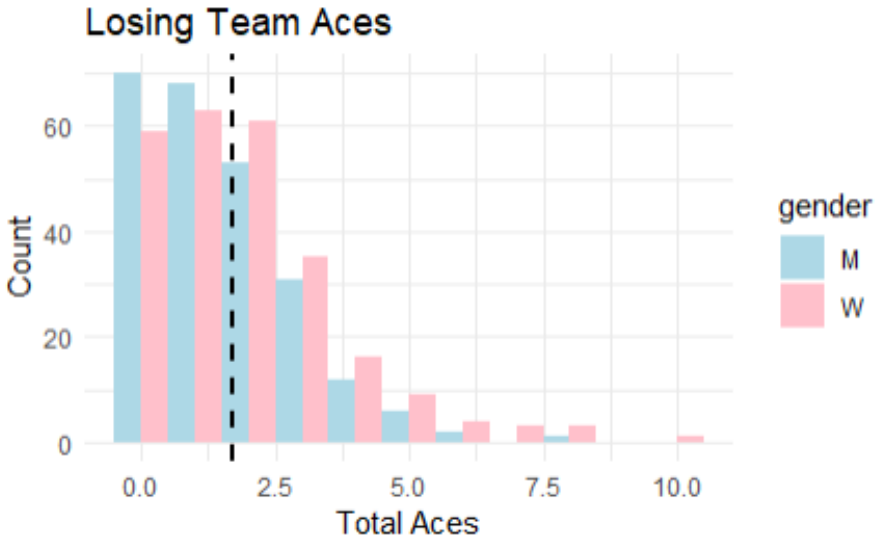




Aces by Gender

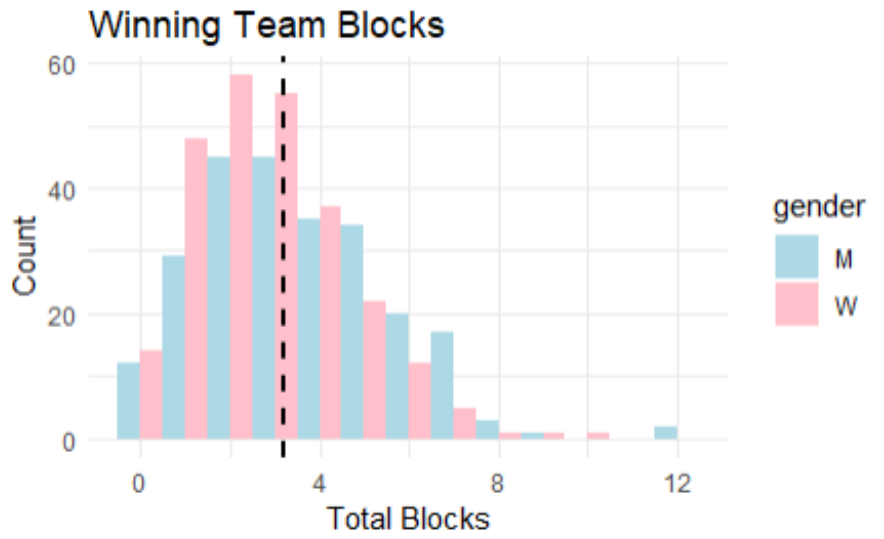
- The null hypothesis is that there is no difference between the mean number of aces for men and women
- Men's matches average 3.86 aces, while women average 4.81 total aces in a match
- The t-test provides a p-value of .00001892 which is much smaller than the standard of .05 and we accept the alternative hypothesis that the difference is not zero.
- Women's matches average about 1 more ace per match than men

