Which paper airplane goes the furthest?

Brodric Young, Colby Orton, Lorenzo , Jordan Reed

Randomizing The Data

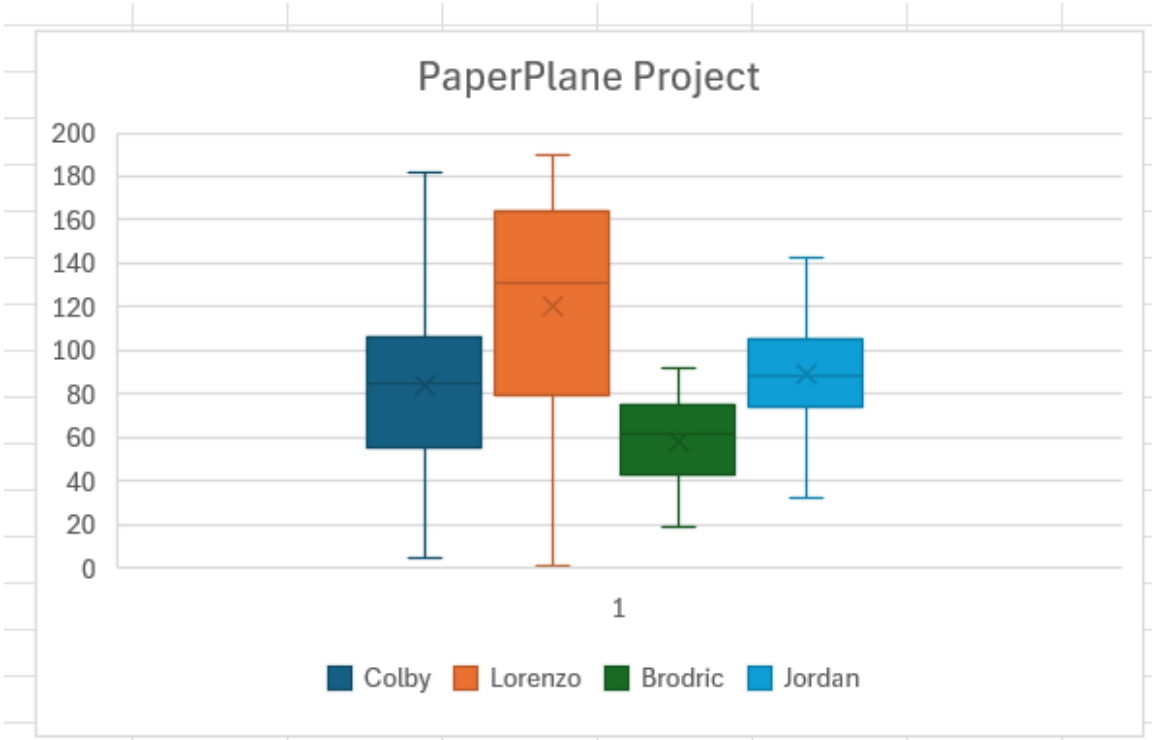
- A variety of methods were used to randomize our data. They include the following methods:
  - Systematic Sampling
  - Computer Randomization
  - Changing Height and Speed of Throws

Collected Data

Simple Random Samples

	A	B	C	D
1	Colby	Lorenzo	Brodric	Jordan
2	136	190	51.75	98.75
3	86	112	61.75	90.5
4	89	35.1	55.5	126.5
5	72	162.7	65.25	102.25
6	85	129.3	81	84
7	125	129.5	74.75	91
8	49	50.3	46.5	83.5
9	168	25.3	45.25	32
10	155	180.5	61.75	113
11	95	170	81	93.5
12	95	145.3	75.75	39.5
13	27	98	68.75	95
14	57	132.4	20.75	81.5
15	44	157.5	82.25	143
16	87	172.4	26.25	55
17	84	143.5	91.5	132
18	182	167.3	43.75	138
19	30	75.7	41.25	114
20	111	118.5	27.75	74
21	63	80.4	72.25	41
22	95	1	38	58
23	62	142.3	72.25	99
24	105	149.8	18.75	97
25	153	66.6	68.5	85.75
26	57	166.3	57.75	80.25
27	5	167.7	83	80
28	36	123.8	24.25	73.75
29	74	95.1	47.25	66.5
30	33	68.6	71.75	83
31	62	158.6	81	132

