Lab Report: Putter Stability Comparison (Revised Distances)

Objective: To investigate the effect of putter stability on putting accuracy at various distances, comparing the Prodigy PA-3 (stable) and PA-5 (understable) putters.

Hypothesis: At closer distances (10, 15 feet), where accuracy is generally higher, the stable PA-3 putter will demonstrate comparable or slightly greater accuracy than the understable PA-5 putter. At longer distances (20, 25 feet), the PA-3 is hypothesized to show a greater advantage due to its increased stability.

Materials:

- Prodigy PA-3 Putter (3/3/0/1)
- Prodigy PA-5 Putter (3/4/-2/0.5)
- Measuring tape or marked putting area
- Pen or pencil
- Data collection sheets (see tables below)

Procedure:

The experiment was conducted using the two Prodigy putters: the PA-3 (stable) and the PA-5 (understable). Trials were performed at 10, 15, 20, and 25-foot distances.

- **Trials:** At each distance, ten putts were thrown with each putter. The order of putter use (PA-3 first or PA-5 first) was randomized for each distance to minimize bias. Results (made or missed) were recorded in the data table.

Data Collection:

10-Foot Trial:

Putter	Putt 1	Putt 2	Putt 3	Putt 4	Putt 5	Putt 6	Putt 7	Putt 8	Putt 9	Putt 10	Total Made
PA-3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10
PA-5	✓	✓	✓	X	✓	✓	✓	✓	✓	✓	9

15-Foot Trial:

Putter	Putt 1	Putt 2	Putt 3	Putt 4	Putt 5	Putt 6	Putt 7	Putt 8	Putt 9	Putt 10	Total Made
PA-3	✓	✓	✓	✓	✓	✓	X	✓	✓	✓	9
PA-5	✓	X	✓	X	✓	✓	X	✓	✓	✓	7

20-Foot Trial:

Putter	Putt 1	Putt 2	Putt 3	Putt 4	Putt 5	Putt 6	Putt 7	Putt 8	Putt 9	Putt 10	Total Made
PA-3	✓	X	✓	X	✓	X	✓	✓	X	✓	6
PA-5	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	9

25-Foot Trial:

Putter	Putt 1	Putt 2	Putt 3	Putt 4	Putt 5	Putt 6	Putt 7	Putt 8	Putt 9	Putt 10	Total Made
PA-3	X	✓	✓	✓	X	X	X	X	X	X	3
PA-5	X	X	X	✓	✓	✓	✓	✓	✓	X	6

Analysis:

Results Summary:

Distance (feet)	PA-3 Made/Attempted	PA-5 Made/Attempted	PA-3 Percentage	PA-5 Percentage	Difference (PA-3 - PA-5)
10	10/10	9/10	100%	90%	10%
15	9/10	7/10	90%	70%	20%
20	6/10	9/10	60%	90%	-30%
25	3/10	6/10	30%	60%	-30%

Statistical Analysis:

A paired t-test will be used to analyze the data.

1. **Calculate the difference (PA-3 - PA-5) in made putts for each distance.** (See table above)
2. **Calculate the mean difference (d̄):** (1 + 2 - 3 - 3) / 4 = -0.75
3. **Calculate the standard deviation of the differences (sd):**
   ○ Squared differences from the mean: (1.75)^2, (2.75)^2, (-2.25)^2, (-2.25)^2 = 3.0625, 7.5625, 5.0625, 5.0625
   ○ Sum of squared differences: 20.75
   ○ Variance: 20.75 / (4-1) = 6.917
   ○ Standard Deviation: √6.917 ≈ 2.63
4. **Calculate the t-statistic:** t = d̄ / (sd / √n) = -0.75 / (2.63 / √4) ≈ -0.57
5. **Determine the degrees of freedom (df):** n - 1 = 4 - 1 = 3
6. **Find the p-value:** Using a t-table or calculator with df = 3 and t ≈ -0.57, the two-tailed p-value is well above 0.05.

Interpretation:

The p-value is greater than 0.05. This means that there is no statistically significant difference in putting accuracy between the PA-3 and PA-5 putters at these distances.

Conclusion:

The results of this experiment do *not* support the hypothesis. While the PA-3 showed slightly better performance at 10 and 15 feet, the PA-5 demonstrated greater accuracy at 20 and 25 feet. However, due to the high p-value, these observed differences are not statistically significant. This suggests that, at these closer distances, the difference in stability between the PA-3 and PA-5 does not significantly impact putting accuracy. Other factors, such as release consistency and aim, likely play a more dominant role.

What does stability have to do with putting now that it is revised to more closer distances?

At closer distances (10, 15 feet), subtle differences in stability appear to have minimal impact on putting accuracy. The PA-3's higher stability didn't translate into a statistically significant advantage. This suggests that at short ranges, the act of putting itself (smooth release, consistent aim) is the primary determinant of success. At longer distances (20, 25 feet), while the PA-5 performed better in this particular trial, the lack of statistical significance means we can't definitively link this to stability. More likely, random variation and the small sample size are influencing these results.

Limitations and Future Research: (Same as previous response)