**Ski to Sea: Which sport leg is most important?**

The Ski to Sea race is a multi-sport relay race held annually in Whatcom County, Washington. The race consists of seven legs: cross-country skiing, downhill skiing or snowboarding, running, road biking, canoeing, mountain biking, and kayaking, with each leg representing a different outdoor sport. A team will consist of one person for each leg of the race, except for the canoe leg which has two paddlers per canoe. Racers are allowed to compete in multiple legs of the race. A team must have a minimum of three racers and a maximum of eight, with a maximum of three legs per individual. The canoe leg must have two participants regardless of the number or racers per team. The Ski to Sea Race does not allow individuals to complete all legs of the race.

Data: ***Ski\_To\_Sea\_Data.csv***

1. Overall, which leg of the race shows the strongest positive correlation with the canoeing leg?

The road biking leg shows the strongest positive correlation with the canoeing leg, with a correlation coefficient of 0.428.

1. Between which leg and overall completion time is the correlation the strongest? Report the correlation.

The kayak leg shows the strongest correlation with the overall completion time, with a correlation coefficient of 0.464. This suggests that teams that perform well in the kayak leg tend to have better overall completion times.

1. Also, between which two legs is the correlation the weakest? Report the correlation.

The correlation between the running leg and the cross-country skiing leg is the weakest, with a correlation coefficient of 0.034.

1. Write a brief interpretation of the correlation between the strongest and weakest leg of the race and the overall completion time.

The kayak leg shows the strongest correlation with the overall competition time, with a correlation coefficient of 0.464. If a team wants to focus on improving their overall time, they should prioritize the kayak leg of the race. The running leg shows the weakest correlation with overall competition time at 0.015. This may indicate that it is easy for teams to succeed in the running leg and harder to find talent for the other legs.

1. In general, what is a better indicator of a team's success in the Ski to Sea race, their performance in the running legs or the biking legs? Why do you think this?

Performance in the biking legs (both road biking and cross country biking) appears to be a better indicator of a team's success in the Ski to Sea race, as these legs show stronger correlations with the overall completion time compared to the running legs. This suggests that teams that perform well in the biking legs tend to have better overall completion times.

1. How do the correlation matrices from 2009 and 2019 compare? Which race leg demonstrates the strongest correlation with the overall finish time in each of these years?

In 2009, the kayak leg displayed the strongest correlation with r = 0.794, while in 2019, the road bike leg exhibited the strongest correlation with r = -0.347.