



Quantitative Analysis of 2023 Survey Data on Golfer Experience related to Distance, Playing Length and Tee Selection

Dave Pierce, Green Section, December 12, 2023

1. Summary

Sporting Insights (SI), formerly Sports Marketing Surveys was contracted to perform a recreational golfer survey as part of the Distance Insights Golfer Experience Phase 3 project. A quantitative analysis of about 65,000 responses was completed by the USGA. Golfer preferences for hole length to club hitting distance ratios were calculated to bracket hole lengths for golfers. These ratios can be used to estimate desired overall course lengths to improve the golfer experience. The analysis also examines the performance of golfers of different skill levels.

2. Introduction

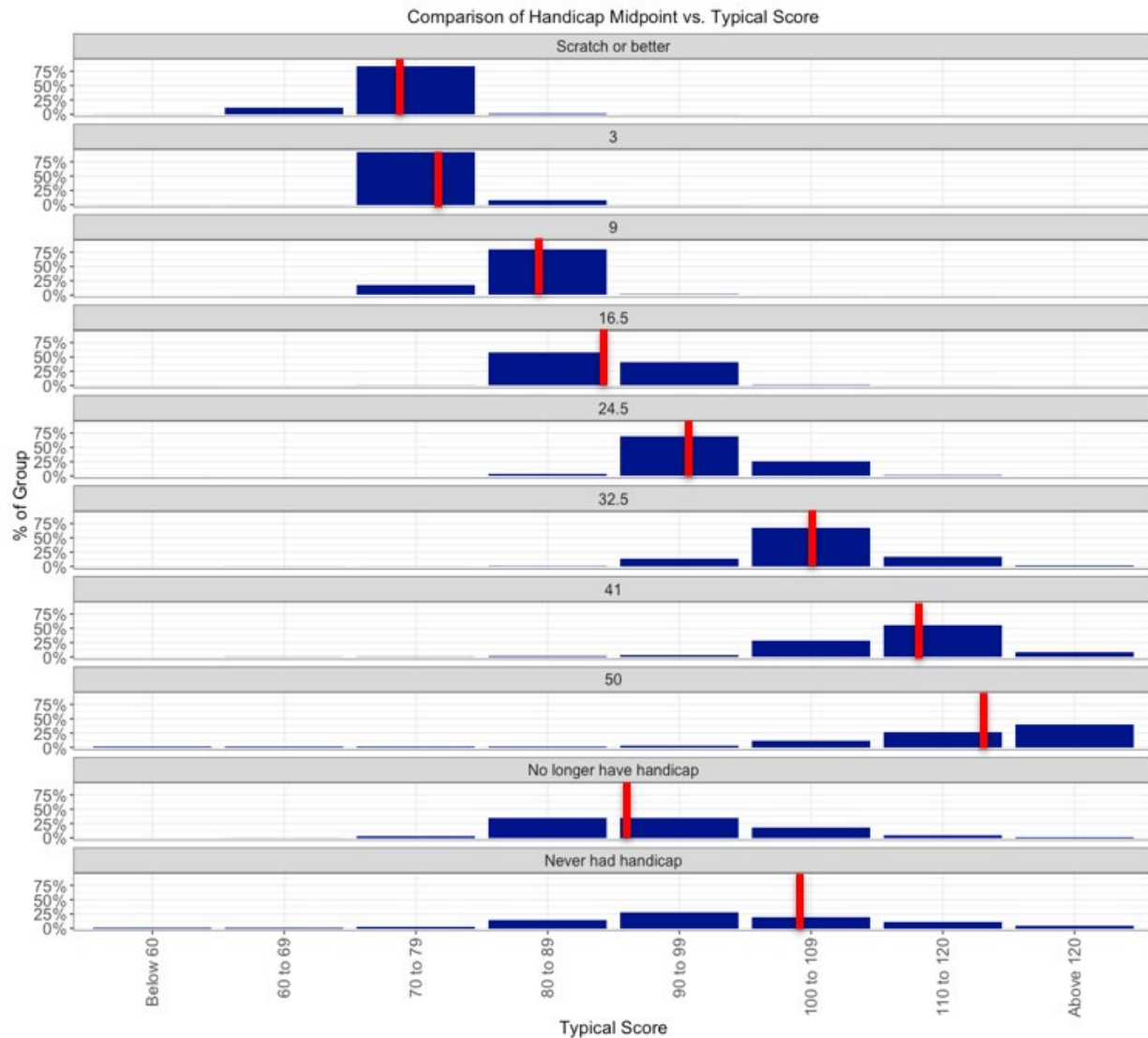
In the Spring of 2023, the USGA administered a comprehensive survey to inquire about recreational golfers' abilities and preferences on the golf course through SI, a golf survey vendor based in the United Kingdom. The survey had over 65,000 responses from golfers of various demographics, abilities, and locations around the United States. Sporting Insights provided a detailed report on the demographics and general results of the survey which is also published in the USGA Golfer Experience report library. The goal of this quantitative study was to analyze the survey responses to identify various trends in the data reported by recreational golfers.

3. Handicap Index vs. Performance

Handicap Index™ (HI) bins were established in the survey [midpoints in brackets were used for analysis and the charts] as follows: scratch or better [scratch], 1 – 5 [3], 6 – 12 [9], 13 – 20 [16.5], 21- 28 [24.5], 29 – 36 [32.5], 37 – 45 [41], 46 – 54 [50] no Handicap Index and never had Handicap Index. All Handicap Index groupings were represented in the survey data. Figure 1 compares the reported Handicap Index to the typical score reported by each golfer to examine consistency. Because bins are used for both, some variation is expected. The red line indicates the expected typical score based on HI bin. For every HI bin, the red line is within or close to the tallest bar indicating that in general, golfers report a typical score that aligns with their Handicap Index. Better HI groupings from the data have better typical round scores on

average. Additionally, worse HI groups have more variation in their typical scores suggesting lack of consistency compared to better HI groups or a misunderstanding of what their HI is or what it means.

Figure 1: SI Survey Handicap Index vs. Typical Score



Furthermore, the survey asked golfers to estimate their club hitting distances. Figures 2 through 4 show the **self-reported** hitting distances for Driver, 7-Iron, and Pitching Wedge respectively by gender. It is important to note that these distance responses are **estimates** by the golfer and not actual recorded distances via a launch monitor. Future work should compare self-reported hitting distances to measured hitting distances for these clubs. The red line represents the median (50th percentile in each bar chart).

Figure 2: Self-reported Driving Distance Distribution (By Gender)

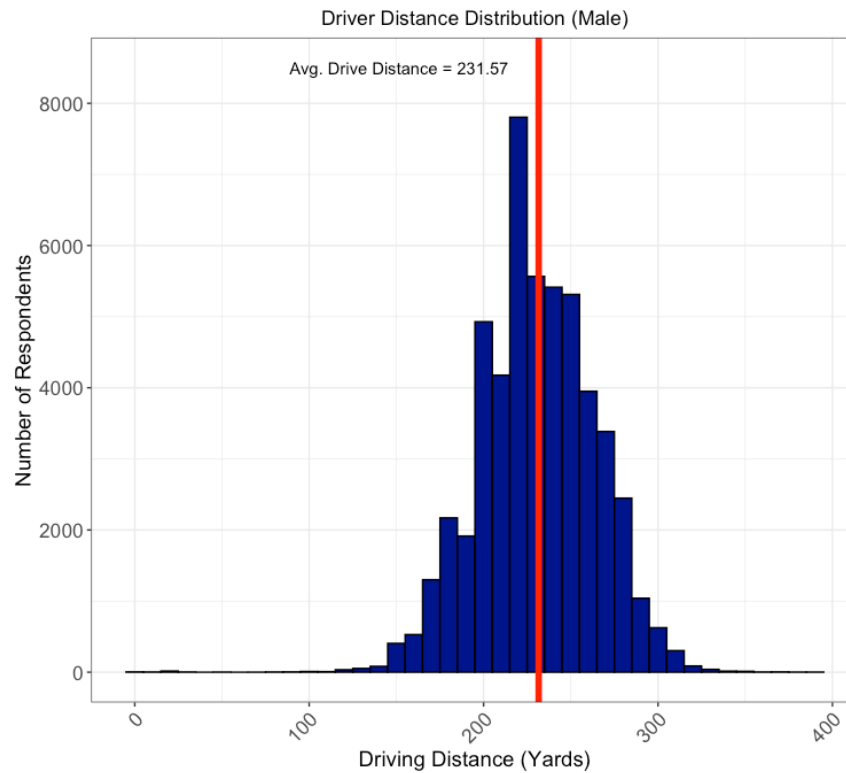
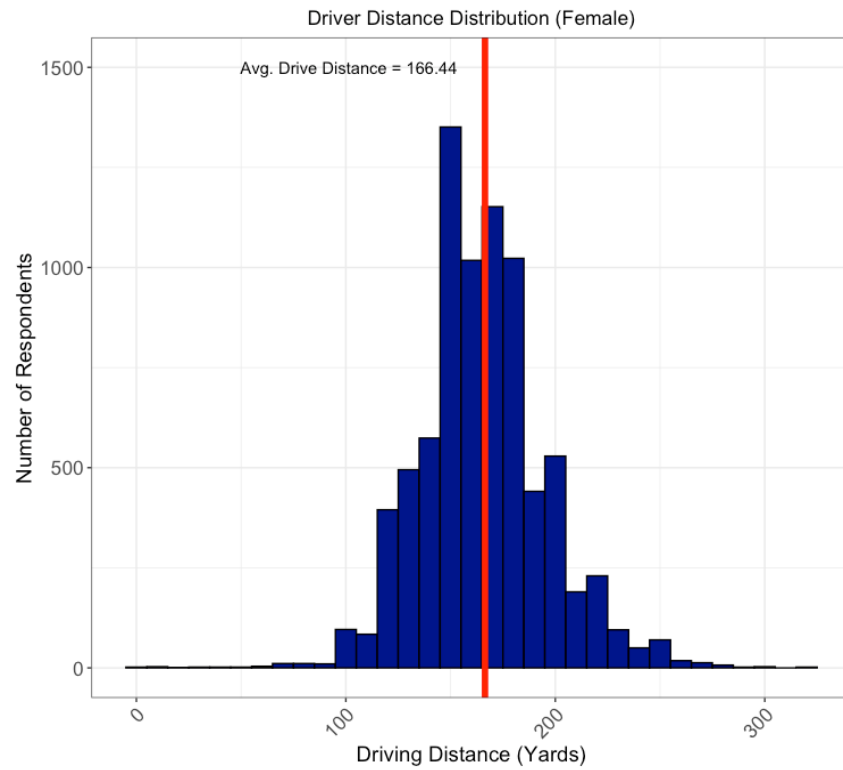


