Test Bank

# Chapter 9: Related samples *t* tests

## Multiple Choice

1. A sports psychologist wants to know if weight training leads to more positive mood. To assess the effects of weight training on mood, she obtained a sample of 10 people who had never weight trained and measured their mood. She then instructed them in proper weight training techniques and had them follow a training program for one month. At the end of the month the participants’ mood was measured again. The mood scale was scored such that higher numbers indicate more positive mood. *Which of the following is NOT an assumption for this related samples t-test?* The data are as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| Participant | Prior to Weight Training | After Weight Training | D (after – prior) |
| 1 | 5 | 7 |  |
| 2 | 4 | 6 |  |
| 3 | 3 | 6 |  |
| 4 | 2 | 1 |  |
| 5 | 5 | 6 |  |
| 6 | 6 | 7 |  |
| 7 | 7 | 7 |  |
| 8 | 6 | 5 |  |
| 9 | 2 | 4 |  |
| 10 | 6 | 6 |  |

A. normality

B. homogeneity of variance

C. appropriate measurement of the IV and the DV

D. independence

Ans: B

Learning Objective: Assumptions

2. A sports psychologist wants to know if weight training leads to more positive mood. To assess the effects of weight training on mood, she obtained a sample of 10 people who had never weight trained and measured their mood. She then instructed them in proper weight training techniques and had them follow a training program for one month. At the end of the month the participants’ mood was measured again. The mood scale was scored such that higher numbers indicate more positive mood. What are the *one-tailed* null hypotheses for this statistical analysis?

A. Participants will NOT report less positive mood after weight training than prior to weight training.

B. Participants will NOT report more positive mood after weight training than prior to weight training.

C. Participants will report less positive mood after weight training than prior to weight training.

D. Participants will report more positive mood after weight training than prior to weight training.

Ans: B

Learning Objective: Null Hypotheses

3. A sprts psychologist wants to know if weight training leads to more positive mood. To assess the effects of weight training on mood, she obtained a sample of 10 people who had never weight trained and measured their mood. She then instructed them in proper weight training techniques and had them follow a training program for one month. At the end of the month the participants’ mood was measured again. The mood scale was scored such that higher numbers indicate more positive mood. What are the *one-tailed* research hypotheses for this statistical analysis?

A. Participants will NOT report less positive mood after weight training than prior to weight training.

B. Participants will NOT report more positive mood after weight training than prior to weight training.

C. Participants will report less positive mood after weight training than prior to weight training.

D. Participants will report more positive mood after weight training than prior to weight training.

Ans: D

Learning Objective: Research Hypothesis

4. A sports psychologist wants to know if weight training leads to more positive mood. To assess the effects of weight training on mood, she obtained a sample of 10 people who had never weight trained and measured their mood. She then instructed them in proper weight training techniques and had them follow a training program for one month. At the end of the month the participants’ mood was measured again. The mood scale was scored such that higher numbers indicate more positive mood. What are the *one-tailed* null hypotheses for this statistical analysis? Difference scores will be computed as After–Before.

A. µD ≠ 0

B. µD > 0

C. µD ≤ 0

D. µD = 0

E. µD ≥ 0

F. µD < 0

Ans: C

Learning Objective: Null hypothesis

5. A sports psychologist wants to know if weight training leads to more positive mood. To assess the effects of weight training on mood, she obtained a sample of 10 people who had never weight trained and measured their mood. She then instructed them in proper weight training techniques and had them follow a training program for one month. At the end of the month the participants’ mood was measured again. The mood scale was scored such that higher numbers indicate more positive mood. What are the *one-tailed* research hypotheses for this statistical analysis? Difference scores will be computed as After–Before.

A. µD ≠ 0

B. µD > 0

C. µD ≤ 0

D. µD = 0

E. µD ≥ 0

F. µD < 0

Ans: B

Learning Objective: Research hypothesis

6. A sports psychologist wants to know if weight training leads to more positive mood. To assess the effects of weight training on mood, she obtained a sample of 10 people who had never weight trained and measured their mood. She then instructed them in proper weight training techniques and had them follow a training program for one month. At the end of the month the participants’ mood was measured again. The mood scale was scored such that higher numbers indicate more positive mood. The research did a *one-tailed* significance test. Difference scores will be computed as After–Before. Locate the critical region (α = .05)

