Putting Units 1-4 Into Practice

[Your Name Here]

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We are going to work through the following situation to put into practice everything that we've covered in Units 1-4. To assist us, I've created this R Markdown document with placeholders for R code and narrative interpretations.

The Context

We've been hired again, this time by the Kenton Food Company. They wish to test four different package designs for a new breakfast cereal. Using a lottery, they have identified twenty stores, all with approximately equal sales volumes and comparable locations, to serve as test sites. Outside of the package design, all twenty stores have agreed to keep other conditions which might impact sales (e.g., price, amount and location of shelf space, special promotions, etc.) at pre-determined fixed states. They have come to us for assistance to ensure that they can find out which design leads to the higher sales (measured in number of cases sold by each store), including whether 3-color printing (Designs A and B) is different from 5-color printing (Designs C and D) and whether including cartoons (Designs A and C) vs. no cartoons (Design B and D) impact sales figures.

What are the Statistical Research Questions?

1. [Write an SRQ]
2. [Write a second SRQ]
3. [Perhaps a third SRQ]
4. [Perhaps a fourth SRQ]
5. [Perhaps a fifth SRQ; add more as needed]

Study Design

With our SRQ in mind, let us design a study which will allow us to answer the SRQ.

Key Elements

- Response: [fill in]
  - Unit of Measure: [fill in]
- Measurement Unit: [fill in]
- Factor: [fill in' fixed or random effect?]
- Experimental Design:
  1) Experimental Units: [fill in]
  2) Treatments: [fill in]
  3) Treatment Assignment Method:
- What kind of design? [fill in]

Study Design Description

[Transform the Key Elements list into a descriptive narrative of how you will conduct the study]

Exploratory Data Analysis

[Your Data Explorations Go Here]

Statistical Inference Methods

[Explain how our study does or does not meet the base requirements of One-way ANOVA.]

Hypotheses

[State your hypotheses here.]

Method

To decide between the hypotheses and answer our research question, we will use [insert method choice here]. To account for multiple comparison problems, we will conceptualize the following testing family(-ies):

- [describe testing family]

Further, we will control the [name] Type I Error Rate, with an overall Type I risk of [value]. We will achieve this by using the [name] method.

Assumptions

[List and discuss the assumptions of your selected method to get to a sampling distribution]

Results

[Write Up your results]

Discussion

[Discuss the implications of the results section in the context of the study. What will you tell the client?]

Code Appendix

```
# Setting Document Options
knitr::opts_chunk$set(
  echo = FALSE,
  warning = FALSE,
  message = FALSE,
  fig.align = "center"
)

# Add additional packages by name to the following list
packages <- c("tidyverse", "knitr", "kableExtra",
              "hasseDiagram", "car", "psych", "parameters",
              "DescTools")
lapply(
  X = packages,
  FUN = library,
  character.only = TRUE
)

# Set constraint
options("contrasts" = c("contr.sum", "contr.poly"))

options(knitr.kable.NA = "")
source("https://raw.github.com/neilhatfield/STAT461/master/rScripts/ANOVATools.R")

# Load the data
packageSales <- read.table(
  file = "https://raw.github.com/neilhatfield/STAT461/master/dataFiles/packageSales.csv",
  header = TRUE,
  sep = ","
)

# You'll have several code blocks here as you engage in EDA.
# You should create several data visualizations as well as
# tables of summary statistics.
# Create your Hasse Diagram here


# Apply your chosen method for the sampling distribution here

# Assess each of your assumptions and discuss your assessment

# copy this block (and update the name) as needed to complete your analyses.
```