Figure 3: Self-reported 7-Iron Distance Distribution (By Gender)

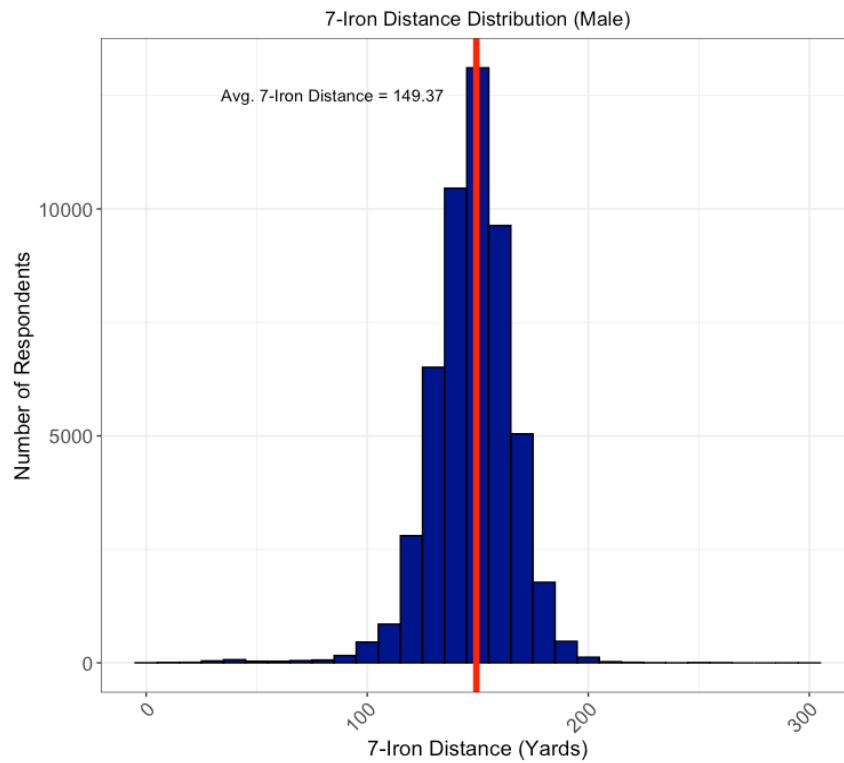
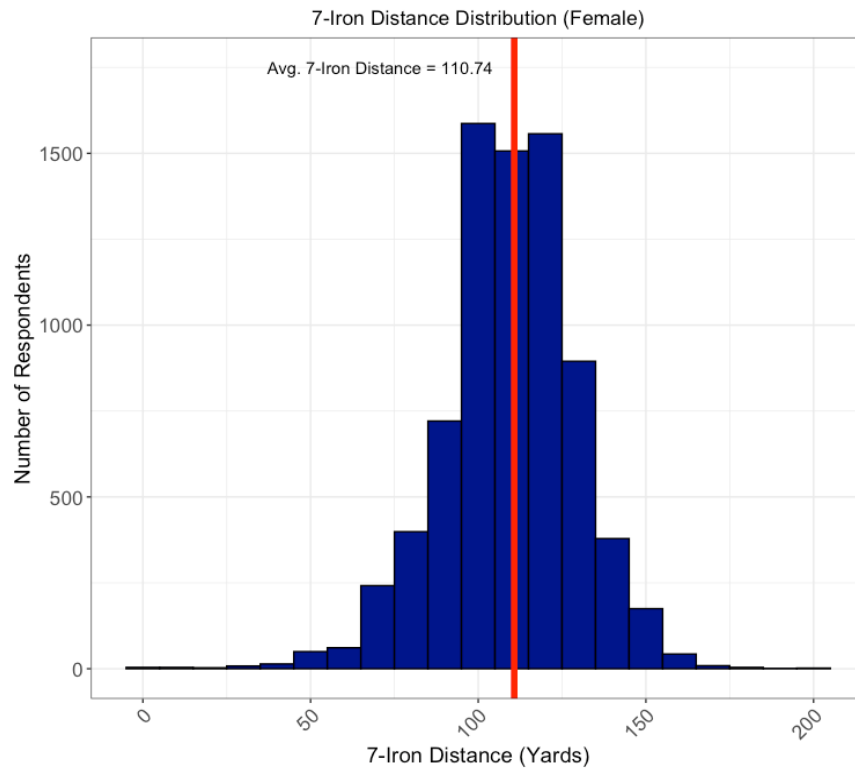
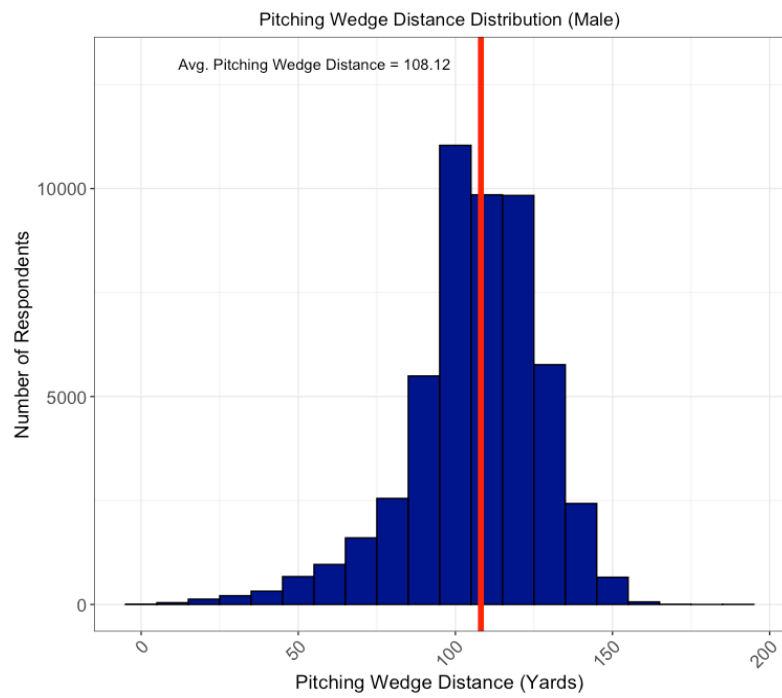
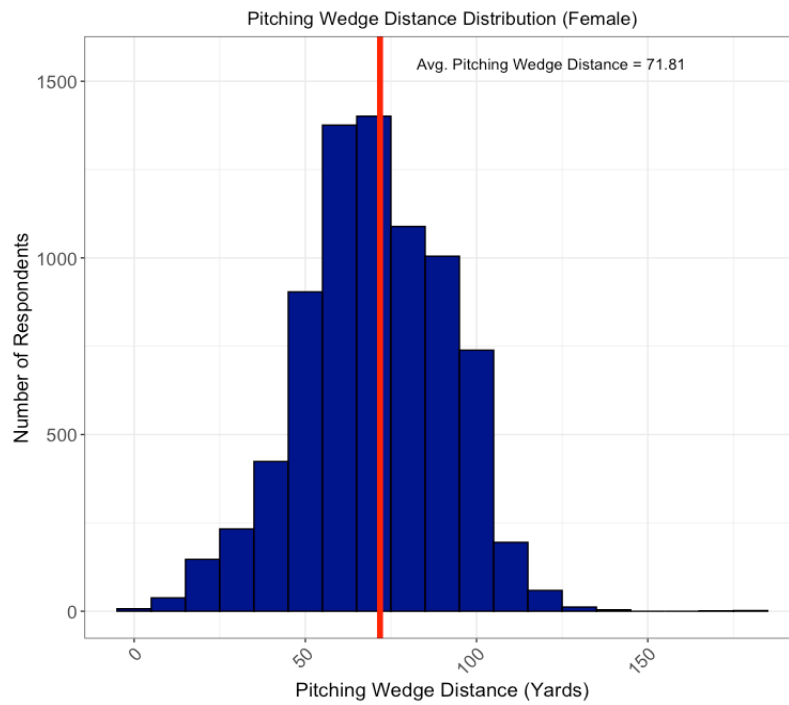