A. reject H0 if *t* > 1.8331

B. reject H0 if *t* < 1.8331

C. reject H0 if *t* > 1.8331 or *t* < −1.8331

D. reject H0 if *t* > −1.8331

Ans: A

Learning Objective: Critical region

7. A sports psychologist wants to know if weight training leads to more positive mood. To assess the effects of weight training on mood, she obtained a sample of 10 people who had never weight trained and measured their mood. She then instructed them in proper weight training techniques and had them follow a training program for one month. At the end of the month the participants’ mood was measured again. The mood scale was scored such that higher numbers indicate more positive mood. Compute the repeated measures *t*-test. D is computed after—prior. The data are as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| Participant | Prior to Weight Training | After Weight Training | D (after—prior) |
| 1 | 5 | 7 |  |
| 2 | 4 | 6 |  |
| 3 | 3 | 6 |  |
| 4 | 2 | 1 |  |
| 5 | 5 | 6 |  |
| 6 | 6 | 7 |  |
| 7 | 7 | 7 |  |
| 8 | 6 | 5 |  |
| 9 | 2 | 4 |  |
| 10 | 6 | 6 |  |

A. 0.66

B. 2.08

C. 0.43

D. 1.83

Ans: B

Learning Objective: Compute test statistic

8. A sports psychologist wants to know if weight training leads to more positive mood. To assess the effects of weight training on mood, she obtained a sample of 10 people who had never weight trained and measured their mood. She then instructed them in proper weight training techniques and had them follow a training program for one month. At the end of the month the participants’ mood was measured again. The mood scale was scored such that higher numbers indicate more positive mood. D is computed after—prior. Should you reject or fail to reject the null hypothesis?

A. reject

B. fail to reject

Ans: A

Learning Objective: Rejecting null

9. A sports psychologist wants to know if weight training leads to more positive mood. To assess the effects of weight training on mood, she obtained a sample of 10 people who had never weight trained and measured their mood. She then instructed them in proper weight training techniques and had them follow a training program for one month. At the end of the month the participants’ mood was measured again. The mood scale was scored such that higher numbers indicate more positive mood. D is computed after—prior. Compute the effect size for this study.

A. 0.66

B. 2.08

C. 0.43

D. 1.83

Ans: A

Learning Objective: Compute effect size

10. A sports psychologist wants to know if weight training leads to more positive mood. To assess the effects of weight training on mood, she obtained a sample of 10 people who had never weight trained and measured their mood. She then instructed them in proper weight training techniques and had them follow a training program for one month. At the end of the month the participants’ mood was measured again. The mood scale was scored such that higher numbers indicate more positive mood. D is computed after—prior. How large is this effect?

A. small

B. small–medium

C. medium

D. medium–large

E. large

Ans: D

Learning Objective: Interpret effect size

11. A sports psychologist wants to know if weight training leads to more positive mood. To assess the effects of weight training on mood, she obtained a sample of 10 people who had never weight trained and measured their mood. She then instructed them in proper weight training techniques and had them follow a training program for one month. At the end of the month the participants’ mood was measured again. The mood scale was scored such that higher numbers indicate more positive mood. D is computed after—prior. Which of the following is the best summary of the results of this study.

A. Participants reported a significantly more positive mood after weight training than before weight training.

B. Participants reported a significantly less positive mood after weight training than before weight training.

C. there was no significant difference between the moods prior to weight training and the moods after weight training.

Ans: A

Learning Objective: Interpreting results

12. A researcher rejected the null hypothesis for a one-tailed repeated *t*-test. The specific results were *t*(9) = 2.08, *p* = .03. The α value for the significance test was .05. What is the probability that this researcher made a Type I error?

A. 0

B. .05

C. .03

D. .01

Ans: B

Learning Objective: Type I error

13. A researcher *failed to rejected the null hypothesis* for a one-tailed repeated *t*-test. The specific results were *t*(99) = .08, *p* = .90. The α value for the significance test was .05. What is the probability that this researcher made a Type I error?

A. 0

B. .05

C. .03

D. .01

Ans: A

Learning Objective: Type I error

14. After reading an article about the benefits of acupuncture, a researcher decides to conduct an experiment to determine if acupuncture has an effect on back pain. The researcher recruits 11 people with chronic back pain to participate in a study. Each participant rates his or her back pain prior to the acupuncture and following the acupuncture. Ratings are made on a 10-point scale with higher numbers indicating greater back pain. The SPSS output is below. The 99% confidence interval around the mean difference is provided in the output. Which of the following statements is the best interpretation of this confidence interval?

