PSYC 7720 Lab

Lab 12 Activity

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Directions:

A. Download the taste_data.csv. This is a two-factor within subjects design with an additional between subjects factor (similar to a split-plot design). In this simulated data, participants were given 6 fruits that tasted either sweet, sour, or bitter as well as either round or angular in shape. They were then asked to give each fruit a rating between 0 (threatening) and 100 (pleasant). Half the participants completed the task at breakfast time, while the other half completed the task at lunch time.
B. Answer the following questions and save the code you used in an R script.
C. You have until the end of lab to complete.

```
library(tidyverse)

dat <- read_csv('taste_data.csv') %>%
  mutate(Meal_Time)

dvs <- dat %>%
  select(Sweet_Round:Bitter_Angular)

dv_names <- str_split(names(dvs), "_", simplify = TRUE)
colnames(dv_names) <- c("taste", "shape")
```

Questions:

1. To practice, run a one-way multivariate RM ANOVA on taste, ignoring the shape of the fruit.

```
mod1 <- car::Anova(mod = lm(as.matrix(dvs) ~ 1),
                   idata = data.frame(dv_names),
                   idesign = ~ taste,
                   type = 3
)
mod1
```

```
##
## Type III Repeated Measures MANOVA Tests: Pillai test statistic
##             Df test stat approx F num Df den Df    Pr(>F)
## (Intercept)  1   0.99909    20786      1     19 < 2.2e-16 ***
## taste        1   0.40089        6      2     18  0.009944 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

2. Run the more appropriate analysis here, the full two-way multivariate RM ANOVA on taste and shape. Interpret the results of the omnibus test.

```
mod2 <- car::Anova(mod = lm(as.matrix(dvs) ~ 1),
                   idata = data.frame(dv_names),
                   idesign = ~ taste * shape,
                   type = 3
)
mod2
```

```
##
## Type III Repeated Measures MANOVA Tests: Pillai test statistic
##             Df test stat approx F num Df den Df    Pr(>F)
## (Intercept)  1   0.99909  20786.4      1     19 < 2.2e-16 ***
## taste        1   0.40089      6.0      2     18  0.009944 **
## shape        1   0.36049     10.7      1     19  0.004004 **
## taste:shape  1   0.96145    224.5      2     18  1.88e-13 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

- There was a significant *taste* x *shape* two-way interaction, so follow-up tests are necessary to interpet how the effect of *taste* on fruit ratings varies by the *shape* of the fruit. However, the question only asked for interpretation of the omnibus test.

3. Finally, run the same model as question 2 but add the between-subject factor *Meal_Time*. Interpret the results of the omnibus test.

```
mod3 <- car::Anova(mod =
  lm(cbind(Sweet_Round, Sweet_Angular, Sour_Round, Sour_Angular,
           Bitter_Round, Bitter_Angular) ~ Meal_Time, data = dat),
                   idata = data.frame(dv_names),
                   idesign = ~ taste * shape,
                   type = 3
)
mod3
```

```
##
## Type III Repeated Measures MANOVA Tests: Pillai test statistic
##                       Df test stat approx F num Df den Df    Pr(>F)
## (Intercept)            1   0.99818   9857.0      1     18 < 2.2e-16 ***
## Meal_Time              1   0.00562      0.1      1     18   0.75345
## taste                  1   0.40209      5.7      2     17   0.01263 *
## Meal_Time:taste        1   0.08612      0.8      2     17   0.46511
## shape                  1   0.19963      4.5      1     18   0.04827 *
## Meal_Time:shape        1   0.00205      0.0      1     18   0.84982
## taste:shape            1   0.92310    102.0      2     17  3.39e-10 ***
## Meal_Time:taste:shape  1   0.03319      0.3      2     17   0.75061
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

- There was no significant *meal time* x *taste* x *shape* three-way interaction. There was a significant *taste* x *shape* two-way interaction, so follow-up tests are necessary to interpet how the effect of *taste* on fruit ratings varies by the *shape* of the fruit. However, the question only asked for interpretation of the omnibus test.