Figure 4: Self-reported Pitching Wedge Distance Distribution (By Gender)



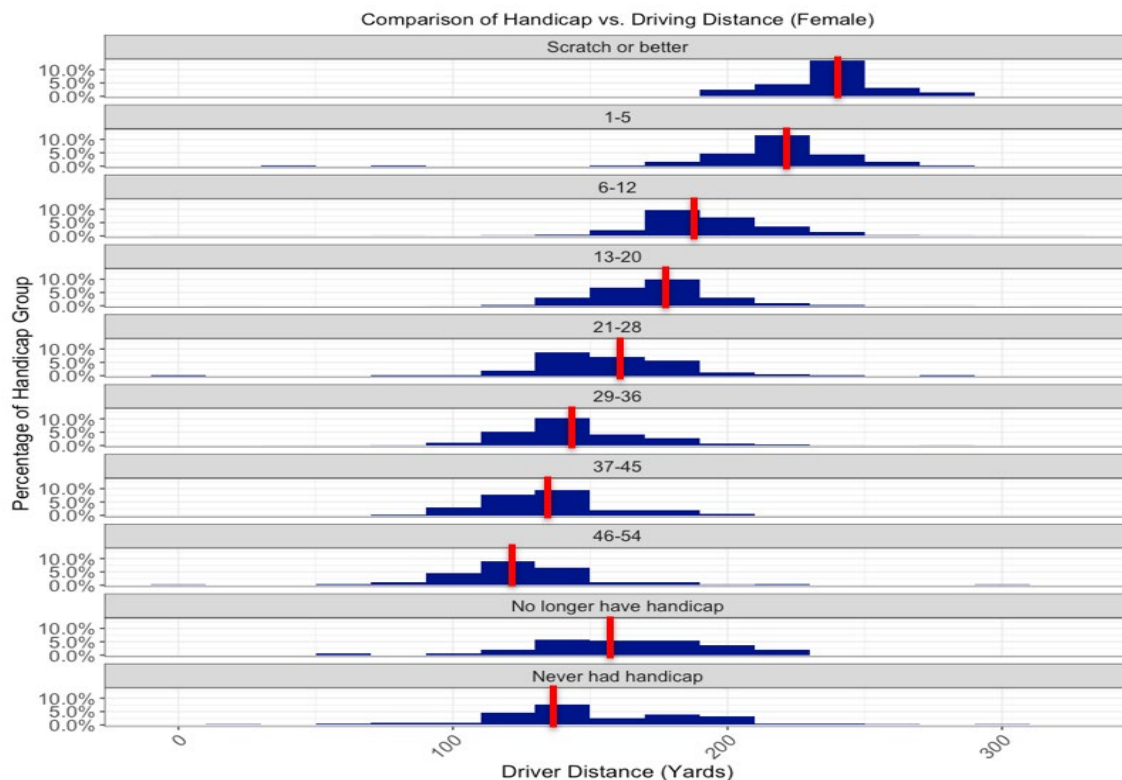
Each club length distribution has a wide range as shown in the plots above. Table 1 shows the female 5th and male 95th percentiles in club length for each club is shown. This range provides coverage of nearly all golfers.

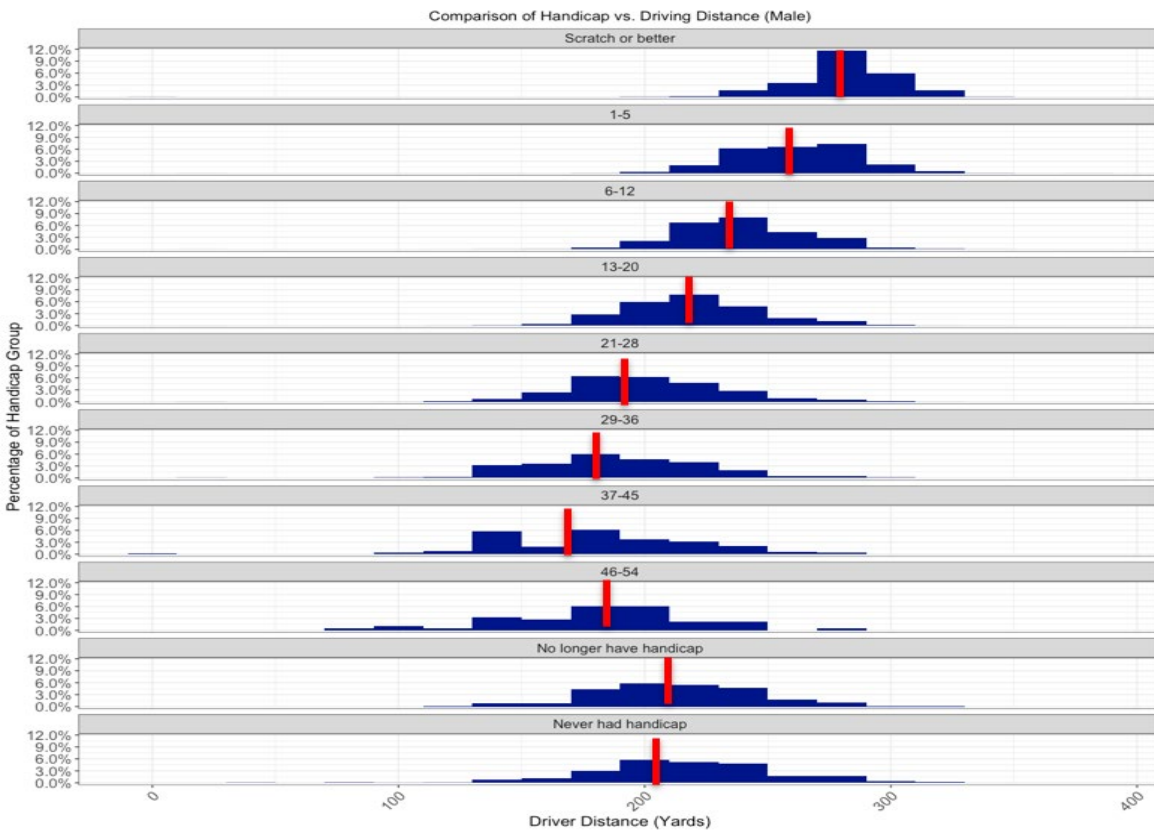
Table 1: Self-reported Club Length Ranges (Yards) Considering Gender Differences

Club	5th Percentile of Female	95th Percentile of Male
Driver	119	285
7-Iron	74	176
Pitching Wedge	36	141

Upon examining the distributions of the selected club lengths for each gender, the analysis was extended to club lengths by Gender and HI groupings. Driver distance estimates are shown Figure 5 below for both male and female golfers with the red line again indicating the median. Across both genders, lower HI groups have longer distance drives than higher HI groups.

Figure 5: Self-reported Driving Distance vs. Handicap Index (By Gender)





These same trends can be seen across all club types recorded in the survey. Both 7-iron [Figure 6] and Pitching Wedge [Figure 7] distances are plotted below for each HI grouping. On average, better golfers hit longer distances for both 7-Irons and Pitching Wedges.