A. We can be 99% confident that the sample mean difference is between 0.13 and 2.59

B. We can be 99% confident that the true population mean difference is between 0.13 and 2.59

C. We can be 99% confident that 99% of the sample mean differences are between 0.13 and 2.59

D. We can be 99% confident that the researcher will correctly reject the null

Ans: B

Learning Objective: Interpreting CIs

15. The researcher originally requested a 99% confidence interval around the mean difference, but later decided that she wanted a 95% confidence interval. Use the provided SPSS output below to compute the 95% confidence interval around the mean difference.



A. 0.97, 1.75

B. 0.5, 2.22

C. 0.08, 2.64

D. 0.13, 2.6

Ans: B

Learning Objective: Computing CI

16. After reading an article about the benefits of acupuncture, a researcher decides to conduct an experiment to determine if acupuncture has an effect on back pain. The researcher recruits 11 people with chronic back pain to participate in a study. Each participant rates his or her back pain prior to the acupuncture and following the acupuncture. Ratings are made on a 10-point scale with higher numbers indicating greater back pain. The SPSS output is below. Choose the correct APA style summary for this study.



A. Participants reported significantly less back pain after receiving acupuncture (*M* = 7.00, *SD* = 1.41) than before receiving acupuncture (*M* = 8.36, *SD* = 1.21), *t*(10) = 3.52, *p* < .05, two tailed, *d* = 1.05

B. Participants did not report significantly less back pain after receiving acupuncture (*M* = 7.00, *SD* = 1.41) than before receiving acupuncture (*M* = 8.36, *SD* = 1.21), *t*(10) = 3.52, *p* < .05, two tailed, *d* = 1.05

C. There was a significant difference in back pain before and after receiving (*M* = 7.00, *SD* = 1.41), *t*(10) = 3.52, *p* < .05, two tailed, *d* = 1.05

D. There was *not* a significant difference in back pain before and after receiving (*M* = 7.00, *SD* = 1.41), *t*(10) = 3.52, *p* < .05, two tailed, *d* = 1.05

Ans: A

Learning Objective: Reporting results from SPSS

17. After reading an article about the benefits of acupuncture, a researcher decides to conduct an experiment to determine if acupuncture has an effect on back pain. The researcher recruits 11 people with chronic back pain to participate in a study. Each participant rates his or her back pain prior to the acupuncture and following the acupuncture. Ratings are made on a 10-point scale with higher numbers indicating greater back pain. For the study described above, how much of a difference would you expect between the sample mean and the population mean assuming that the null hypothesis is true?

A. 0

B. 0.05

C. 0.06

D. 0.2

E. 1.65

F. 2.00

Ans: A

Learning Objective: Hypothesis testing logic

18. A cognitive psychologist is conducting a study to determine if a *visual* attention training program influences participants’ ability to detect *auditory* signals. He knows the visual training program increases people’s ability to detect *visual* signals but he is not sure if the same program would also increase people’s ability to detect auditory signals or if attending to the visual signals would detract from people’s ability to detect auditory signals. He obtained a sample of 10 people and first recorded how many auditory signals they detected. Then he gave them the *visual* attention training. After they completed this training, he gave them the auditory signal detection task a second time. Which of the following facts suggests that the appropriate measurement of variables assumption is met?

A. each person took the test individually

B. the difference scores are normally distributed in both conditions.

C. the study clearly defined how the two conditions were different and the DV was measured on an interval/ratios scale.

Ans: C

Learning Objective: Assumptions

19. A cognitive psychologist is conducting a study to determine if a *visual* attention training program influences participants’ ability to detect *auditory* signals. He knows the visual training program increases people’s ability to detect *visual* signals but he is not sure if the same program would also increase people’s ability to detect auditory signals or if attending to the visual signals would detract from people’s ability to detect auditory signals. He obtained a sample of 10 people and first recorded how many auditory signals they detected. Then he gave them the *visual* attention training. After they completed this training, he gave them the auditory signal detection task a second time. Based on the information provided above, does a one or two tailed significance test seem appropriate?

A. one-tailed test

B. two-tailed test

Ans: A

Learning Objective: Hypothesis testing logic

20. A cognitive psychologist is conducting a study to determine if a *visual* attention training program influences participants’ ability to detect *auditory* signals. He knows the visual training program increases people’s ability to detect *visual* signals but he is not sure if the same program would also increase people’s ability to detect auditory signals or if attending to the visual signals would detract from people’s ability to detect auditory signals. He obtained a sample of 10 people and first recorded how many auditory signals they detected. Then he gave them the *visual* attention training. After they completed this training, he gave them the auditory signal detection task a second time. What is the *two-tailed* null hypothesis for this statistical analysis?

