

TO: John Doe, Head Trainer, U.S. Cycling Team

FROM: XXX

DATE: July 20, 2020

SUBJECT: Recommending the Regular Consumption of Dark Chocolate for Cyclists

Background:

I am tasked with interpreting the results of a study that involves chocolate consumption of cyclists as well as advising you whether or not the chocolate should be included in the cyclists' diet. Based on the results, **I recommend you considering dark chocolate inclusion given that it improves all-out sprint performance.**

This experiment adopts a randomized crossover design. In other words, each participant receives the dark chocolate versus white chocolate treatments during the different two-week time periods. **A crossover design is more efficient than a parallel one because fewer cyclists are required in the experiment. Moreover, each cyclist serves as his/her own matched control. This will reduce the potential imbalances of some covariates.**

Now I will proceed to the interpretation of the results:

Interpretation:

(1) Dark Chocolate vs. Baseline Case:

With 95% confidence, we can conclude from this experiment that at the population level, the mean difference of all-out sprint performance between cyclists who consume dark chocolate and those who do not consume any kind of chocolate is between 165m and 314m. In fact, we can be even 99% confident about this conclusion.

(2) White Chocolate vs. Baseline Case:

We cannot tell that at the population level, there is a mean difference of all-out sprint performance between cyclists who consume white chocolate and those who do not consume any kind of chocolate. In plain words, the study suggests that consuming white chocolate has no effect on sprint performance, statistically speaking.

(3) Dark Chocolate vs. White Chocolate:

With 95% confidence, we can conclude from this experiment that at the population level, the mean difference of all-out sprint performance between cyclists who consume dark chocolate and those who consume white chocolate is between 82m and 292m. In fact, we can be even 99% confident. This result suggests that the consumption of dark chocolate improves the cyclists' performance more greatly.

Recommendation:

According to the results of the study, I recommend the team including dark chocolate in the athlete's diet given that it improves the cyclists' sprint performance significantly. On the other hand, I remain neutral to the inclusion of white chocolate since it has no statistical effect on the players' performance.

Reference:

Patel, R. K.; Brouner, J.; Spendiff, O. *Journal of the International Society of Sports Nutrition*. 2015 12:47.