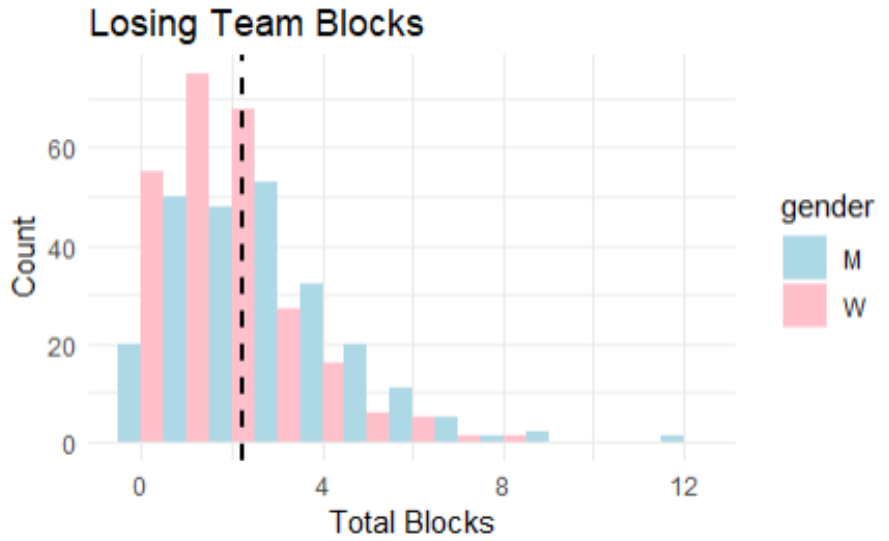




Blocks by Gender

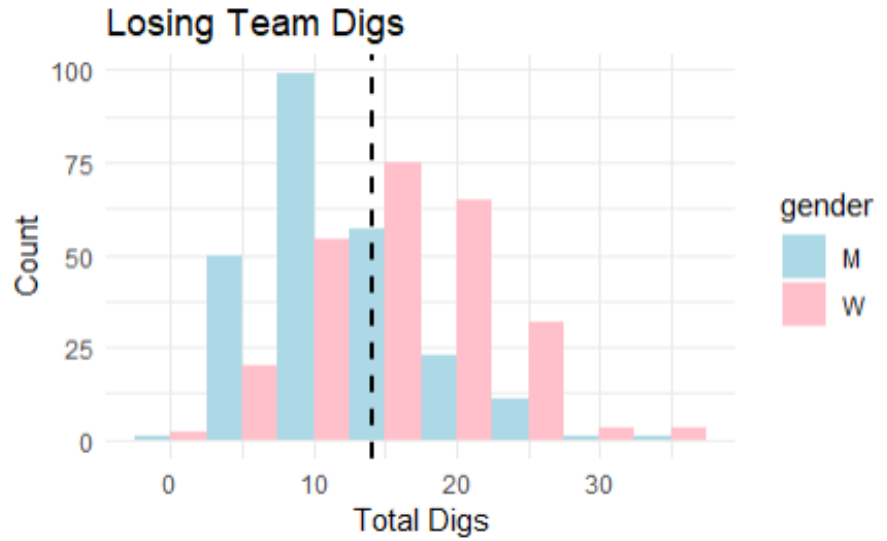
- The null hypothesis is that there is no difference between the mean number of blocks for men and women
- Men's matches average 6.30 blocks, while women average 4.54 total blocks per match
- The t test provides a p-value of 1.433e-12 so we reject the null hypothesis and conclude that the difference in means is not zero.
- Men's matches average about 2 more blocks per match than women