A. The number of auditory signals detected will be higher after training.

B. The number of auditory signals detected will not be higher after training.

C. The number of auditory signals detected will be lower after training.

D. The number of auditory signals detected will not be different after training.

E. The number of auditory signals detected will be different after training.

Ans: D

Learning Objective: Two-tailed null hypothesis

21. A cognitive psychologist is conducting a study to determine if a *visual* attention training program influences participants’ ability to detect *auditory* signals. He knows the visual training program increases people’s ability to detect *visual* signals but he is not sure if the same program would also increase people’s ability to detect auditory signals or if attending to the visual signals would detract from people’s ability to detect auditory signals. He obtained a sample of 10 people and first recorded how many auditory signals they detected. Then he gave them the *visual* attention training. After they completed this training, he gave them the auditory signal detection task a second time. What is the *two-tailed* research hypothesis for this statistical analysis?

A. The number of auditory signals detected will be higher after training.

B. The number of auditory signals detected will not be higher after training.

C. The number of auditory signals detected will be lower after training.

D. The number of auditory signals detected will not be different after training.

E. The number of auditory signals detected will be different after training.

Ans: E

Learning Objective: Two-tailed research hypothesis

22. A cognitive psychologist is conducting a study to determine if a *visual* attention training program influences participants’ ability to detect *auditory* signals. He knows the visual training program increases people’s ability to detect *visual* signals but he is not sure if the same program would also increase people’s ability to detect auditory signals or if attending to the visual signals would detract from people’s ability to detect auditory signals. He obtained a sample of 10 people and first recorded how many auditory signals they detected. Then he gave them the *visual* attention training. After they completed this training, he gave them the auditory signal detection task a second time. Compute the *df* and locate the critical value. Use an α of .05, two tailed.

A. 2.0860

B. 2.8453

C. 2.2622

D. 3.2498

E. 3.1693

F. 2.2281

Ans: C

Learning Objective: Critical region

23. A cognitive psychologist is conducting a study to determine if a *visual* attention training program influences participants’ ability to detect *auditory* signals. He knows the visual training program increases people’s ability to detect *visual* signals but he is not sure if the same program would also increase people’s ability to detect auditory signals or if attending to the visual signals would detract from people’s ability to detect auditory signals. He obtained a sample of 10 people and first recorded how many auditory signals they detected. Then he gave them the *visual* attention training. After they completed this training, he gave them the auditory signal detection task a second time. The data for this study are below. Compute the repeated measures *t*-test.

|  |  |
| --- | --- |
| Before Visual Attention Training | After Visual Attention Training |
| 4 | 4 |
| 3 | 2 |
| 5 | 4 |
| 7 | 7 |
| 5 | 5 |
| 6 | 5 |
| 7 | 6 |
| 2 | 2 |
| 4 | 5 |
| 4 | 3 |

A. 1.39

B. 0.29

C. 2.58

D. 0.22

E. 0.57

F. 1.81

G. 4.40

Ans: F

Learning Objective: Computing test statistic

24. A cognitive psychologist is conducting a study to determine if a *visual* attention training program influences participants’ ability to detect *auditory* signals. He knows the visual training program increases people’s ability to detect *visual* signals but he is not sure if the same program would also increase people’s ability to detect auditory signals or if attending to the visual signals would detract from people’s ability to detect auditory signals. He obtained a sample of 10 people and first recorded how many auditory signals they detected. Then he gave them the *visual* attention training. After they completed this training, he gave them the auditory signal detection task a second time. The data for this study are below. Compute the effect size of this study.

|  |  |
| --- | --- |
| Before Visual Attention Training | After Visual Attention Training |
| 4 | 4 |
| 3 | 2 |
| 5 | 4 |
| 7 | 7 |
| 5 | 5 |
| 6 | 5 |
| 7 | 6 |
| 2 | 2 |
| 4 | 5 |
| 4 | 3 |

