Final Exam – Part 2

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Concerned Coffee Connaisseur

A pretentious coffee snob that you know loves to extol the virtues of blooming coffee grounds when making a cup of coffee. Your friend says that anyone can tell the difference between a bloomed cup of coffee and an unbloomed cup of coffee. To test this, you enlist 20 of your closest coffee drinking friends. For each friend, you make 2 cups of coffee: 1 bloomed and 1 unbloomed, but keep the brewing process identical otherwise. You randomize the order in which the drinker tries the coffee, and ask them for an "enjoyment" score between 1 and 10, including decimals. The data you collect is in the below table, which can be loaded using the code below the table:

```
bloomed <- c(9.2, 8, 9.1, 7.7, 8.1, 7.8, 7, 9.2
             , 8.3, 7, 8.8, 7, 7.4, 8.5, 7.8, 7.1
             , 6.4, 8, 8.4, 7.4)
unbloomed <- c(7.9, 7.9, 7.7, 7.9, 7.7, 7.6, 7.8
               , 7.8, 7.8, 7.9, 7.7, 7.9, 7.8, 7.8
               , 7.8, 7.8, 7.9, 7.8, 7.8, 7.9)

coffee <- data.frame(participantID = 1:20
                     , bloomed = bloomed
                     , unbloomed = unbloomed)
```

a. What test should you use to determine if bloomed coffee is more enjoyable? (Be as specific as possible.)

A **Paired t-test** will be use to determine if bloomed coffee is more enjoyable

b. What are the degrees of freedom of the test statistic associated with (a)?

The degrees of freedom of the test statistic associated with paired t-test is **19**. The Paired t-test is performed in part c of this question.

c. Test whether bloomed coffee enjoyment is higher than unbloomed coffee.

Hypothesis

The H_0 is Null hypothesis and H_A is Alternative hypothesis.

$$H_0: \text{ Bloomed coffee is equally enjoyable as unbloomed coffee}$$
$$\text{vs.}$$
$$H_A: \text{ Bloomed coffee enjoyment is higher than unbloomed coffee}$$

Test Statistic and *p*-value

Preforming the **Paired t-test*:

```
coffee_t_test <- t.test(coffee$bloomed, coffee$unbloomed, paired = TRUE, alternative = "greater")
coffee_t_test
```

```
##
##  Paired t-test
##
## data:  coffee$bloomed and coffee$unbloomed
## t = 0.53213, df = 19, p-value = 0.3004
## alternative hypothesis: true mean difference is greater than 0
## 95 percent confidence interval:
##  -0.2249472        Inf
## sample estimates:
## mean difference
##             0.1
```

Here, we get the test statistic as **0.53213** and p-value as **0.3004**. Also, the degrees of freedom of the test statistic associated with paired t-test is **19**.

Statistical Decision

We **accept** the Null Hypothesis H_0 as p-value is greater than α level of significance.(i.e., p-value > 0.05)

Conclusion

There is enough evidence to support the null hypothesis. Therefore, we conclude that the statement, "Bloomed coffee is equally enjoyable as unbloomed coffee", is accurate.

d. Is your friend a pretentious snob, or might there be something to this whole "blooming" thing?

My friend may be a pretentious snob as the result of the paired t-test suggest that "Bloomed coffee is equally enjoyable as unbloomed coffee".