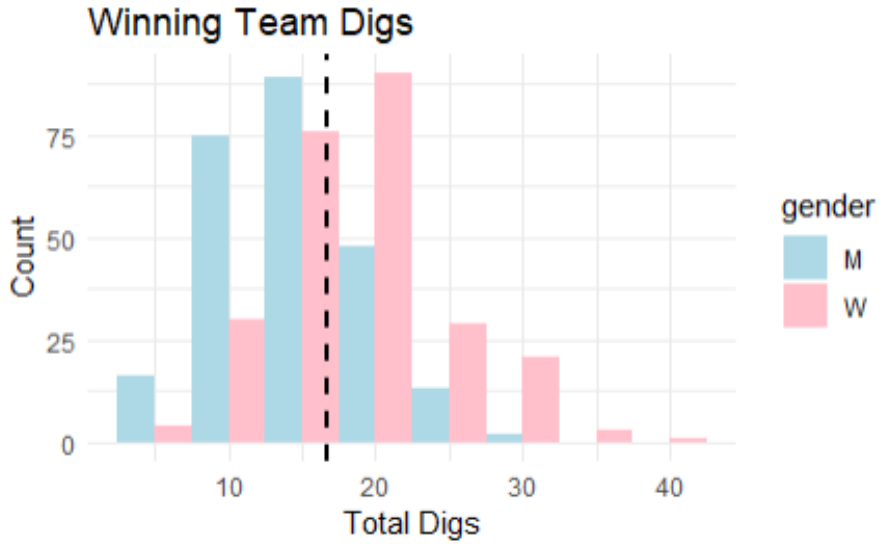




Digs by Gender

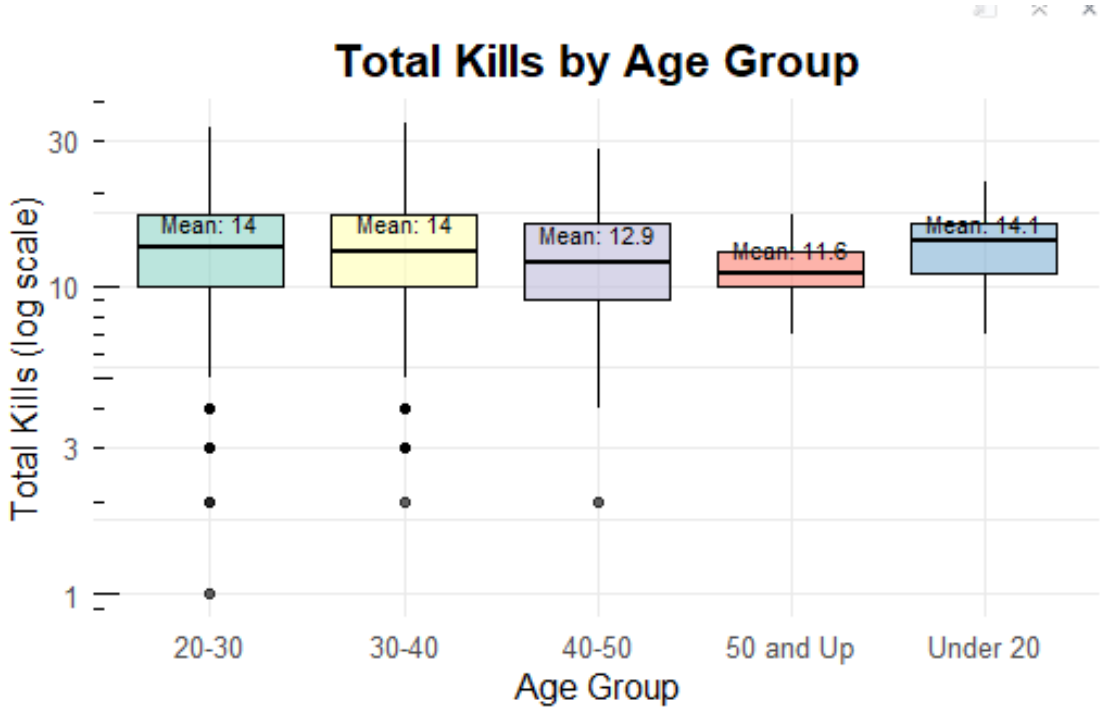
- The null hypothesis is that there is no difference between the mean number of digs for men and women
- Men's matches average 26.52 digs, while women average 34.97 total digs per match
- The t test provides a p-value of 2.2e-16 so we reject the null hypothesis and conclude that the difference in means is not zero
- Women's matches average 6-10 more digs per match than men.