Figure 6: Self-reported 7-Iron Distance vs. Handicap Index (By Gender)

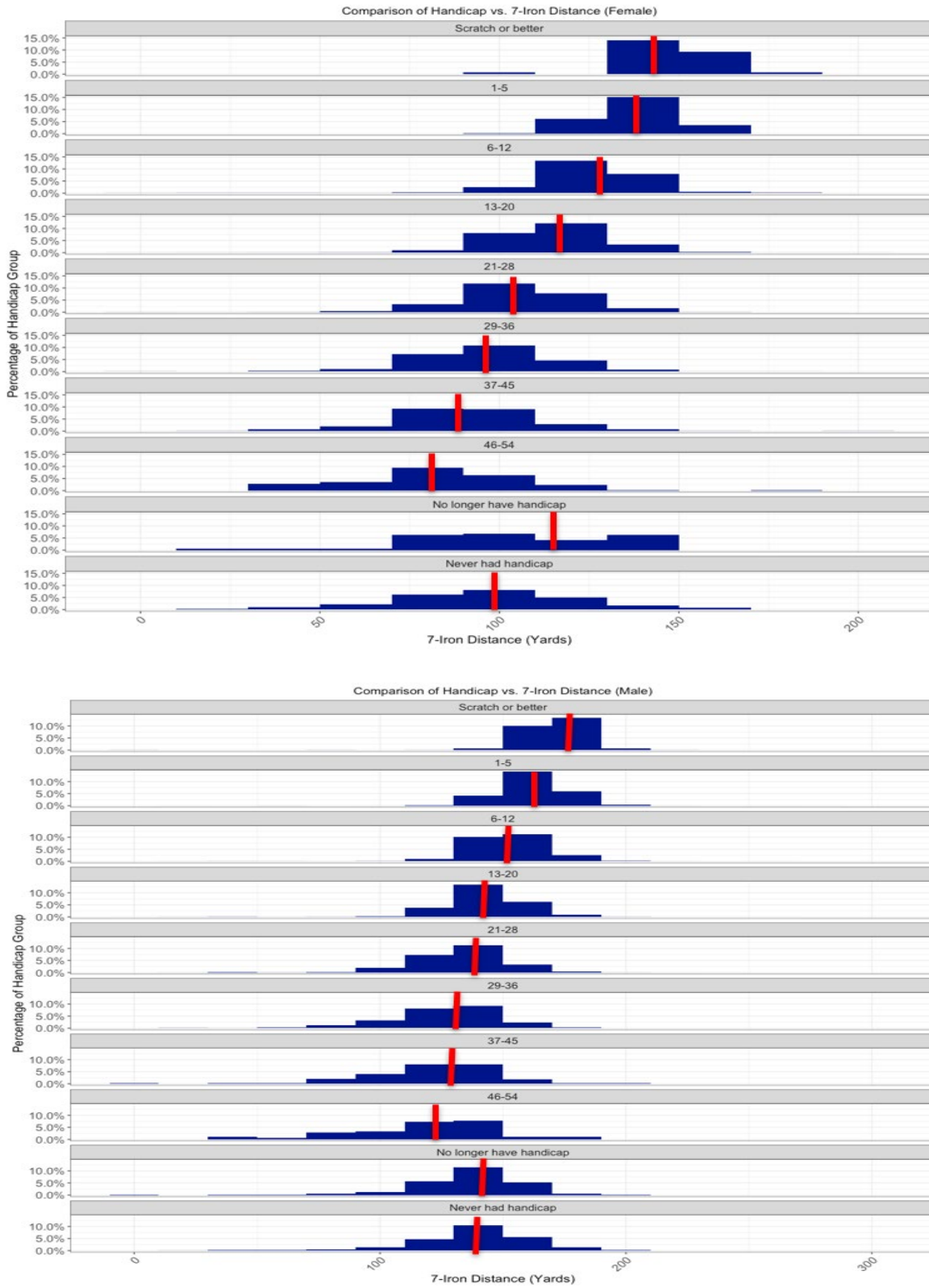
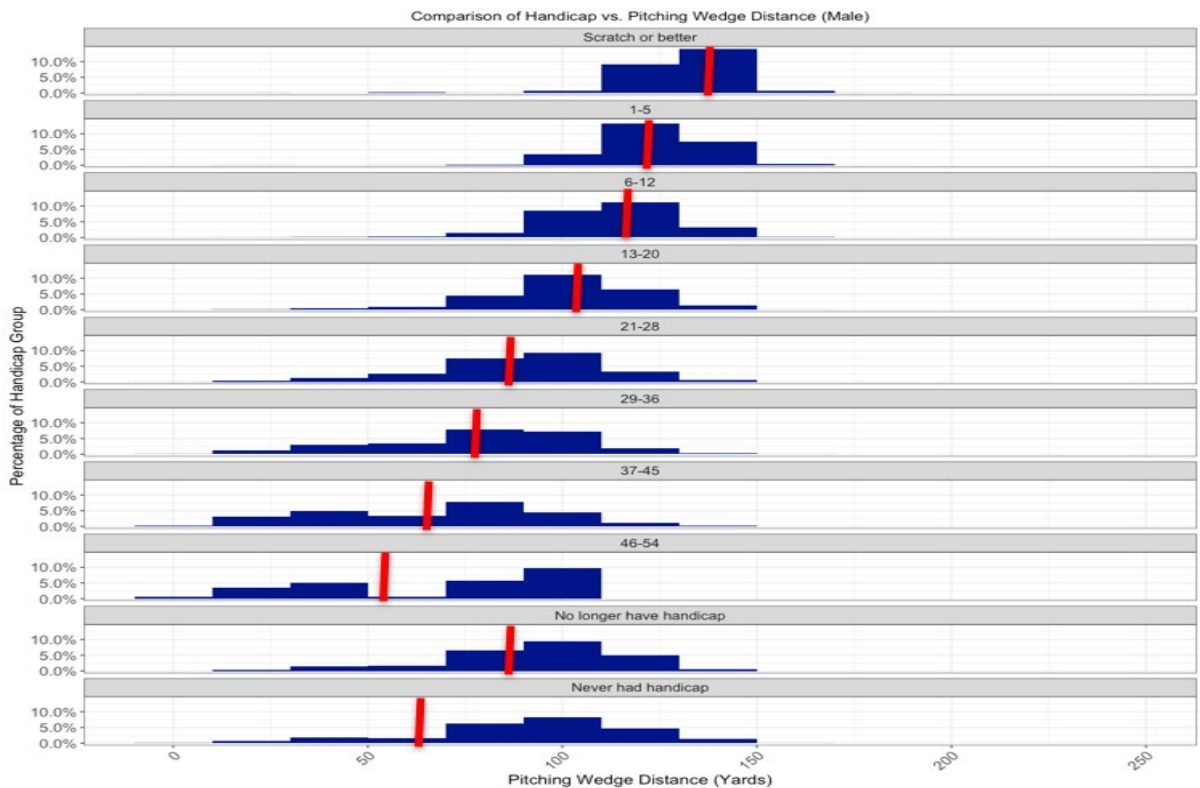
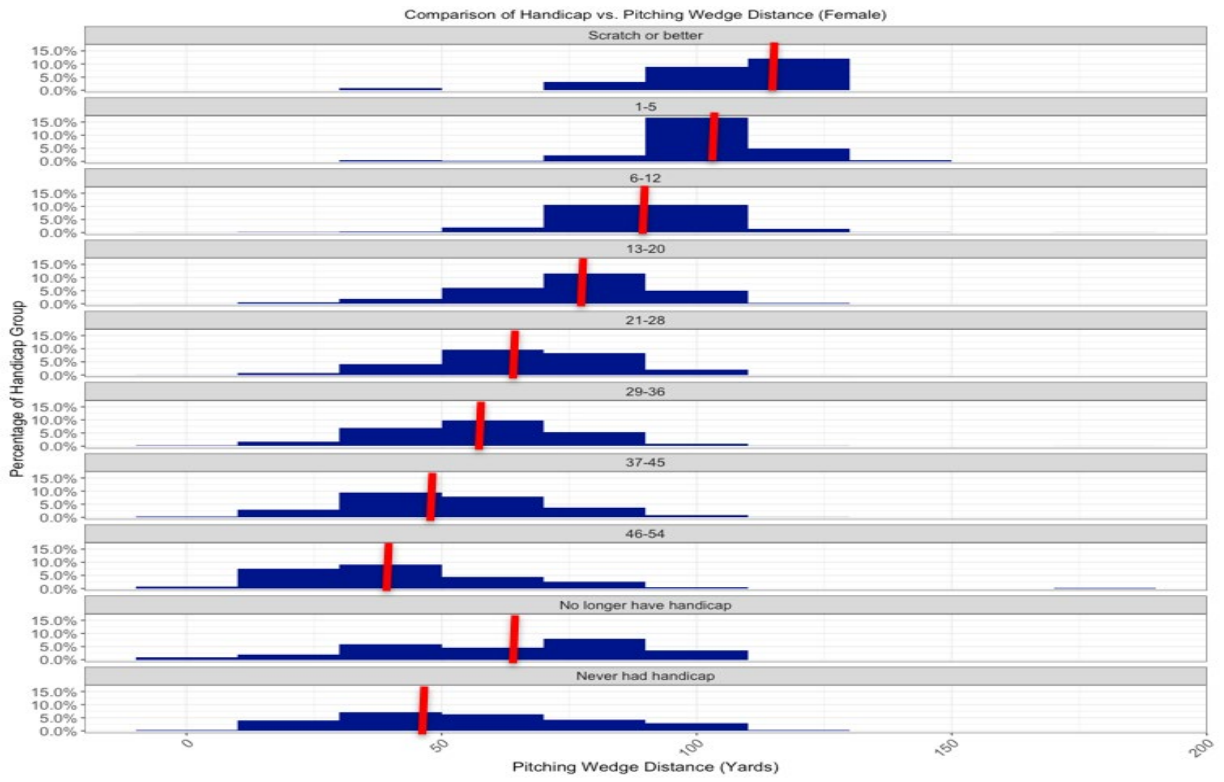


Figure 7: Self-reported Pitching Wedge Distance vs. Handicap Index (By Gender)



4. Handicap Index, Club Distance and Accuracy Analyses

4.1 Relationship between Handicap Index and self-reported driving distance

The previous section showed that better golfers estimate their hitting distances to be longer on average. A linear regression was used to determine whether the relationships in the plots were *statistically significant* across the golfer survey data. Model coefficient estimates shown in Table 2 demonstrate that driver distance does have a statistically significant impact on Handicap Index. For every 1-yard increase in driver distance, Handicap Index decreases by 0.128 on average. This model was statistically significant. On average, when driving distance for men and women are equal, a women's HI is lower by about 0.6 units.

