

Case 1

1. Nur is investigating the hypothesis, “*Students who write exam in the morning have better scores on the exam than students who write exam in the afternoon.*”
2. Nur uses a **between-groups design**, selects exam time (morning, afternoon) as the IV and exam score (in points) as the DV. She controls for the extraneous variables.
3. She recruits 15 students per condition (30 students in total).
4. She runs the experiment and collects the data
5. Statistical analysis shows the following:

(Unpaired) *t*-test showed that the exam time (morning, afternoon) had a significant effect on the exam score, $t(28) = 5.3$, $p = 0.31$.

Students writing exam in the morning ($M = 80.2$ points 95% CI [69.5, 90.9]) have better scores than those who write exam in the afternoon ($M = 70.5$ points 95% CI [65.5, 75.5]). Difference between means is 9.7 points.

Case 2

1. Simon is investigating the hypothesis, “*Students who eat yogurt before the exam have better scores on the exam than students who eat snickers and students who eat banana.*”
2. Simon uses a **between-groups design**, selects food (yogurt, snickers, banana) as the IV and exam score (in points) as the DV. He controls for the extraneous variables.
3. He recruits 20 students per condition (60 students in total).
4. He runs the experiment and collects the data
5. Statistical analysis shows the following:

(Unpaired) *t*-test showed that the food (yogurt, snickers, banana) had a significant effect on the exam score, $t(58) = 17.3$, $p = 0.002$.

Students who ate yogurt before the exam (M = 75.89 points 95% CI [69.87, 81.91]) have better scores than those who ate snickers (M = 52.47 points 95% CI [47.58, 57.36]) and those who ate banana (M = 62.55 95% CI [57.5, 67.6]).

Overall difference between means is 23.42 points.

Case 3

1. Jan-Peter is investigating the hypothesis, *“Students who listen to music before the exam have better scores on the exam than students who do not listen to music”*
2. Jan-Peter uses a **within-groups design**, selects preparation (music, no music) as the IV and exam score (in points) as the DV. He controls for the extraneous variables.
3. He recruits 20 students.
4. He runs the experiment and collects the data
5. Statistical analysis shows the following:

One-way ANOVA showed that the preparation (music, no music) had a significant effect on the exam score, $F(2, 20) = 10.3, p = 0.04$.

Students who listened to music before the exam ($M = 75.89$ points 95% CI [69.87, 81.91]) have better scores than those who did not listen to music ($M = 62.55$ 95% CI [57.5, 67.6]).

Difference between means is 13.34 points.