

1. The full F-test can tell researchers which groups differ with respect to the mean of a continuous response.

True

False

2. The hypotheses specified in post hoc comparisons are specified before looking at the data.

True

False

3. Post hoc comparisons performed without adjusting for type I error rates is a form of data dredging.

True

False

4. Markus is conducting a study on the effect of eating dark chocolate on health. In the study, Markus recruits $n = 24$ individuals, and splits them into three groups:

1. A control group that eats no dark chocolate.
2. A group that eats one ounce of dark chocolate per day for six weeks.
3. A group that eats one ounce of dark chocolate per day for six weeks and performs at least 30 minutes of exercise four times per week.

Markus and his team measured 10 different health markers, including blood pressure, blood sugar, and body fat percentage, before and after the six week period. The data analysis showed that blood sugar levels were lower in the dark chocolate (no exercise) group.

Which of the following would help avoid data dredging:

If hypotheses about the relationships between dark chocolate and health markers cannot be specified before conducting the study, then, to achieve an overall false positive rate of 5%, the team should set the familywise type I error rate to 5%, and adjust individual hypothesis test type I error rates accordingly.

Neither pre-specifying hypotheses nor type I error rate adjustments will help in this case.

Specify any hypotheses about the relationships between dark chocolate and health markers before conducting the study.

If hypotheses about the relationships between dark chocolate and health markers cannot be specified before conducting the study, then, to achieve an overall false positive rate of 5%, the team should set the individual hypothesis type I error rate to 5%.

5. Markus is conducting a study on the effect of eating dark chocolate on health. In the study, Markus recruits $n = 24$ individuals, and splits them into three groups:

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Suppose that 10 tests relating each of the health markers to dark chocolate consumption (group 2 above) are independent of one another, and each have a significance level of $\alpha = 0.1$. What is the probability of *at least one* of these tests to be yield a false positive?

0.4012631

0.3486784

0.5987369

0.6513216