A. 1.39

B. 0.29

C. 2.58

D. 0.22

E. 0.57

F. 1.81

G. 4.40

Ans: E

Learning Objective: Computing effect size

25. A cognitive psychologist is conducting a study to determine if a *visual* attention training program influences participants’ ability to detect *auditory* signals. He knows the visual training program increases people’s ability to detect *visual* signals but he is not sure if the same program would also increase people’s ability to detect auditory signals or if attending to the visual signals would detract from people’s ability to detect auditory signals. He obtained a sample of 10 people and first recorded how many auditory signals they detected. Then, he gave them the *visual* attention training. After they completed this training, he gave them the auditory signal detection task a second time. The data for this study are below. The researchers in this study should:

|  |  |
| --- | --- |
| Before Visual Attention Training | After Visual Attention Training |
| 4 | 4 |
| 3 | 2 |
| 5 | 4 |
| 7 | 7 |
| 5 | 5 |
| 6 | 5 |
| 7 | 6 |
| 2 | 2 |
| 4 | 5 |
| 4 | 3 |

A. reject the null hypothesis

B. fail to reject the null hypothesis

Ans: B

Learning Objective: Rejecting null hypothesis

26. A cognitive psychologist is conducting a study to determine if a *visual* attention training program influences participants’ ability to detect *auditory* signals. He knows the visual training program increases people’s ability to detect *visual* signals but he is not sure if the same program would also increase people’s ability to detect auditory signals or if attending to the visual signals would detract from people’s ability to detect auditory signals. He obtained a sample of 10 people and first recorded how many auditory signals they detected. Then he gave them the *visual* attention training. After they completed this training, he gave them the auditory signal detection task a second time. The data for this study are below. Which of the following is the best summary of the results?

|  |  |
| --- | --- |
| Before Visual Attention Training | After Visual Attention Training |
| 4 | 4 |
| 3 | 2 |
| 5 | 4 |
| 7 | 7 |
| 5 | 5 |
| 6 | 5 |
| 7 | 6 |
| 2 | 2 |
| 4 | 5 |
| 4 | 3 |

A. The number of auditory signals detected after the visual attention training (*M* = x.x, *SD* = x.x) is not significantly different than the number of auditory signals detected before the visual attention training (*M* = x.x, *SD* = x.x), *t*(x) = x.xx, *p* > .05, *d* = .xx, two tailed.

B. The number of auditory signals detected after the visual attention training (*M* = x.x, *SD* = x.x) is significantly different than the number of auditory signals detected before the visual attention training (*M* = x.x, *SD* = x.x), *t*(x) = x.xx, *p* > .05, *d* = .xx, two tailed.

C. The number of auditory signals detected after the visual attention training (*M* = x.x, *SD* = x.x) is significantly more than the number of auditory signals detected before the visual attention training (*M* = x.x, *SD* = x.x), *t*(x) = x.xx, *p* > .05, *d* = .xx, two tailed.

D. The number of auditory signals detected after the visual attention training (*M* = x.x, *SD* = x.x) is significantly less than the number of auditory signals detected before the visual attention training (*M* = x.x, *SD* = x.x), *t*(x) = x.xx, *p* > .05, *d* = .xx, two tailed.

Ans: A

Learning Objective: Reporting results in APA style

27. A Valpo statistics student conducted a study to determine if the psychological health of Valpo professors changed across the course of a semester. The student had 5 Valpo professors complete a psychological health survey at the beginning of the Spring semester and then again at the end of the Spring semester. The data from this study are below. What is the numerical value for sampling error in this study?

|  |  |  |
| --- | --- | --- |
| Professor | Beginning of Semester | End of Semester |
| 1 | 20 | 18 |
| 2 | 19 | 19 |
| 3 | 18 | 16 |
| 4 | 22 | 20 |
| 5 | 20 | 20 |

A. 1.095

B. 0.4

C. 0.49

D. 4.8

E. 2.45

Ans: C

Learning Objective: Computing expected sampling error

28. A Valpo statistics student conducted a study to determine if the psychological health of Valpo professors changed across the course of a semester. The student had 5 Valpo professors complete a psychological health survey at the beginning of the Spring semester and then again at the end of the Spring semester. The data from this study are below. Locate the critical value of t for this study. Use an α of .05, two tailed.