Sample Means			
Colby	Lorenzo	Brodric	Jordan
84.067	120.517	57.908	89.442
Sample Standard Deviations			
Colby	Lorenzo	Brodric	Jordan
43.812	50.339	20.967	28.475
Sample Sizes			
Colby	Lorenzo	Brodric	Jordan
30	30	30	30



Describing the Data

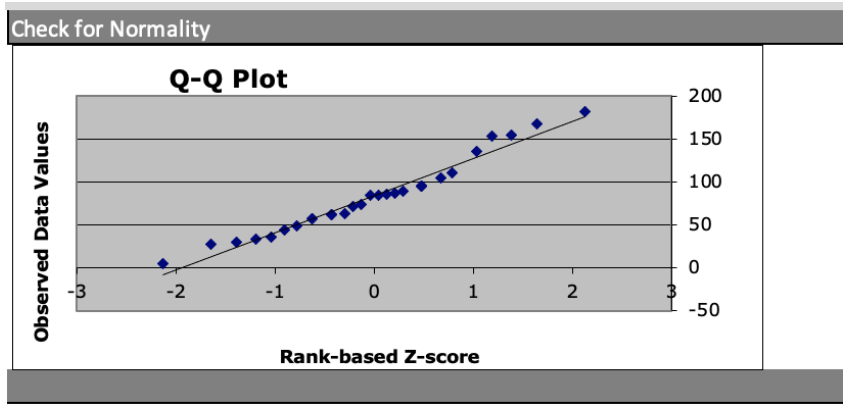
- Averages and Standard Deviations
- Sample Sizes & Means
- Box Plot

Requirements: Simple Random Sample

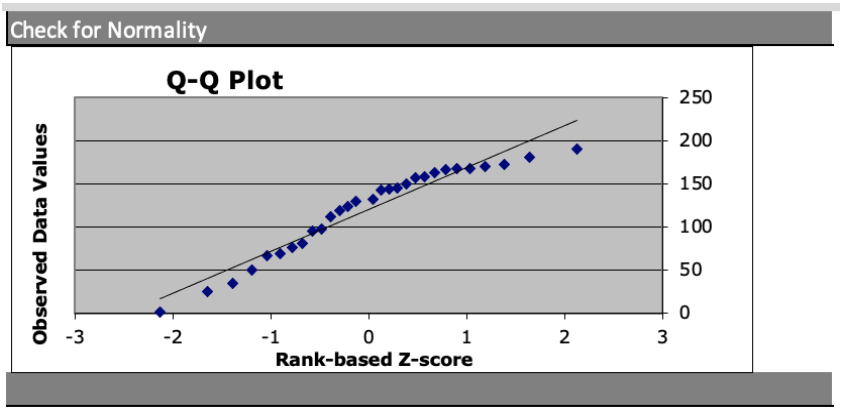
- Each of our individual data sets were selected randomly using various methods from larger data sets that were larger than 30 samples