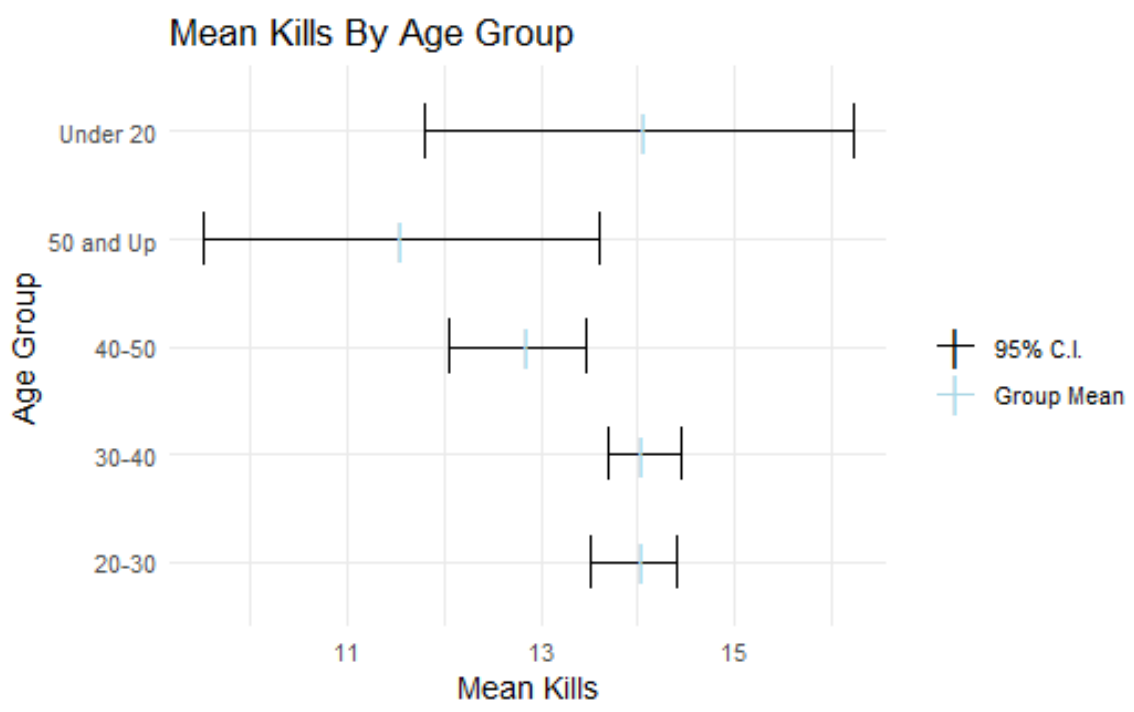




Kills by Age

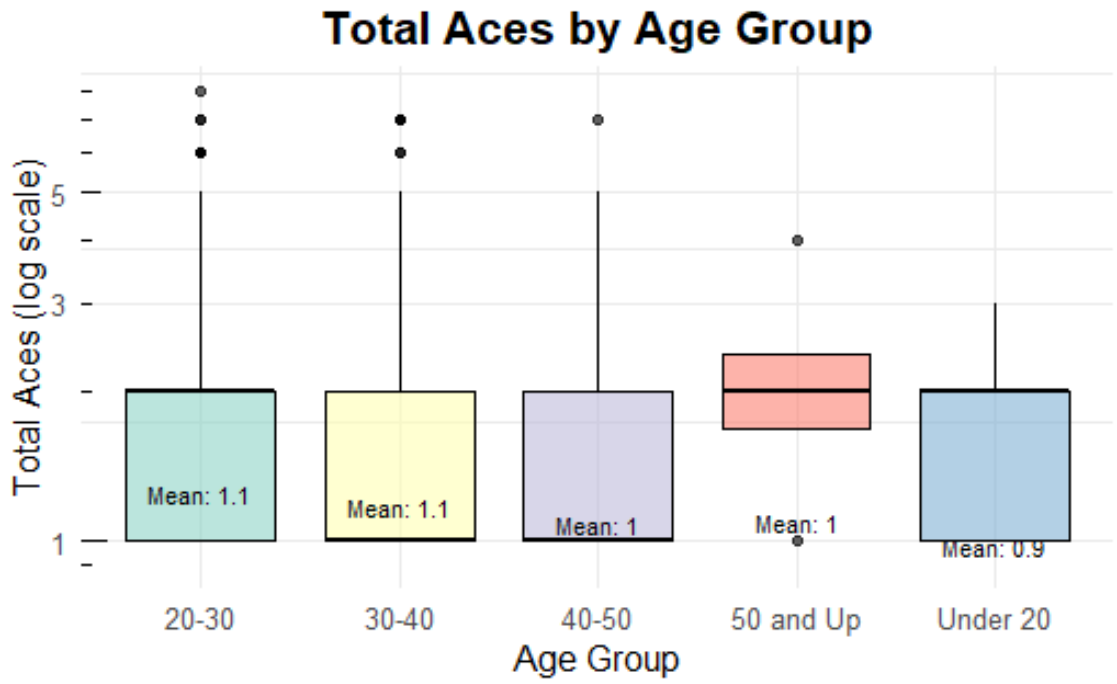
- The null hypothesis is that there is no difference of mean kills between each age group
- ANOVA provided a p-value of .0258 so at least one age group is likely different than the rest
- Pairwise t test concluded that the age group 40-50 is most unlike the others
- Bootstrapping provided the visualization of confidence intervals