A. 2.0150

B. 2.5706

C. 2.1318

D. 2.7764

Ans: D

Learning Objective: Critical region

29. A Valpo statistics student conducted a study to determine if the psychological health of Valpo professors changed across the course of a semester. The student had 5 Valpo professors complete a psychological health survey at the beginning of the Spring semester and then again at the end of the Spring semester. The data from this study are below. Compute the repeated measures *t*-test.

|  |  |  |
| --- | --- | --- |
| Professor | Beginning of semester | End of semester |
| 1 | 20 | 18 |
| 2 | 19 | 19 |
| 3 | 18 | 16 |
| 4 | 22 | 20 |
| 5 | 20 | 20 |

A. .49

B. 2.8

C. 2.45

D. 1.095

E. 4.8

Ans: C

Learning Objective: Computing test statistic

30. A Valpo statistics student conducted a study to determine if the psychological health of Valpo professors changed across the course of a semester. The student had 5 Valpo professors complete a psychological health survey at the beginning of the Spring semester and then again at the end of the Spring semester. The data from this study are below. Compute the effect size (d).

|  |  |  |
| --- | --- | --- |
| Professor | Beginning of Semester | End of Semester |
| 1 | 20 | 18 |
| 2 | 19 | 19 |
| 3 | 18 | 16 |
| 4 | 22 | 20 |
| 5 | 20 | 20 |

A. .49

B. 2.

C. 2.45

D. 1.095

E. 4.8

Ans: D

Learning Objective: Computing effect size

31. A Valpo statistics student conducted a study to determine if the psychological health of Valpo professors changed across the course of a semester. The student had 5 Valpo professors complete a psychological health survey at the beginning of the Spring semester and then again at the end of the Spring semester. The data from this study are below. Which of the following is the best one-sentence summary of these results in APA style.

|  |  |  |
| --- | --- | --- |
| Professor | Beginning of Semester | End of Semester |
| 1 | 20 | 18 |
| 2 | 19 | 19 |
| 3 | 18 | 16 |
| 4 | 22 | 20 |
| 5 | 20 | 20 |

A. The psychological health of the Valpo instructors was not significantly different at the beginning of the semester compared to the end of the semester.

B. The psychological health of the Valpo instructors was significantly different at the beginning of the semester compared to the end of the semester.

C. The psychological health of the Valpo instructors was significantly higher at the beginning of the semester compared to the end of the semester.

D. The psychological health of the Valpo instructors was significantly lower at the beginning of the semester compared to the end of the semester.

Ans: A

Learning Objective: Summarizing results

32. When all other factors are the same, which of the following statistical tests typically has the most statistical power?

A. independent samples *t*-test

B. matched samples *t*-test

C. repeated samples *t*-test

Ans: C

Learning Objective: Statistical Power

33. When all other factors are the same, which of the following statistical tests typically has the least sampling error?

A. independent samples *t*-test

B. matched samples *t*-test

C. repeated samples *t*-test

Ans: C

Learning Objective: Comparing research designs

34. Researchers studying long term memories had 54 students study 30 “normal” words. After a 10-min delay period the students tried to recall as many of the 30 words as they could. One week later *the same 54 students* had to study 30 “high imagery” words and again after a 10-min delay period they tried to recall as many of the “high imagery” words as they could. What statistic should the researchers use to compare the mean number of normal and high imagery words that were recalled?

A. z for a sample mean

B. single sample *t*

C. repeated measures *t*

Ans: C

Learning Objective: Choosing test statistic

35. It is hypothesized that children who had survived a brain tumor were more likely to have behavioral and emotional difficulties than were children who had not experienced such trauma. To test this hypothesis, 40 children who all had survived a brain tumor participated in a study. Parents of the children rated their own child’s behavioral difficulties. The mean rating was 10.1 with a standard deviation of 3. This data was compared with the known population ratings from children who had not suffered a brain tumor, which were 8.7 with a standard deviation of 2.8. What statistic should be used to determine if children who have survived a brain tumor are more likely to have behavioral difficulties than children who have not experienced such a trauma?

A. z for a sample mean

B. single sample *t*

C. repeated measures *t*

Ans: A

Learning Objective: Choosing test statistic

36. The HOPE VI Panel Study was created to test a program aimed at improving troubled public housing developments. Residents of 5 housing developments were asked about their quality of life and their answers were scored by trained researchers and then translated into a “quality of life scale”. Lower scores indicated a lower quality of life. These data were then compared the national average on the “quality of life scale” which was µ = 125.6 with a standard deviation of σ = 11.3. What statistic should be used to determine if the quality of life scores for the residents in the housing developments are significantly different from the scores in the general population?

A. z for a sample mean

B. single sample t

C. repeated measures t

Ans: A

Learning Objective: Choosing test statistic

37. Researchers studied the effects of sleep deprivation. Fifty students were assigned to one night of sleep loss (participants were required to call the laboratory every ½ hour all night). The next day the participants came to the laboratory and were given a series of math problems from which they were to choose which ones they wanted to complete for money (more difficult problems, if performed correctly, would be rewarded with more money). The next day these same participants were allowed to get a normal night of sleep. The next day they came back to the laboratory and were again asked to pick math problems to perform for money. What statistic should be used to compare the difficulty of the chosen math problems across the first and second days?

