Tool: IBM SPSS Software

1. Distribution of End Score (Figure 1):

End_Score

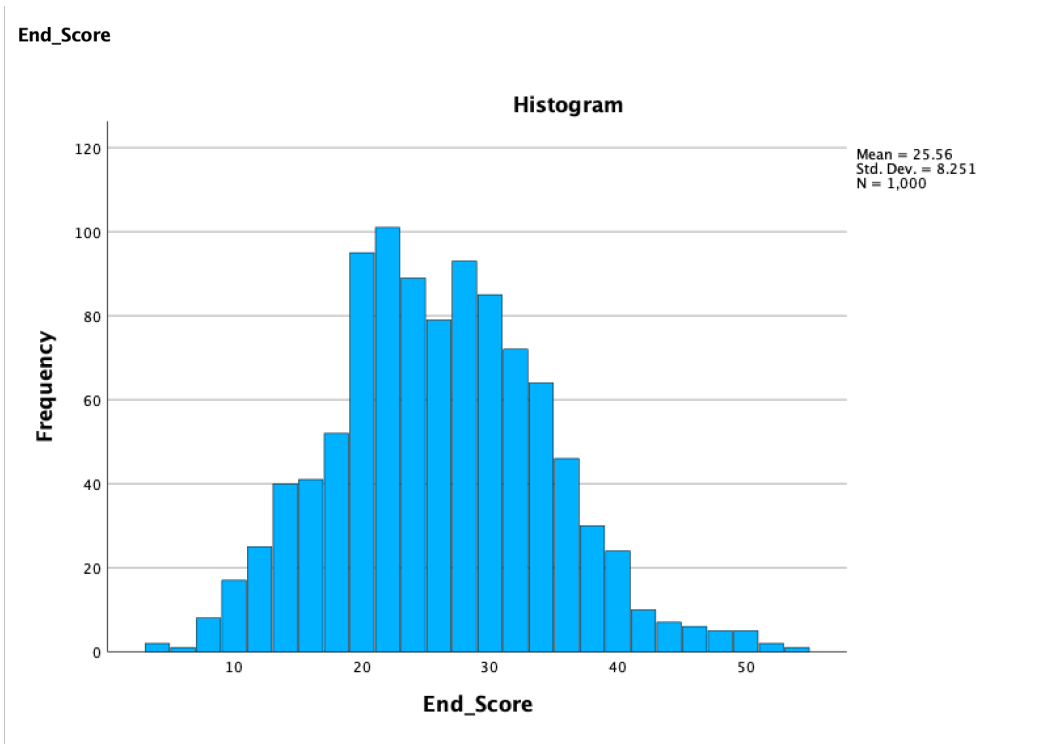### Histogram

Mean = 25.56
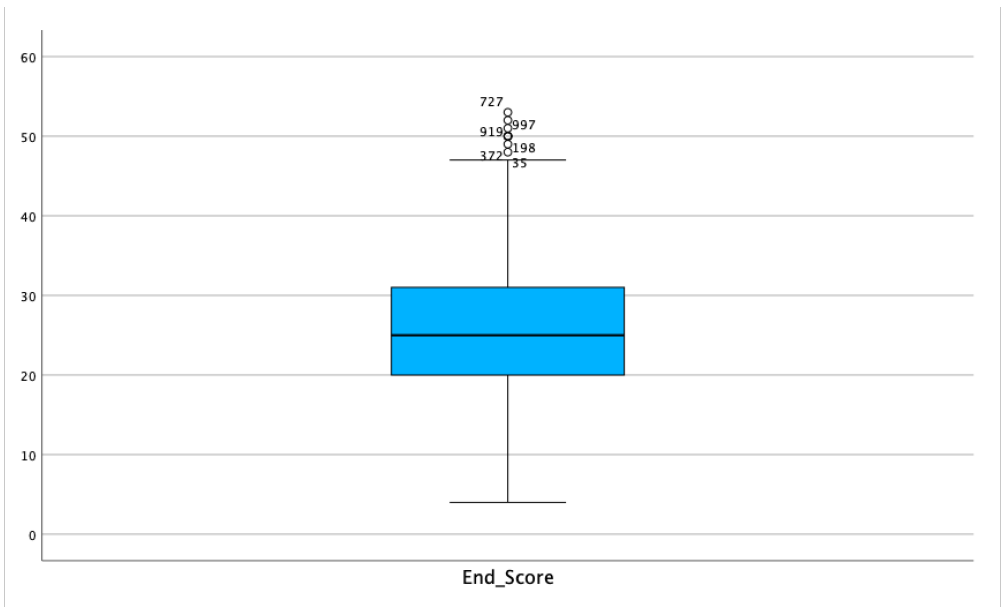Std. Dev. = 8.251
N = 1,000

Figure 1

Figure 2

The distribution of end scores is normal (Boxplot - Figure 2), thus, the Central Limit Theorem is valid.

The data (Figure 3) provides insights into the distribution of archer scores. Below are the key findings:

- On average, archers tend to score around 25.56 points in each end.
- 50% archers score between 25.05 points and 26.07 points in each of their recorded end score.
- The highest recorded end score is 53 points, while the lowest is 4 points.

Descriptives

			Statistic	Std. Error
End_Score	Mean		25.56	.261
	95% Confidence Interval for Mean	Lower Bound	25.05	
		Upper Bound	26.07	
	5% Trimmed Mean		25.42	
	Median		25.00	
	Variance		68.080	
	Std. Deviation		8.251	
	Minimum		4	
	Maximum		53	
	Range		49	
	Interquartile Range		11	
	Skewness		.254	.077
	Kurtosis		.060	.155

Figure 3

=> *Educated assumptions can be made regarding the average performance of an archer in each end shot:*

- *The average archer should score between 25.05 and 26.07 points in each end.*
- *To be a competent archer, he/she should score higher than 26.07 points in each end.*

2. Difference in the average round score between Junior Canberra competition (Competition_ID: 1) and AA50/1440 competition (Competition_ID: 3). (Using Independent Sample t-Test)