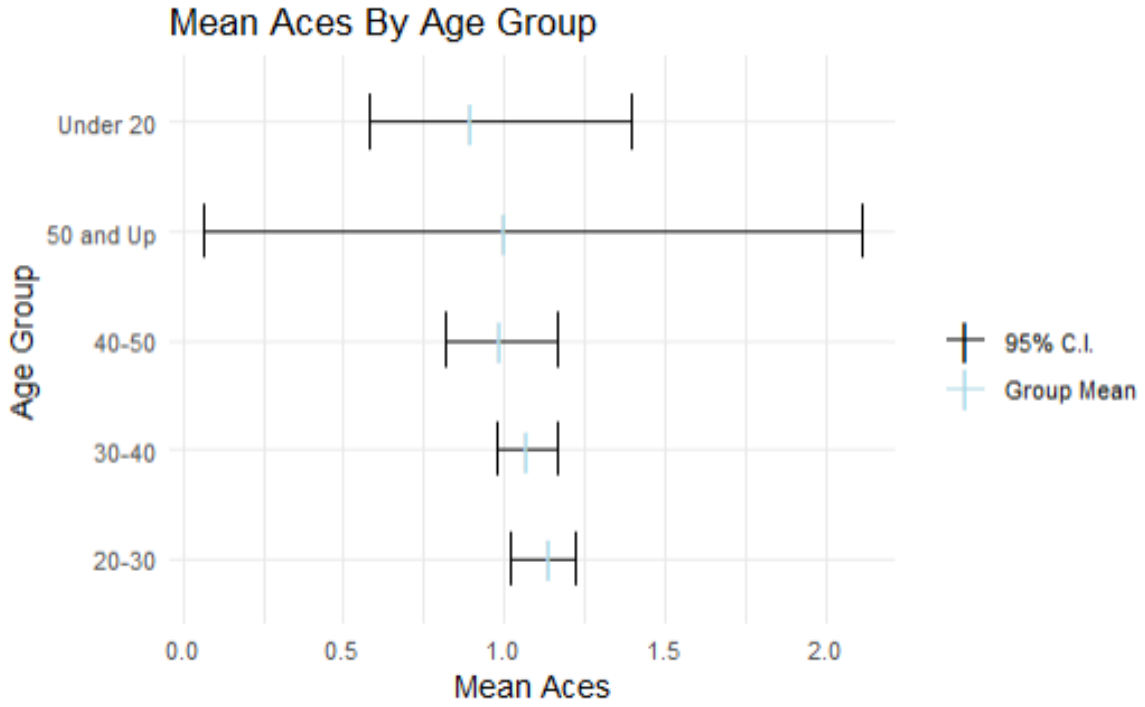




Aces by Age

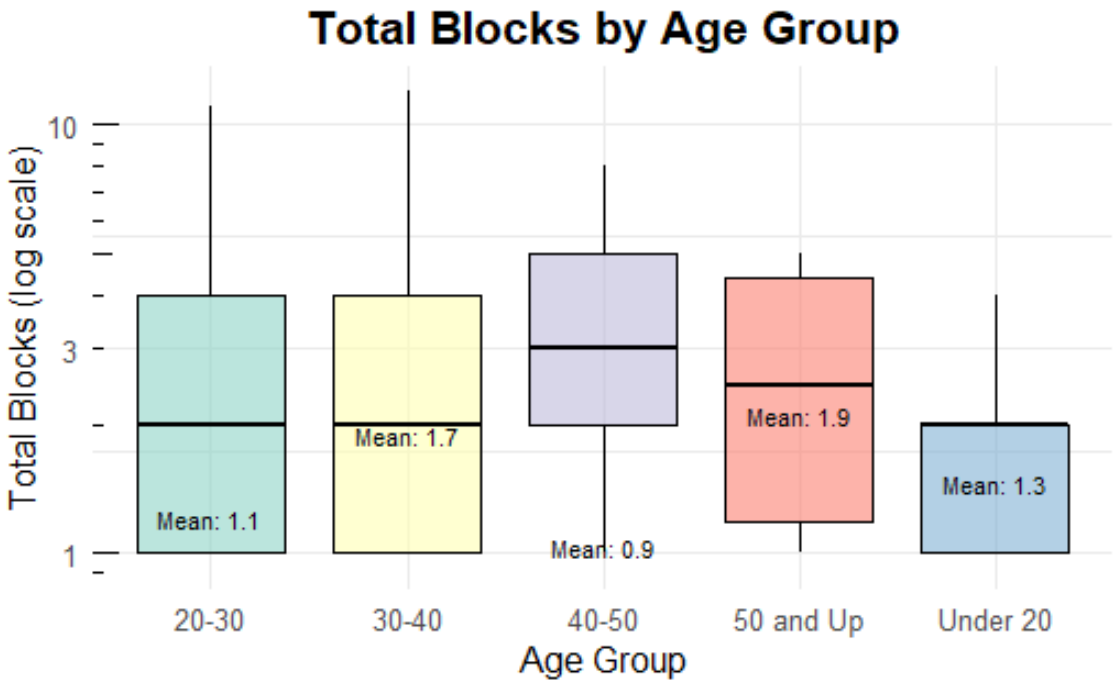
- The null hypothesis is that there is no difference in mean aces between age groups
- ANOVA provided a p-value of .5 so we accept the null hypothesis that there is not a statistically significant difference in means
- Pairwise t test had the same results.
- Bootstrapping provided the visualization of confidence intervals