A. z for a sample mean

B. single sample *t*

C. repeated measures *t*

Ans: C

Learning Objective: Choosing test statistic

38. A teacher wants to estimate the amount of attitude change that would occur in a population of high school students if they watched a video on global warming. A higher score indicates a greater acceptance that human actions are at least partially responsible for long term raising temperatures. She measured the attitudes of 36 students, showed them the video and then measured their attitudes again. Use the data below to create a 95% confidence interval for the *mean change* in students’ attitudes.

Mean attitude before watching the video: *M*before = 141;

Mean attitude after watching the video: *M*after = 152;

*SD* of mean attitude change (*SDD*) = 5.5

A. LB = 5.5, UB =16.5

B. LB = 9.45, UB = 12.55

C. LB = 10.08, UB = 11.92

D. LB = 9.14, UB = 12.86

Ans: D

Learning Objective: Computing CI for mean difference

39. A teacher wants to estimate the amount of attitude change that would occur in a population of high school students if they watched a video on global warming. A higher score indicates a greater acceptance that human actions are at least partially responsible for long term raising temperatures. She measured the attitudes of 36 students, showed them the video and then measured their attitudes again. Use the data below to create a 95% confidence interval for the *mean change* in students’ attitudes.

Mean attitude before watching the video: *M*before = 141;

Mean attitude after watching the video: *M*after = 152;

*SD* of mean attitude change (*SDD*) = 5.5

Which of the following is a correct interpretation of this confidence interval?

A. The mean change in the population is likely to be between the upper and lower bounds.

B. The mean change in the sample is likely to be between the upper and lower bounds.

C. If the study were repeated 100 times, the mean change would be between the upper and lower bounds 95 times.

D. The mean attitude after watching the video is likely to be lower than the lower bound and the mean attitude after watching the video is likely to be higher than the upper bound.

Ans: A

Learning Objective: Interpreting CI

40. A clinical psychologist wants to determine if anxiety scores are *lower* after 10 group therapy sessions than before the sessions. He has a group of 10 clients with anxiety take a standardized test that measures their anxiety before the 10 sessions and then again after the 10 group sessions. Which of the following statements is the best null hypothesis for this study?

A. The group therapy sessions will reduce anxiety scores.

B. The group therapy sessions will not reduce anxiety scores.

C. The group therapy session will have no effect on anxiety scores.

D. The group therapy session will change anxiety scores.

Ans: B

Learning Objective: Null hypothesis

41. A clinical psychologist wants to determine if anxiety scores are *lower* after 10 group therapy sessions than before the sessions. He has a group of 10 clients with anxiety take a standardized test that measures their anxiety before the 10 sessions and then again after the 10 group sessions. Which of the following statements is the best research hypothesis for this study?

A. The group therapy sessions will reduce anxiety scores.

B. The group therapy sessions will not reduce anxiety scores.

C. The group therapy session will have no effect on anxiety scores.

D. The group therapy session will change anxiety scores.

Ans: A

Learning Objective: Research hypothesis

42. A clinical psychologist wants to determine if anxiety scores are *lower* after 10 group therapy sessions than before the sessions. He has a group of 10 clients with anxiety take a standardized test that measures their anxiety before the 10 sessions and then again after the 10 group sessions. What is the critical value for this study? Use an α value = .05, one tailed.

A. 2.2622

B. 2.2010

C. 1.8125

D. 1.8331

Ans: D

Learning Objective: Critical value

43. A clinical psychologist wants to determine if anxiety scores are *lower* after 10 group therapy sessions than before the sessions. He has a group of 10 clients with anxiety take a standardized test that measures their anxiety before the 10 sessions and then again after the 10 group sessions. The data are below. Compute the repeated measures *t*-test. Compute the D as Before–After.

|  |  |
| --- | --- |
| Before Sessions | After Sessions |
| 15 | 10 |
| 13 | 12 |
| 12 | 12 |
| 9 | 8 |
| 15 | 14 |
| 11 | 10 |
| 14 | 13 |
| 10 | 9 |
| 9 | 9 |
| 11 | 11 |

A. 1.84

B. 12.54

C. 2.40

D. .76

Ans: C

Learning Objective: Computing test statistic

44. A clinical psychologist wants to determine if anxiety scores are *lower* after 10 group therapy sessions than before the sessions. He has a group of 10 clients with anxiety take a standardized test that measures their anxiety before the 10 sessions and then again after the 10 group sessions. The data are below. Compute the effect size. Compute the D as Before–After.

