Questions 1 – 5

Cyberbullying is bullying that takes place using electronic technology, such as sending mean text messages or emails, or posting on social networking sites rumors, embarrassing pictures or videos, or creating fake profiles. Cyberbullying messages and images can be posted anonymously and distributed quickly to a very wide audience. It can be difficult or impossible to trace the source, and to delete inappropriate or harassing messages, texts, and pictures after they have been posted or sent. It can happen any time of the day or night and reach a kid even when he or she is alone.

For each of the following statements, determine the type of parameter it is estimating. Note that you can use each alternative more than once, and you do not need to use all of them.

a) one mean
b) one proportion
c) difference of two independent means
d) difference of two independent proportions
e) mean of matched pair differences

1. Cyberbullying typically starts in middle school. The average age for obtaining a mobile phone in the U.S. is 11.6 years old, which is around 6th grade.

2. Teens send, on average, twice as many texts per day as an adult, reducing face-to-face communication skills.

3. 81% of teens say bullying online is easier to get away with.

4. Cyberbullying reporting is on the increase. Six percent of teens reported being cyberbullied in the 2008-2009 school year, but 16% reported it for the 2011-2012 school year.

5. Cyberbullies spend more time online than other teens overall (38.4 hours compared to 26.8 hours).

6. The One Way ANOVA test statistic:
   a) is the same as the p-value
   b) is computed from the p-value
c) is always found on the t table
d) is used to find the p-value
e) is always found on the F table
7. If there is really no difference in the population, the chance of observing data like the one collected is given by:
   a) The null hypothesis
   b) The alternative hypothesis
   c) The test statistic
   d) The p-value
   e) The sampling distribution

Questions 8-19 Are some fats more easily absorbed into food when frying? Four different types of fat were tested for frying the same exact donut recipe, and the grams of fat in each donut was measured. Output for this study appears below. Use it to answer the questions on the following page.

One-way ANOVA: Fat A, Fat B, Fat C, Fat D

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor</td>
<td>3</td>
<td>1869.0</td>
<td>623.0</td>
<td>7.89</td>
<td>0.002</td>
</tr>
<tr>
<td>Error</td>
<td>16</td>
<td>1263.2</td>
<td>79.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>3132.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Individual 95% CIs For Mean Based on Pooled StDev

Level  | N  | Mean | StDev | Individual 95% CIs For Mean Based on Pooled StDev
A      | 5  | 67.400 | 7.987 |
B      | 5  | 86.600 | 7.503 |
C      | 5  | 76.000 | 11.045 |
D      | 5  | 60.800 | 8.585 |

Individual confidence level = 98.87%

Tukey 95% Simultaneous Confidence Intervals
All Fairwise Comparisons

A subtracted from:

<table>
<thead>
<tr>
<th>Lower</th>
<th>Center</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>3.107</td>
<td>19.200</td>
</tr>
<tr>
<td>C</td>
<td>-7.493</td>
<td>8.600</td>
</tr>
<tr>
<td>D</td>
<td>-22.693</td>
<td>-6.600</td>
</tr>
</tbody>
</table>

B subtracted from:

<table>
<thead>
<tr>
<th>Lower</th>
<th>Center</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-26.693</td>
<td>-10.600</td>
</tr>
<tr>
<td>D</td>
<td>-41.893</td>
<td>-25.800</td>
</tr>
</tbody>
</table>

C subtracted from:

<table>
<thead>
<tr>
<th>Lower</th>
<th>Center</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>-31.293</td>
<td>-15.200</td>
</tr>
</tbody>
</table>
8. According to the output, the treatment means for the first and fourth treatments are:
   a) Not significant.
   b) Not significantly different from each zero.
   c) Not significantly different from each other.
   d) Significantly different from each other.
   e) Significantly different from zero.

9. The ANOVA table for this study found that there are:
   a) No significant differences between any of the four fats.
   b) No significant differences between some of the four fats.
   c) Significant differences between all of the four fats.
   d) Significant differences between some of the four fats.
   e) Differences among some fats, but not significant.