Although both competitions enforce the same division of using Longbow equipment, one is organised for females of all ages (AA50/1440), the other is organised for young archers under 21. The average round score for these two competitions are hypothesised to be different.

	Round_ID	Class_Age	Class_Gender	Min_Max	Equipment_Desc
1	Junior Canberra	21	Female	Max	Longbow
2	AA50/1440	Open	Female	Min	Longbow

Figure 4

The mean round score of the Junior Canberra competition (M = 40.76 points, s = 11.72 points, n = 250) is higher than the mean round score of Female Open AA50/1440 (M = 39.32 points, s = 10.316 points, n = 238). However, an independent sample t-test (Figure 5) shows that this difference in the average round score is insignificant, t(483.07) = 1.45, p = 0.145. The 95% confidence interval indicates that the mean round score of Junior Canberra competition is between 0.517 point lower than and 3.406 points higher than the mean round score of Female Open AA50/1440 competition.

Hence, there is insufficient evidence to suggest the difference between the average round score of Junior Canberra and AA50/1440.

T-Test

Group Statistics

	Competition_ID	N	Mean	Std. Deviation	Std. Error Mean
Round_Score	1	250	40.76	11.719	.741
	3	238	39.32	10.316	.669

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p			Lower	Upper
Round_Score	Equal variances assumed	3.922	.048	1.443	486	.075	.150	1.445	1.001	−.523	3.412
	Equal variances not assumed			1.447	483.069	.074	.148	1.445	.998	−.517	3.406

Figure 5

=> *Educated assumption can be made regarding equivalent rounds:*
- Junior Canberra and Female Open AA50/1440 may have the same difficulty and can be suggested as equivalent rounds for archers who competed in either of the competitions.