Lab Report: Putter Stability Comparison

Objective: To investigate the effect of putter stability on putting accuracy within Circle 1 (33 feet).

Hypothesis: The understable PA-5 putter will result in a higher rate of successful putts within Circle 1 compared to the stable PA-3 putter due to its flight characteristics.

Materials:

- Prodigy PA-3 Putter (3/3/0/1, 172g)
- Prodigy PA-5 Putter (3/4/-2/0.5, 173g)
- Measuring tape or marked putting area
- Pen or pencil

Procedure:

The experiment was conducted using two Prodigy putters: the PA-3 (stable) and the PA-5 (understable). Three trials were performed.

- **Trials 1 & 2:** The "5 Throws Each Putter at One Distance, Then Move" method was employed. At each distance (11ft, 22ft, and 33ft), five putts were thrown with the PA-3, followed by five putts with the PA-5. This was repeated for each distance.
- **Trial 3:** Ten consecutive putts were thrown at each distance, alternating between the PA-3 and PA-5 (PA-3, PA-5, PA-3, PA-5, etc.). This was done to simulate a more natural putting scenario.

Data Collection:

This experiment investigated the effect of disc stability on putting accuracy using two Prodigy putters: the PA-3 (3, 3, 0, 1) and the PA-5 (3, 4, -2, 0.5). The PA-3 is more stable (less turn, less fade) than the PA-5. Circle 1 putting (11, 22, and 33 feet) was employed to minimize extraneous variables. The experiment was conducted outdoors in 32-degree Fahrenheit temperatures with no significant wind. Three test protocols were used: PA-3 first, PA-5 first, and alternating throws. There was a 6-minute break between test 1 and 2, and another 6-minute break between test 2 and 3.

Results Summary:

Putter	11' (Made/Attempted)	22' (Made/Attempted)	33' (Made/Attempted)	Total Made	Overall Percentage
PA-3	15/15	4/15	3/15	22/45	48.9%
PA-5	15/15	6/15	0/15	21/45	46.7%

Statistical Analysis:

While the raw numbers suggest a slightly higher success rate for the PA-3, a McNemar's test was performed to determine if this difference is statistically significant. This test is appropriate for paired nominal data, as each thrower used both putters.

McNemar's test focuses on discordant pairs – those where the putters had different outcomes. The following contingency table was constructed for the combined 22' and 33' putts:

	PA-5 Made	PA-5 Missed
PA-3 Made	2 (b)	2
PA-3 Missed	4 (c)	7

- b: The number of pairs where the PA-3 was made, but the PA-5 was missed.
- c: The number of pairs where the PA-3 was missed, but the PA-5 was made.

The McNemar's test statistic is calculated as:

$\chi^2 = (|b - c| - 1)^2 / (b + c)$

$\chi^2 = (|2 - 4| - 1)^2 / (2 + 4)$ $\chi^2 = (|-2| - 1)^2 / 6$ $\chi^2 = (2 - 1)^2 / 6$ $\chi^2 = 1/6$ $\chi^2 \approx 0.167$

With 1 degree of freedom, this test statistic yields a high p-value (well above 0.05).

Interpretation:

The results show a slightly higher overall success rate for the more stable PA-3 putter. However, this difference is not statistically significant ($p > 0.05$). This means that, based on this experiment, we cannot confidently conclude that the PA-3 is a superior putter in terms of accuracy at circle 1 distances.

Comparison:

While the PA-3 showed a marginally higher overall percentage, the differences are minimal. At 11 feet, both putters performed identically. The PA-5 showed a slightly better performance at 22 feet, while the PA-3 appeared to perform better at 33 feet, though these observed differences are not statistically significant.

Conclusion:

This experiment, conducted in 32-degree Fahrenheit temperatures with no significant wind and with 6-minute breaks between test sets, did not provide sufficient evidence to demonstrate a significant difference in putting accuracy between the Prodigy PA-3 and PA-5 putters within circle 1. While the PA-3 showed a marginally higher overall make percentage, statistical analysis indicates this difference could be due to random chance. Further research with a larger sample size and potentially a more controlled experimental design would be needed to draw more definitive conclusions. It's also important to note that individual putting styles and preferences can significantly influence putter performance, and this experiment did not account for those individual variations.