Table 2: Handicap Index vs. Self-reported Driver Distance Model Estimates

$$\text{Males: Handicap Index Midpoint} = B0 + B1*(\text{Driving Distance}) + B2 + \epsilon$$

$$\text{Females: Handicap Index Midpoint} = B0 + B1*(\text{Driving Distance}) + \epsilon$$

Variable Name	Estimate	P-Value
B0	44.80	<0.001
B1	-0.128	<0.001
B2	-0.579	<0.001

4.2 Relationship between estimated club distances

The following models explore how one club distance relates to another club distance for players. Table 3 shows the relationship between Driver and 7-iron. The model shows that for every 1-yard increase in 7-iron distance, Driver distance increases by 1.44 yards on average. This model was statistically significant. As examples on how to use the model:

- A golfer who hits a 7-iron 150 yards would be expected to hit their driver 231 yards
- A golfer who hits a 7-iron 100 yards would be expected to hit their driver 160 yards

Table 3: Self-reported Driver Distance vs. 7-Iron Distance Model Estimates

$$\text{Driving Distance} = B0 + B1*(7\text{-Iron Distance}) + \epsilon$$

Variable Name	Estimate	P-Value
B0	16.02	<0.001
B1	1.436	<0.001

An analogous relationship can be seen when comparing Driver distance and Pitching Wedge distance of the survey respondents. The model in Table 4 shows that for every 1-yard increase in Pitching Wedge distance, Driver distance increases by 1.22 yards on average. The results of the model were statistically significant. As examples on how to use the model:

- A golfer who hits a PW 120 yards would be expected to hit their driver 243 yards
- A golfer who hits a PW 75 yards would be expected to hit their driver 188 yards

Table 4: Self-reported Driver Distance vs. Pitching Wedge Distance Model Estimates

$$\text{Driving Distance} = B0 + B1*(PW \text{ Distance}) + \epsilon$$

Variable Name	Estimate	P-Value
B0	97.31	<0.001
B1	1.220	<0.001

Finally, Table 5 shows the relationship between Pitching Wedge and 7-Iron distance among the survey responses. Every 1-yard increase in Pitching Wedge distance increases 7-Iron distance by 0.75 yards on average. The model was statistically significant. As examples on how to use the model:

- A golfer who hits a PW 120 yards would be expected to hit their 7-iron 157 yards
- A golfer who hits a PW 75 yards would be expected to hit their 7-iron 123 yards

Table 5: Self-reported 7-Iron Distance vs. Pitching Wedge Distance Model Estimates

$$7 \text{ Iron Distance} = B0 + B1*(PW \text{ Distance}) + \varepsilon$$

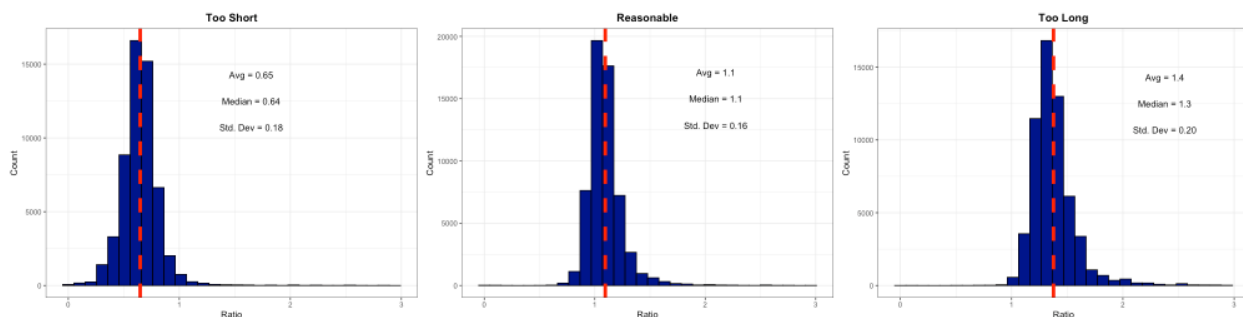
Variable Name	Estimate	P-Value
B0	66.86	<0.001
B1	0.75	<0.001

5. Self-reported Club Distance to Preferred Hole Length Ratios

The survey then asked respondents about their hole length preferences when playing a round of golf for par 3, par 4 and par 5 holes. These preferences were split into three different categories for each type of hole – what hole length is too long, too short, and reasonable. **By calculating the ratio of the respondents' hole length preferences to their estimated club hitting distances, we are able to normalize hole length preferences for golfers.**

Figure 8 shows the ratio of respondents' Par 3 hole length preferences to 7-Iron distances for each hole category. Focusing on the median indicated by the red line and shown on each chart, golfers find that Par 3s get too short when they are less than 64% of their 7-iron distance. They become too long at 130% of their 7-iron distance and are reasonable at 110% of their 7-iron distance (or about a 6-iron distance). **These ratios bracket the desired Par 3 distances according to golfers.**

Figure 8: Self-reported 7-Iron vs. Par 3 Hole Length Preference Ratios

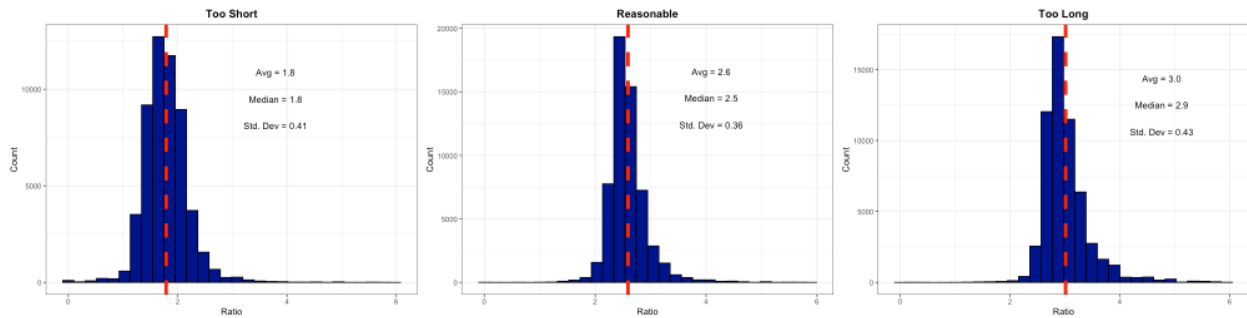


The same process was applied to survey respondents' hole length preferences for Par 4s. The ratios increase as hole lengths for Par 4s are longer than Par 3s.

Figure 9 shows the ratio of respondents' Par 4 hole length preferences to 7-Iron distances for each hole category. Focusing on the median indicated by the red line and shown on each chart, golfers find that Par 4s get too short when they are less than 180% of their 7-iron distance. They become too long at

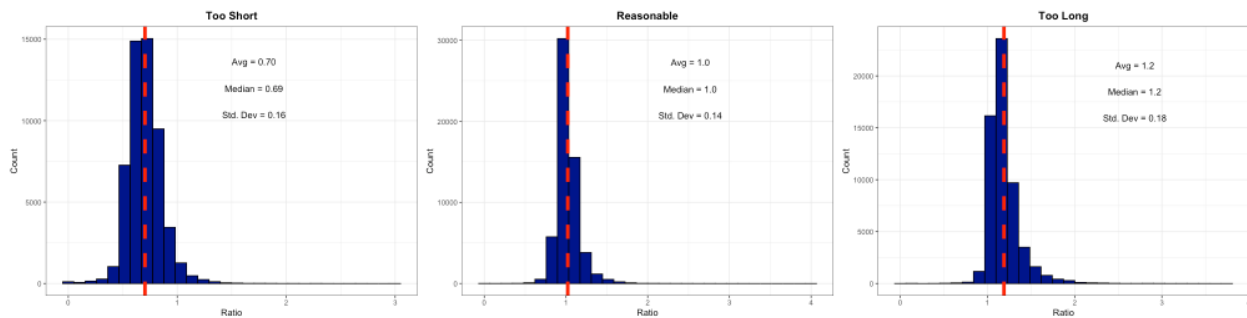
290% of their 7-iron distance and are reasonable at 250% of their 7-iron distance. **These ratios bracket the desired Par 4 distances according to golfers.**

Figure 9: Self-reported 7-Iron vs. Par 4 Hole Length Preference Ratios



A golfer will normally use multiple clubs on a Par 4. Figure 10 shows the results using a more realistic ratio calculated using both a golfer's driver and 7-Iron distances. The formula presumes a Driver off the tee, followed by a 7-iron into the green. Focusing on the median indicated by the red line and shown on each chart, golfers find that Par 4s get too short when they are less than 69% of their Driver + 7-iron distance. They become too long at 120% of their Driver + 7-iron distance and are reasonable at 100% of their Driver + 7-iron distance. **These ratios bracket the desired Par 4 distances according to golfers.**

