C*. Comprehend the following case:

A biologist conducted a study to assess the effects of a particular medication on managing the symptom of a particular viral infection in lab rats. She administered the medication to an experimental group of infected rats and a placebo to a control group of infected rats. She then tested the both groups that produced interval scores reflecting the degree of symptoms of the disease the rats exhibited. Let E = the string of scores from the experimental group and C = the string of scores from the control group. She then employed an F-test of the following null hypothesis:

$$H_o : \mu_E = \mu_C$$

Because the F value was such that $p > 0.05$, the researcher did not reject H_o.

Examine each of the following propositions to determine its true value; indicate your choice by circling either "T" or "F" and then write a paragraph defending you choice:

i. The results of the F-test indicated that the difference in the two means is not statistically significant.

(T) F

Sample explanation:

This is true. Since the researcher determined that to reject the null hypothesis of $\mu_E = \mu_C$, p should be less than 0.05, the results of the F-test indicated that the difference in the two means is not statistically significant. Failing to reject a null-hypothesis means that the statistical results are not significant. That is not to say that $\mu_E = \mu_C$, but rather it says that we do not have evidence whether or not $\mu_E = \mu_C$.

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ii. The results of the *F*-test indicated that it is unlikely that the null hypothesis is true.

T (F)

Sample explanation:

This is false. With $p > 0.05$, we only can conclude that the difference between the sample means (i.e., $\left|\overline{E} - \overline{C}\right|$) being attributable to sampling error is greater than 0.05 and, thus, not *extremely* low. But it doesn't mean that $\mu_E = \mu_C$ is highly unlikely. By setting 0.05 as her significance level rather than a higher number (e.g., 0.40), the researcher is conservatively trying to avoid Type I error. So the results are inconclusive w/r to $|\ \mu_E - \mu_C\ |$.

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iii. The results of the *F*-test suggests that there was hardly any difference in the effects of the experimental medication and the placebo on the scores.

T (F)

Sample explanation:

This is false. Once again, the statistically significant results are inconclusive. The researcher shouldn't draw conclusions about the effects of the treatment from a statistically insignificant results.

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iv. The results of the *F*-test indicated that $\left|\overline{E} - \overline{C}\right|$ is too near 0 to justify rejecting H_o

(T) F

Sample explanation:

This is true. With $p > 0.05$, we only can conclude that the difference between the sample means (i.e., $\left|\overline{E} - \overline{C}\right|$) being attributable to sampling error is greater than 0.05 and, thus, not *extremely* low. But remember that failing to reject H_o is not accepting H_o.

D*. Comprehend the following case:

A biologist conducted a study to assess the effects of a particular medication on managing the symptom of a particular viral infection in lab rats. She administered the medication to an experimental group of infected rats and a placebo to a control group of infected rats. She then tested the both groups that produced interval scores reflecting the degree of symptoms of the disease the rats exhibited. Let E = the string of scores from the experimental group and C = the string of scores from the control group. She then employed an F-test of the following null hypothesis:

$$H_o : \mu_E = \mu_C$$

Because the F value was such that $p < 0.05$, the researcher rejected H_o.

Examine each of the following propositions to determine its true value; indicate your choice by circling either "T" or "F" and then write a paragraph defending you choice:

i. The results of the F-test indicated that the difference in the two means is statistically significant.

(T) F

Sample explanation:

This is true. Since the researcher determined that to reject the null hypothesis of $\mu_E = \mu_C$ that p should be less than 0.05, the results of the F-test indicated that the difference in the two sample means is statistically significant. Rejecting a null-hypothesis means that the statistical results are significant. That is not to say that it is certain that $\mu_E \neq \mu_C$, but it is highly unlikely that only sampling error explains why $\left|\overline{E} - \overline{C}\right|$ is as great as it is.

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ii. The results of the *F*-test indicated that it is unlikely that the null hypothesis is true.

(T) F

Sample explanation:

This is true. Since the researcher determined that to reject the null hypothesis of $\mu_E = \mu_C$ that *p* should be less than 0.05, the results of the *F*-test indicated that the difference in the two sample means would occur in less than 5% of the random samples when $\mu_E = \mu_C$.

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iii. The results of the *F*-test suggests that there was a difference in the effects of the experimental medication and the placebo on the scores.

(T) F

Sample explanation:

This is true assuming that the experiments were conducted accurately. We need to be careful, but is unlikely that $\left|\overline{E} - \overline{C}\right|$ was caused only by random sampling error. Thus, the researcher surmises that other factors must have come into play. If all other conditions were controlled, then it is reasonable to conclude that the treatment must have contributed to the difference.

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iv. The results of the *F*-test indicated that the deviation of $\left|\overline{E} - \overline{C}\right|$ from 0 is unlikely to be solely a function of sampling error.

(T) F

Sample explanation:

This is true. Please my previous explanation.
