Assignment3_JianghongMan

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```
AM_data <- read_excel("angry_moods.xls")
colnames(AM_data) <- c("Gender", "Sports", "Anger_Out", "Anger_In",
                       "Control_Out", "Control_In", "Anger_Expression")
```

Chapter 10

Question 1

If the class is a sample from a population of classes then it is a statistic. If the class is considered the population then it is a parameter.

Question 5

We are confident about the interval contains the parameter. It can also be said that if repeated samples were taken and the 95% confidence interval was computed for each sample, 95% of the intervals would contain the population mean.

Question 10

The experimenter could calculate the confidence interval for the mean blood pressure difference and determine if the lower limit of the interval is at 20 or more.

Question 15

a) sd(m) = sd/nˆ(1/2) = 10/(22ˆ(1/2)) = 2.132, z = 2.576

upper = 60 + 2.576 * 2.132 = 65.49

lower = 60 - 2.576 * 2.132 = 54.5

Thus, the confidence interval will be (54.5, 65.49)

b) df = 21, ci = 99%, t = 2.831

upper = 60 + 2.831 * 2.132 = 66.04

lower = 60 - 2.831 * 2.132 = 53.96

Thus, the confidence interval will be (53.96, 66.04)

Question 20

False

Question 24

```
test_anger_out_gender <-
  t.test(AM_data$Anger_Out ~ AM_data$Gender, data = AM_data, conf.level = 0.99,
         var.equal = TRUE)

test_anger_out_gender
```

```
##
##  Two Sample t-test
##
## data:  AM_data$Anger_Out by AM_data$Gender
## t = 0.80898, df = 76, p-value = 0.4211
## alternative hypothesis: true difference in means is not equal to 0
## 99 percent confidence interval:
##  -1.803310  3.394976
## sample estimates:
## mean in group 1 mean in group 2
##        16.56667        15.77083
```

(-1.803, 3.395)

Question 25

(0.598, 4.986)

The population mean difference is more than 0.

Question 26

(-0.713, -0.414)

Chapter 11

Question 4

a) Echinacea increases or has no effect on the length of colds.

b) There is no relationship between brain size and intelligence.

c) The psychic cannot predict the outcome of a coin flip.

d) Pain relief in the placebo group is greater or equal to pain relief in the drug group.

Question 8

The null hypothesis cannot be proven to be true, p = .2 only provides insufficient evidence that it is false. In other words, a non-significant outcome means that the data do not conclusively demonstrate that the null hypothesis is false.

Question 14

Because this statement is stated in terms of the statistics. A proper null hypothesis should be stated in terms of population parameters.

Question 18

a) .01

b) 0

Question 20

False

Question 21

False

Question 22

True

Question 23

True

Question 24

True

Chapter 12

Question 8

a) As the same participant is observed under two different conditions thus the test would be a correlated paired t-test.

b) t= -1.69, df = 4, p = 0.1663

c) t= -1.69, df = 4, p= 0.1663 / 2 = 0.083

Question 9

Two-tailed test: t = 1.74, p = 0.12

One-tailed: t = 1.74, p = 0.06

The probabilities of independent t-tests are generally bigger than the correlated paired ones. Since the correlated t test controlled for differences between subjects and thus reduced the standard error of the difference between the two means. It can be said the more correlated two variables are, the lower probability the result is.

Question 11

A-B 0.085, Not Significant

A-C 0.043, Significant

A-D 0.0167, Significant

B-C 0.6274, Not Significant

B-D 0.0359, Significant

C-D 0.0513, Not Signant

Question 21

```
test_sports_controlIn <- t.test(AM_data$Control_In ~ AM_data$Sports, data = AM_data, var.equal = TRUE)

test_sports_controlIn
```

```
##
##  Two Sample t-test
##
## data:  AM_data$Control_In by AM_data$Sports
## t = 3.0443, df = 76, p-value = 0.003203
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  1.200155 5.741731
## sample estimates:
## mean in group 1 mean in group 2
##        24.32000        20.84906
```

t = 3.0443, p = 0.003, the difference is statistically significant.

Question 22

```
test_Anger_In_Out <- t.test(AM_data$Anger_In, AM_data$Anger_Out, var.equal = TRUE, paired = TRUE)
test_Anger_In_Out
```

```
##
##  Paired t-test
##
## data:  AM_data$Anger_In and AM_data$Anger_Out
## t = 3.5259, df = 77, p-value = 0.0007146
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  1.088108 3.911892
## sample estimates:
## mean of the differences
##                     2.5
```

t = 3.53, p = .0007, people generally have a higher Anger-In score. The means are dependent.

Chapter 13

Question 5

a) 0.623

First, setting N = 100, pi = 0.5, by testing few times, above 58 can let p below 0.05. Then, by resetting pi to 0.6, we conclude that p becomes 0.623.

b) 0.874

We should repeat the procesure above by setting N = 20 instead 100. Then we calculate the power = 0.1256 this time. Then, 1 - 0.1256 = 0.874