Figure 10: Self-reported Driver & 7-Iron vs. Par 4 Hole Length Preference Ratios

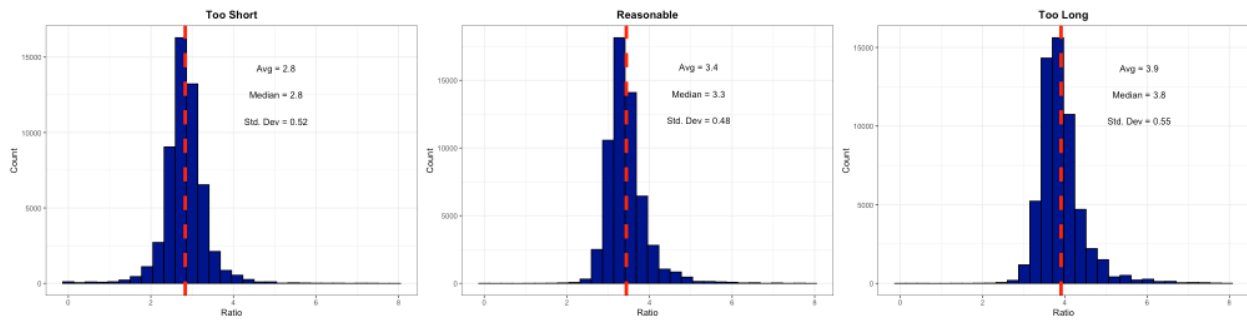


The formula for Par 4 reference distance using multiple clubs of Driver and 7-iron is:

$$\text{Par 4 Club Reference Distance} = \text{Driver Distance} + 7\text{-iron Distance}$$

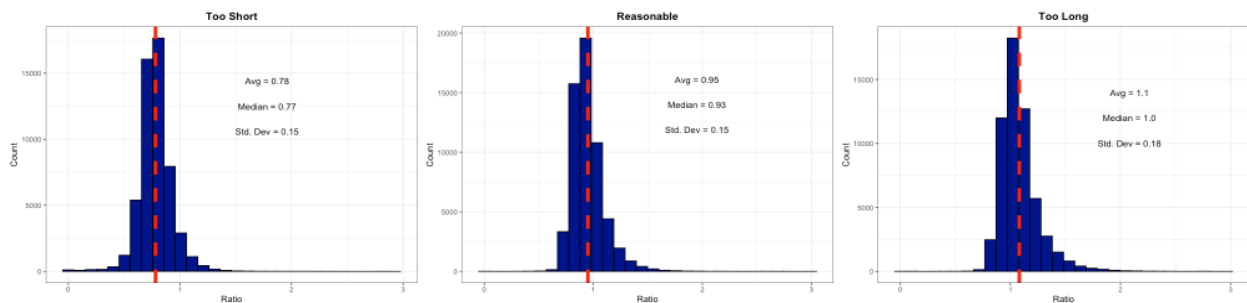
The single club ratio and a multiple club ratio procedure were applied to hole length preferences for Par 5s. Figure 11 shows the ratio of respondents' Par 5 hole length preferences to 7-Iron distances for each hole category. Focusing on the median indicated by the red line and shown on each chart, golfers find that Par 5s get too short when they are less than 280% of their 7-iron distance. They become too long at 380% of their 7-iron distance and are reasonable at 330% of their 7-iron distance. **These ratios bracket the desired Par 4 distances according to golfers.**

Figure 11: Self-reported 7-Iron vs. Par 5 Hole Length Preference Ratios



As with Par 4 holes, a golfer will normally use multiple clubs on a Par 5. Figure 12 shows the results using a more realistic ratio calculated using both a golfer's Driver and PW distances. The formula presumes a Driver off the tee, followed by a fairway wood or hybrid at 85% of the driver distance followed by a 9-iron into the green which is 110% of the PW distance. Focusing on the median indicated by the red line and shown on each chart, golfers find that Par 5s get too short when they are less than 77% of their Driver/PW reference distance. They become too long at 100% of their Driver/PW reference distance and are reasonable at 93% of their Driver/PW reference distance. **These ratios bracket the desired Par 5 distances according to golfers.** These ratios are in line with what was shown in the previous plots.

Figure 12: Self-reported Club Reference Calculation vs. Par 5 Hole Length Preference Ratios



The formula for Par 5 reference distance using multiple clubs of driver and PW is:

$$\text{Par 5 Club Reference Distance} = 1.85 * \text{Driver Distance} + 1.1 * \text{PW Distance}$$

The results using preferred multi-club method are presented in Table 7

Table 7: Summary of Median Hole Reference Ratios using the Multi-club Approach

Hole Par	Reference Clubs	Too Short	Reasonable	Too Long
3	7-iron	0.64	1.10	1.30
4	D + 7-iron	0.69	1.00	1.20
5	D + PW	0.77	0.93	1.00

Tables 8 & 9 show the calculated hole and par-72 course lengths for average male and average female golfers using these ratios. The “model course” is made up of ten par 4s, four par 3s and four par 5s.

Table 8: Hole and Course Lengths (yards) for Average Female Golfer using the Multi-club Approach

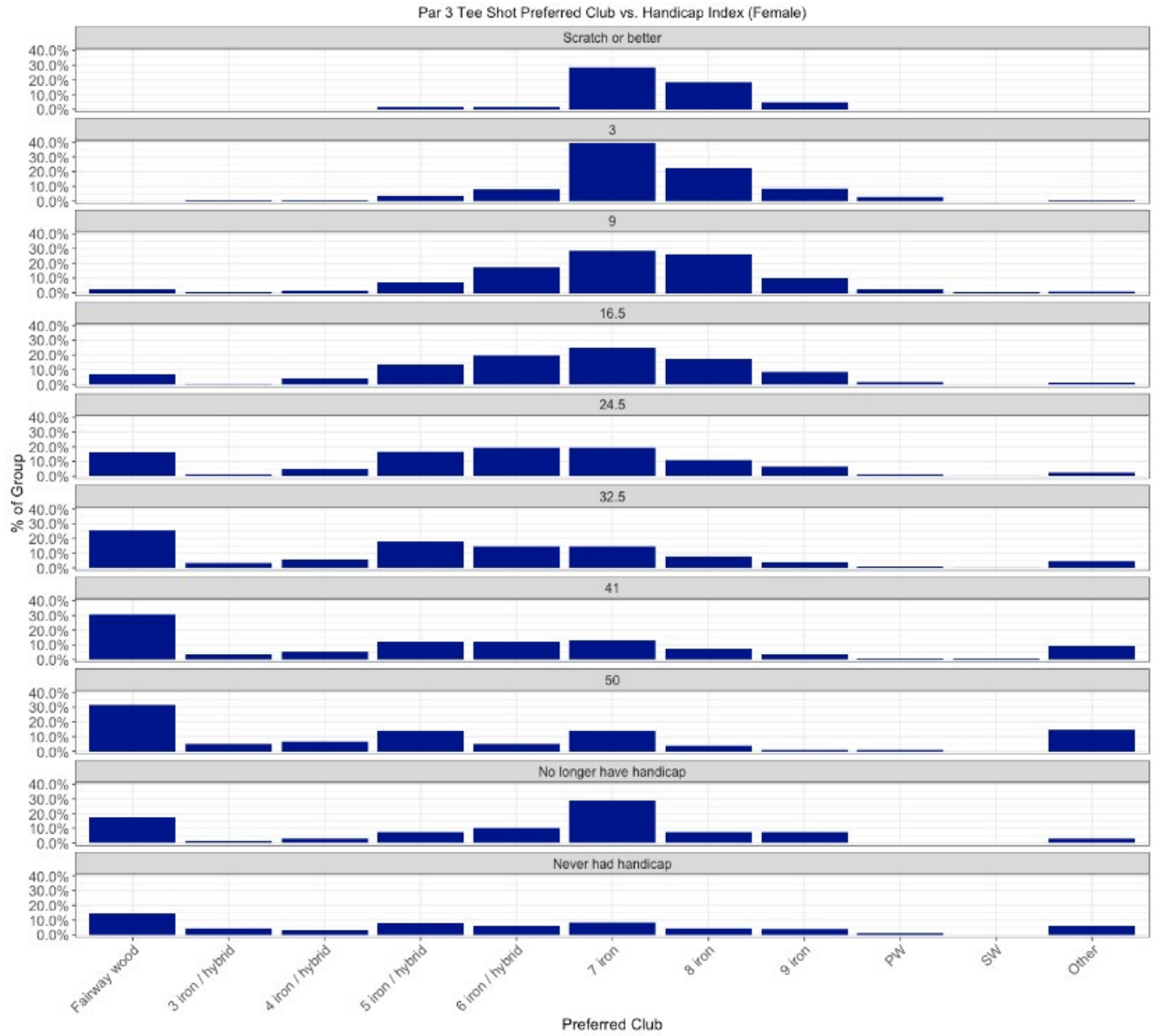
<u>Hole Par</u>	<u>Reference Clubs</u>	<u>Too Short</u>	<u>Reasonable</u>	<u>Too Long</u>
3	7-iron	64	110	130
4	D + 7-iron	179	260	312
5	D + PW	294	355	382