Requirements: Q-Q Plots

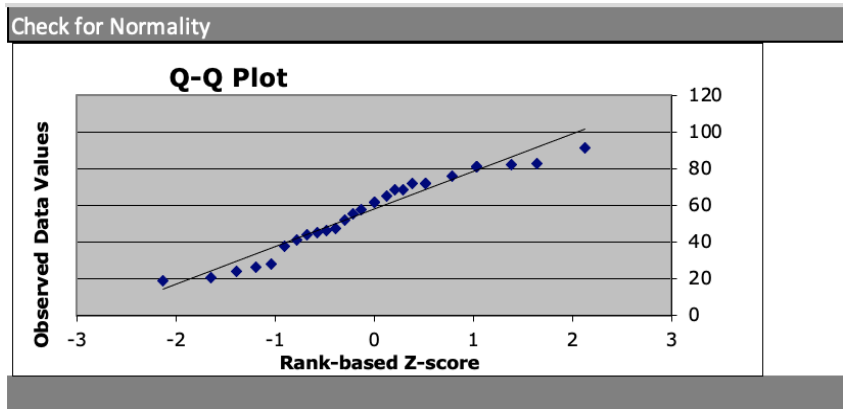
Colby's data



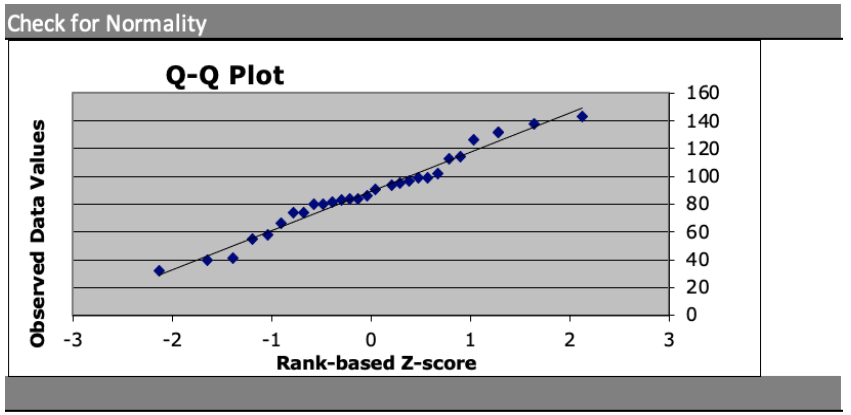
Lorenzo's data



Brodric's data



Jordan's data



Requirements: Satisfy Levene's Test

- Our data sets did not satisfy Levene's Test. Because of this we decided to perform two different independent sample tests.
- One independent sample test was performed between the two samples with the highest sample means. Another was performed between the two samples with the lowest sample means.
- P-Value = 0

Anova: Single Factor rfA sample

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Column 1	30	2683.25	89.4416667	810.800359
Column 2	30	1012	33.7333333	742.335632
Column 3	30	1239.2	41.3066667	768.92346
Column 4	30	531.933333	17.7311111	114.389358
Column 5	30	647.75	21.5916667	328.524425

ANOVA

ırce of Variat	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Gro	99519.9684	4	24879.9921	44.9913797	1.6045E-24	2.43406514
Within Grou	80184.2238	145	552.994647			
Total	179704.192	149				

Requirements: Satisfy Levene's Test

- From the below data we see P-Value is less than alpha. Therefore, Levene's test is not satisfied and we can not perform ANOVA.

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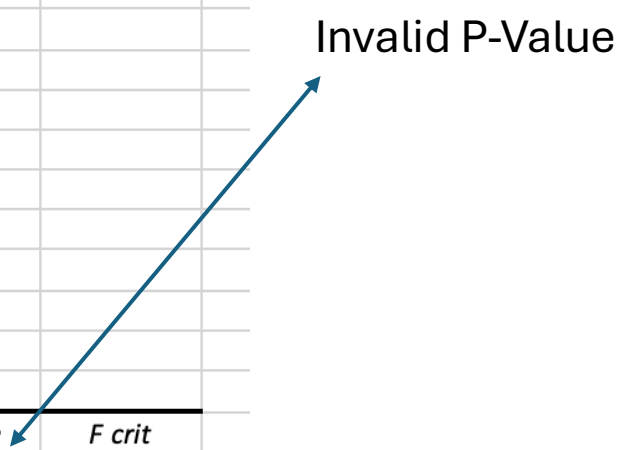

Inferences

- Hypothesis:
- Test Statistic: 2.943
- Degrees of Freedom: 45.825
- P-Value: 0.003
- 0.003 is less than 0.05. We reject the null
- There is sufficient evidence to prove the alternative

Next Steps

- From our data we see that Lorenzo's design was the better design and the design we should move forward with for future projects.