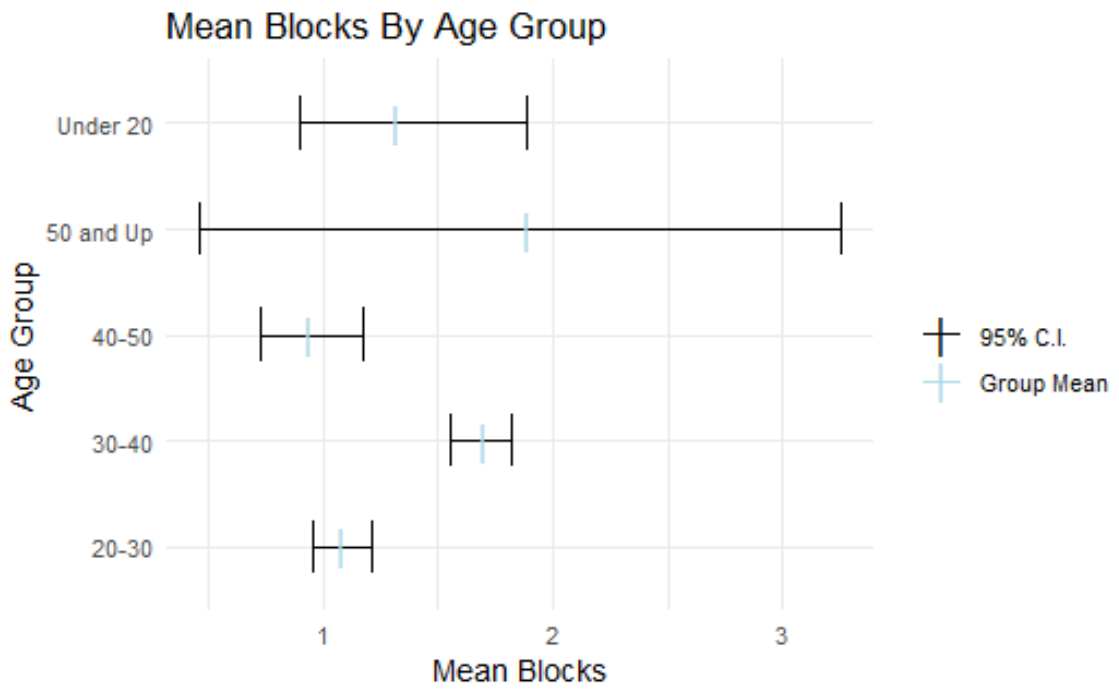




Blocks by Age

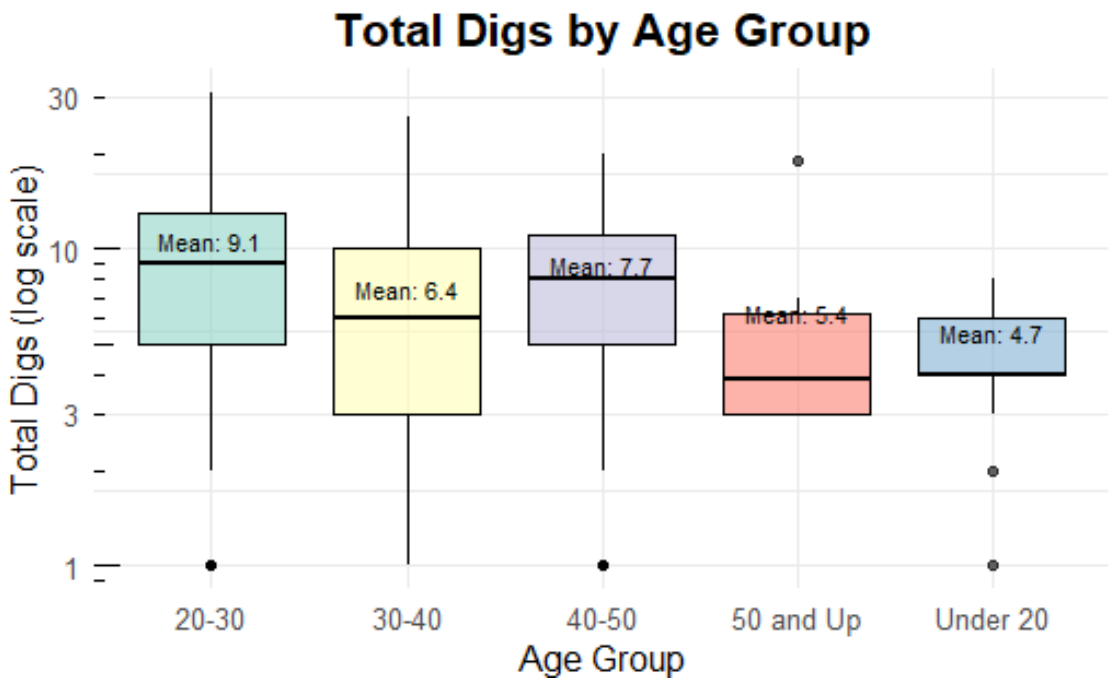
- The null hypothesis is that there is no difference in mean blocks between different age groups
- ANOVA provided a p-value of 1.94e-12 so at least one age group is likely different than the rest
- Pairwise t test concluded that the age group 30-40 is most unlike the others
- Bootstrapping provided the visualization of confidence intervals