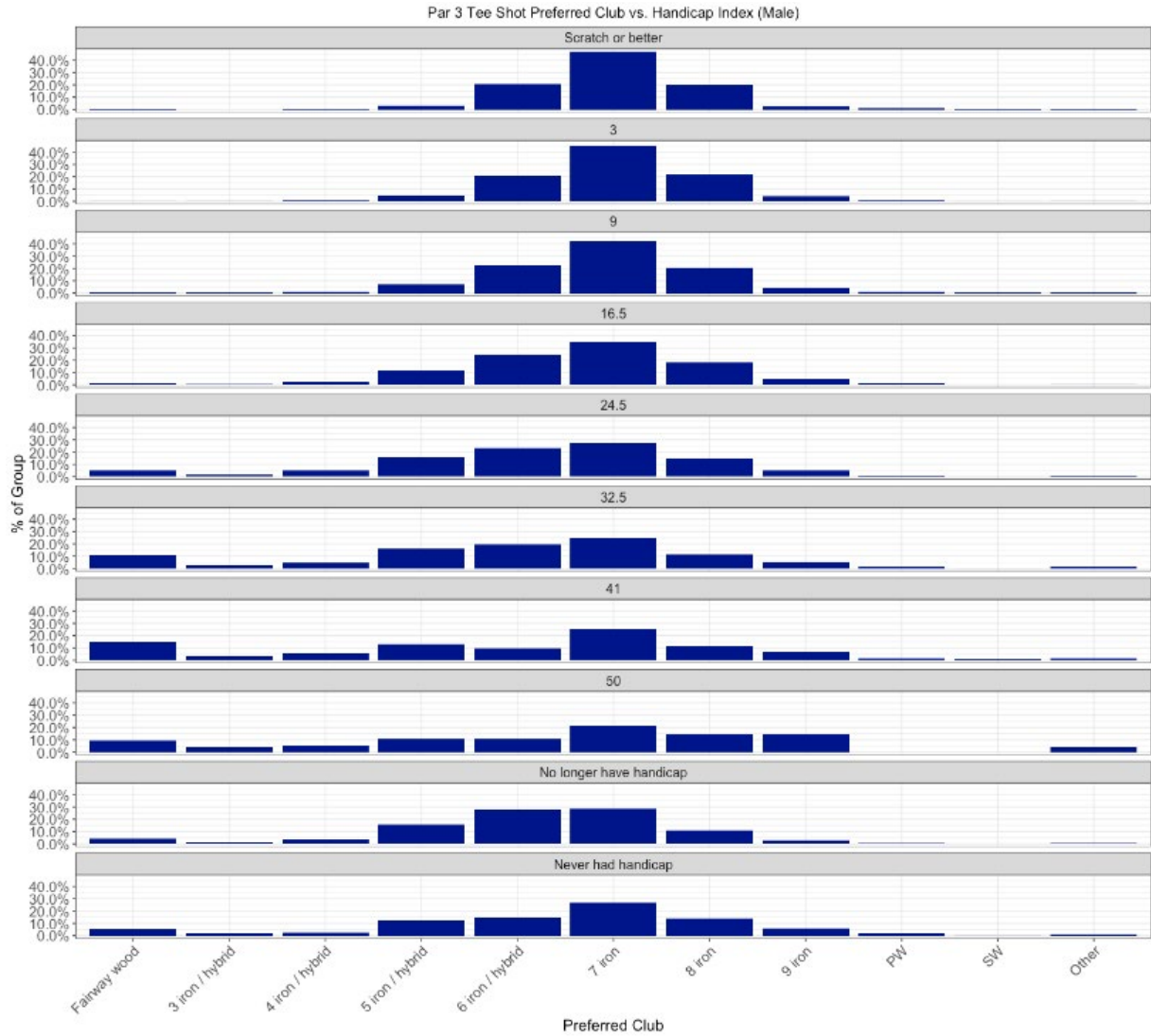
Table 9: Hole and Course Lengths (yards) for Average Male Golfer using the Multi-club Approach

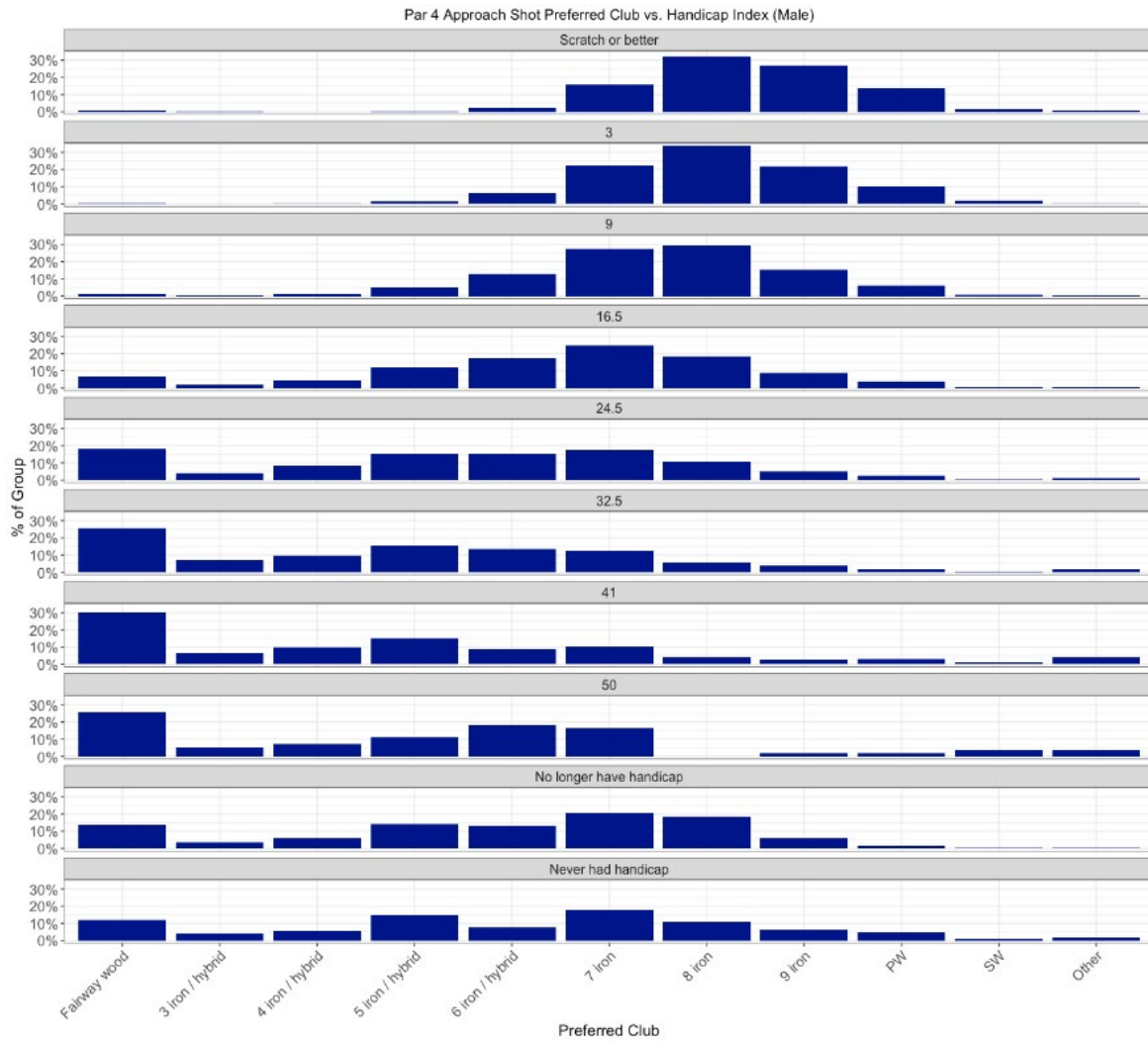
<u>Hole Par</u>	<u>Reference Clubs</u>	<u>Too Short</u>	<u>Reasonable</u>	<u>Too Long</u>
3	7-iron	90	154	182
4	D + 7-iron	243	352	422
5	D + PW	396	478	514