10. When comparing the group means to each other, how many comparisons do we make?
    a) 4
    b) 6
    c) 7
    d) 8
    e) 12

11. The Individual CIs for Means on the output have a Family confidence of:
    a) 95%
    b) less than 95%
    c) more than 95%
    d) 100%
    e) impossible to tell

12. The All Pairwise Comparisons procedure on the output have a Family confidence of:
    a) 95%
    b) less than 95%
    c) more than 95%
    d) 100%
    e) impossible to tell

13. When making All Pairwise Comparisons with the Bonferroni method, at the 94% Individual confidence level, we would end up with a Family confidence level of:
    a) 94%
    b) 99%
    c) 76%
    d) 82%
    e) 64%

14. The degrees of freedom we would use to find the value on the t table for Bonferroni would be:
    a) 5
    b) 4
    c) 3
    d) 16
    e) 19

15. If the margin of error for the Bonferroni procedure is 16.42, the results can be summarized as:
    a) D
    b) D
    c) D
    d) D
    e) D

16. Are there any problems with the assumptions necessary for the validity of these statistical analyses?
    a) No – there seems to be no obvious problem with any of the assumptions.
    b) Yes – there is a problem with the assumption of normality.
    c) Yes – there is a problem with the assumption of equal variances.
    d) Yes – there is a problem with the assumption of random samples.
    e) Yes – there is a problem with the assumption of large enough samples.

17. If the researchers compared the taste of the donuts fried in these four types of fat instead of their fat content they would be considering another:
    a) factor
    b) level
    c) response
    d) replication
    e) experimental unit

18. If the researchers measured the fat content not only for donuts but also for apple fritters fried in these four types of fat they would be considering another:
    a) factor
    b) level
    c) response
    d) replication
    e) experimental unit

19. If the researchers added one more type of fat they would be considering another:
    a) factor
    b) level
    c) response
    d) replication
    e) experimental unit
Questions 20 – 22 Data was collected on monthly temperature in Miami and Honolulu for randomly selected months over the past few years. Temperatures were measured in degrees Farenheit. Answer the following questions assuming the groups are numbered in the same order first mentioned in this story.

20. The 95% confidence interval is: (-3.11, 1.42) Interpret. On average:
   a) the monthly temperatures in Miami are between 1.42°F and 3.11°F higher than in Honolulu.
   b) the monthly temperatures in Miami are between 1.42°F and 3.11°F lower than in Honolulu.
   c) the monthly temperatures in Miami are between 3.11°F lower and 1.42°F higher than in Honolulu.
   d) monthly temperature in Miami is higher than in Honolulu 1.42% to 3.11% of the time.
   e) monthly temperature in Miami is lower than in Honolulu 1.42% to 3.11% of the time.

21. If we wanted to know if there is a difference in average monthly temperature in Miami and Honolulu, the sign of the alternative hypothesis should be:
   a) > b) < c) = d) ≠ e) ≈

22. We expect the p-value for the significance test to be:
   a) greater than 0.05.
   b) smaller than 0.05.
   c) equal to 0.05.
   d) greater than the test statistic.
   e) smaller than the test statistic.

23. Family confidence is an important consideration when we have:
   a) more than one group.
   b) more than two groups.
   c) equal sample sizes.
   d) different sample sizes.
   e) equal means for all groups.

Questions 24-25 Blood-thinning drugs such as Coumadin® (warfarin) interfere with vitamin K-dependent clotting factors. Eating too many green leafy vegetables, which are high in vitamin K, can decrease the ability of blood-thinners to prevent clotting. But you don’t have to give up greens altogether - problems arise from suddenly increasing or decreasing intake, as it can alter the effectiveness of the medicine, so eat your greens in consistent amounts.

24. The response variable of interest here is:
   a) Blood thinning drugs
   b) Vitamin K
   c) Clotting
   d) Leafy Greens
   e) Consistency

25. The warning in the story describes:
   a) the effect of blood thinning drugs on clotting
   b) the effect of blood thinning drugs on vitamin K
   c) the effect of vitamin K on clotting
   d) the interaction between blood thinning drugs and vitamin K
   e) the interaction between blood thinning drugs and clotting

26. The margin of error for Bonferroni will be the same for all comparisons in a study if all the ______ are the same.
   a) means b) standard deviations c) sample sizes d) test statistics e) all of the above

\[
me = t \cdot s_p \sqrt{\frac{1}{n_i} + \frac{1}{n_j}}
\]

\( t \cdot s_p \) always same.