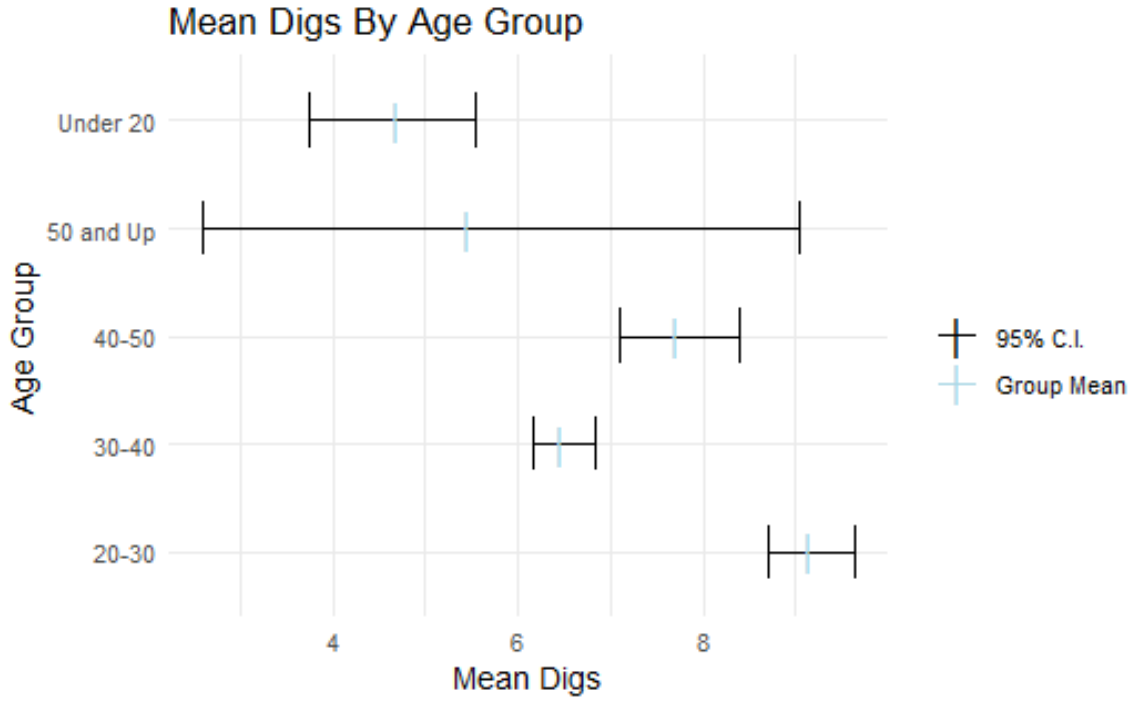




Digs by Age

- The null hypothesis is that there is no difference in mean digs between age groups
- ANOVA provided a p-value of 2e-16 so at least one age group is likely different than the rest
- Pairwise t test concluded that the age group 20-30 is most unlike the others
- Bootstrapping provided the visualization of confidence intervals





Conclusions for Gender

- Mean kills between the genders was proven to not be statistically significant and therefore we can only conclude that there is no difference between genders.
- However, when evaluating blocks, aces, and digs, the difference in averages between men and women was proven to be statistically significant.
- We see that women average more digs and aces per match, while men average more blocks

Conclusions for Age

- We did not see a difference of mean aces among different genders and therefore must conclude that the differences in means is not statistically significant.
- When looking at kills, we saw that there was a small p-value and determined that the group that differed from the rest was the age group 40-50.
- For mean number of blocks, the ANOVA test revealed a small p-value as well and the t test and confidence intervals showed that the group that differed from the rest was the age group of players 30-40.
- For digs it was determined that the 20s-30s age group excelled in this area with a mean number of digs that was significantly different than the rest.

Recommendations

- I would recommend that athletes focus on the skills that they average lower with.
- A female player should want to focus on attacking and blocking in order to excel against peers.
- A male player should instead focus training on serving and defense so that they can succeed against their opponents.

Recommendations Cont.

- In addition, since seeing no noticeable difference in mean aces across genders, my recommendations stem from how the age groups compare to eachother in kills, blocks, and digs.
- Younger athletes ages 20-30 should focus defense, primarily blocking
- Athletes 30-40 should focus on defense, primarily digging
- Athletes age 40-50 should focus on net play which refers to both attacking and blocking

R Markdown Link

- RPubs - Stopher Final Project

Thank You