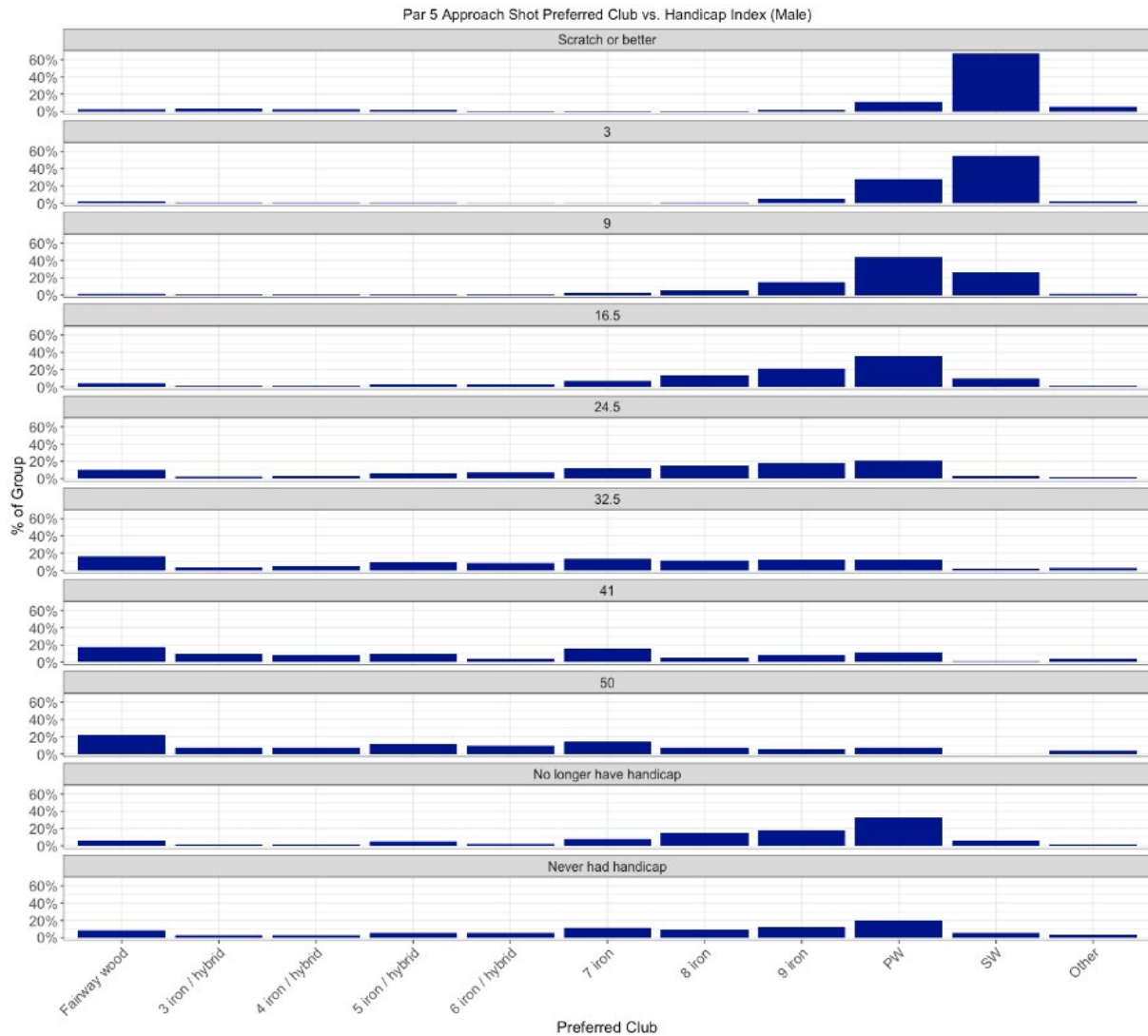
6. Preferred par 3 tee shot club or par 4 / 5 approach shot club by golfer skill level

In 2023, the survey asked some additional questions that permit a deeper dive into golfer hole length preferences, specifically par 3 tee shot preferred club as well as par 4 and 5 approach shot preferred club, all as a function of gender and skill. Figures 13 – 18 present these detailed data, which admittedly, takes careful examination and consideration as to the results and the meaning.









These six charts test the fundamental tenants of the game. They show that there are significant number of golfers who experience golf much differently than the norm. They tend to be less skilled or other than the highest skilled female golfers. They have accepted that a fairway wood on a par 3 is their preferred club to tee off with, a driver / fairway wood on a par 4 is preferred and a driver followed by two fairway woods on a par 5 is preferred.

7. Course Length Distribution by Gender

The survey data also included the course lengths that golfers play from when playing a round of golf. The distribution of these lengths for both males and females are presented in Figure 13. The most common or frequent playing length for males is centered around the 6,000-6,499 yard bin while females are centered around 5,000-5,499 yard bin.

Figure 13: Course Length Distribution by Gender (SI Survey Data)

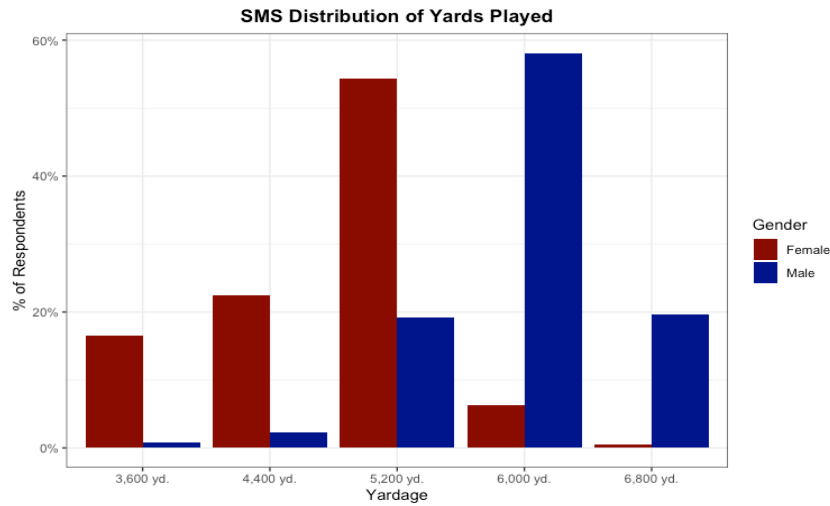
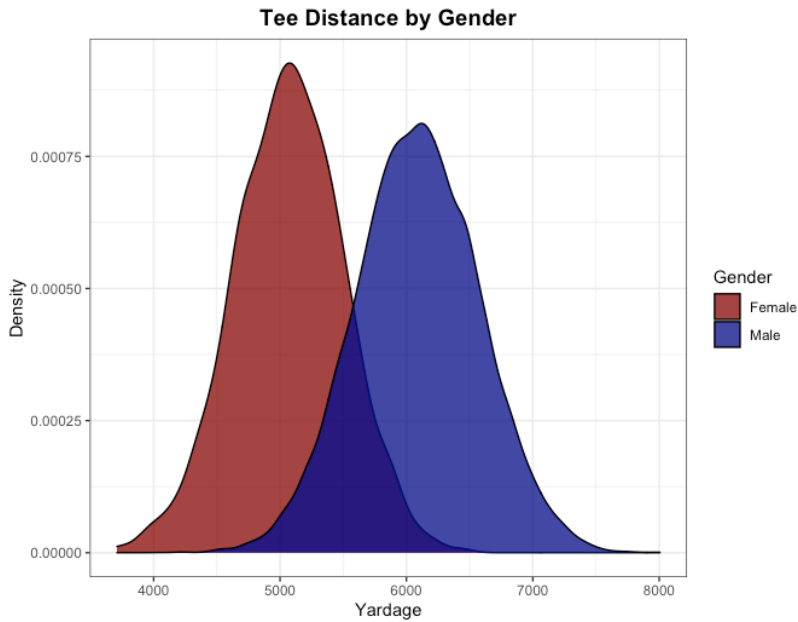


Figure 14 demonstrates that the survey course length distributions align with GHIN score posting course length distributions. Having two separate data sources showing the same playing length trends increases our confidence that course length by gender follows these distributions.

Figure 14: Course Length Distribution by Gender (2020 Score Posting Data Analysis)



8. Conclusions

The overall goal of this study was to explore the more quantitative portions of the SI survey data. First, consistency of the self-reported data was checked. Examining Handicap Index versus typical score confirmed that golfers are reporting both consistently. Also, lower HI golfers reported longer hitting distances for all clubs queried.

Next, correlations between Handicap Index and self-reported hitting distance as well as hitting distance between clubs was determined. These correlations should be considered approximate because the data was requested in bins. Better data is available from the USGA on golfer hitting performance on [usga.org/advanced/golfer experience](https://www.usga.org/advanced/golfer-experience).

In particular, a better understanding of the hole distances that recreational players prefer on a normalized basis to a golfer's self-reported hitting distance was determined. **This study follows up on the new methodology for normalized hole length resulting in the development of clear hole and course length guidelines based on golfers' preferences and abilities established in 2021.** Utilizing either a single club or three clubs are viable approaches to determining desired hole lengths with the three-club method preferred because the distribution of hole lengths are narrower. These ratios should be used to examine preferred course lengths for the full distribution of hitting distances from the slowest to fastest swing speeds demonstrated by recreational golfers to bracket playing lengths that should be considered by facilities to supply that covers both genders across their golfing lifetimes.

Diving deeper into the data, it was shown that shorter hitting golfers (stronger tendency for female or higher HI golfers) experience golf differently than the norm, questioning if available tees or tee selection is driving this significant cohort of golfers.

Finally, distribution of course length currently played is reported and is consistent with previous data.