|  |  |
| --- | --- |
| Before Sessions | After Sessions |
| 15 | 10 |
| 13 | 12 |
| 12 | 12 |
| 9 | 8 |
| 15 | 14 |
| 11 | 10 |
| 14 | 13 |
| 10 | 9 |
| 9 | 9 |
| 11 | 11 |

A. .33

B. .58

C. .25

D. .76

Ans: D

Learning Objective: Computing effect size

45. A clinical psychologist wants to determine if anxiety scores are *lower* after 10 group therapy sessions than before the sessions. He has a group of 10 clients with anxiety take a standardized test that measures their anxiety before the 10 sessions and then again after the 10 group sessions. The data are below. Compute the 95% CI for the change in anxiety score in the population. Compute the D as Before–After.

|  |  |
| --- | --- |
| Before Sessions | After Sessions |
| 15 | 10 |
| 13 | 12 |
| 12 | 12 |
| 9 | 8 |
| 15 | 14 |
| 11 | 10 |
| 14 | 13 |
| 10 | 9 |
| 9 | 9 |
| 11 | 11 |

A. LB = .77, UB = 1.88

B. LB = .06, UB = 2.14

C. LB = .26, UB = 1.94

D. LB = .48, UB = 2.68

Ans: B

Learning Objective: Computing CI

46. A clinical psychologist wants to determine if anxiety scores are *lower* after 10 group therapy sessions than before the sessions. He has a group of 10 clients with anxiety take a standardized test that measures their anxiety before the 10 sessions and then again after the 10 group sessions. The data are below. Compute the D as Before–After. What statistical procedure should the researcher use to estimate how much 10 group therapy sessions would reduce anxiety in the population of anxious clients?

A. a hypothesis testing

B. an effect size

C. a confidence interval

Ans: C

Learning Objective: Purpose of CIs

47. A clinical psychologist wants to determine if anxiety scores are *lower* after 10 group therapy sessions than before the sessions. He has a group of 10 clients with anxiety take a standardized test that measures their anxiety before the 10 sessions and then again after the 10 group sessions. The data are below. Compute the D as Before–After. What statistical procedure should the researcher use to determine if anxiety scores were significantly lower after the group therapy?

A. a hypothesis testing

B. an effect size

C. a confidence interval

Ans: A

Learning Objective: Purpose of significance testing

48. A clinical psychologist wants to determine if anxiety scores are *lower* after 10 group therapy sessions than before the sessions. He has a group of 10 clients with anxiety take a standardized test that measures their anxiety before the 10 sessions and then again after the 10 group sessions. The data are below. Compute the D as Before–After. What statistical procedure should the researcher use to describe how well group therapy works to reduce anxiety scores?

A. a hypothesis testing

B. an effect size

C. a confidence interval

Ans: B

Learning Objective: Purpose of effect size

49. A clinical psychologist wants to determine if anxiety scores are *lower* after 10 group therapy sessions than before the sessions. He has a group of 10 clients with anxiety take a standardized test that measures their anxiety before the 10 sessions and then again after the 10 group sessions. The data are below. Based on the results of the repeated *t*-test, which of the following statements is the best summary of the results?

|  |  |
| --- | --- |
| Before Sessions | After Sessions |
| 15 | 10 |
| 13 | 12 |
| 12 | 12 |
| 9 | 8 |
| 15 | 14 |
| 11 | 10 |
| 14 | 13 |
| 10 | 9 |
| 9 | 9 |
| 11 | 11 |

A. Group therapy does *not* seem to lower anxiety scores.

B. Group therapy does seem to lower anxiety scores.

C. The difference between anxiety scores before and after the group therapy is probably created by sampling error.

D. There was a significant difference between anxiety scores before and after group therapy sessions.

Ans: B

Learning Objective: Summarizing results

50. A researcher wants to know if voters’ political views (e.g., conservativeness vs. liberalness) changes across time. He asked 100 voters to complete a questionnaire that gave them a political ideology score. Higher scores reflected a more conservative political ideology. Then, he asked the same people to complete the same questionnaire 1 year later. What statistical procedure would you use to determine if political ideology changed?

A. z for a sample mean

B. single sample *t*-test

C. repeated measures *t*-test

D. effect size

Ans: C

Learning Objective: Choosing test statistic