**Analyzing Difference in Run Times in Women’s World Cup GS**

In World Cup Giant Slalom (GS), there are two runs. Only the thirty fastest racers from the first run take a second run. If a racer is disqualified (DSQ) or did not finish (DNF) their first run, they do not take a second run. The order for the first run is determined by taking all racers and ordering them by their World Cup points, from highest to lowest. From that, the top 30 racers are put into three groups. The best seven racers are randomly assigning them a bib 1-7. The next eight best competitors are randomly assigned a bib 8-15. The next best 15 racers are randomly assigned a bib 16-30. The remaining racers go in descending order of points. For the second run, competitors race in reverse order of their results on the first run, so the 30th fastest racer on the first run goes 1st on the second run and so on. This data set includes data from only the top thirty finishers as any racers who placed higher than 30th do not take a second run. In this worksheet, you will be tasked with finding summary statistics and a confidence interval, perform a t-test, and interpret your findings.

1. Read in Tremblant1.csv.
2. Find the mean and standard deviation of the difference between Run1\_Time and Run2\_Time.

Mean = -0.9003704

Standard deviation = 0.7064455

1. Find a 95% CI for difference in mean run times and give an interpretation of this interval. (If computing by hand, use n = 27 as three racers DNF Run 2).

By hand:

ME = 2.052 x ($\frac{.7064455}{\sqrt{27}}$) = .2789807

Upper bound: -0.9003704 + .2789807 = -0.621

Lower bound: -0.9003704 - .2789807 = -1.179

With technology:

95% CI: (-1.1798309, -0.6209098)

Interpretation:

We are 95% confident that the run time for Run 2 is somewhere between 1.18 seconds and 0.62 seconds faster than the run time for Run 1.

1. Perform a test for difference in means. State hypotheses, test statistic, degrees of freedom, p-value, and an informative conclusion.

Hypotheses:

$H\_{0}$ : $μ\_{1}= μ\_{2}$

$H\_{a}$: $μ\_{1} \ne μ\_{2}$

t = -6.6225

df = 26

p-value = 5.04 x $10^{-7}$

Decision: Reject $H\_{0}$

Conclusion: We have convincing evidence to show that the mean run time for Run 2 is significantly faster than the mean run time for Run 1.

1. How do your findings in questions 3 and 4 relate?

The 95% CI does not include 0, and the t-test provided evidence to reject $H\_{0}$.