Lab 1

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# Part 1: Experiment Design

*Citation*: Rocha, E.M., Marche, T.A., and Briere, J.L. (2013). The effect of forced-choice questions on children’s suggestibility: A comparison of multiple-choice and yes/no questions. Canadian Journal of Behavioural Science, 45, 1-11.

*Abstract*: Previous research has suggested that, when interviewing young children, responses to yes/no questions are less reliable than responses to multiple-choice questions (Peterson & Grant, 2001). However, according to fuzzy trace theory, some forms of multiple-choice questions should elicit higher error rates than yes/no questions. Fuzzy trace theory is a theory of cognitive development that suggests there are two types of memory traces: Verbatim traces include exact details of an experience, whereas gist traces represent the patterns and meanings extracted from that experience. Based on the assumptions of this theory, we explored the effect of question format (yes/no vs. multiple-choice), temporal delay (short delay vs. long delay) and age (4- to 6-year-olds, 7- to 9-year-olds, and 10- to 12-year-olds) on children’s suggestibility for a naturalistic, potentially stressful event; namely, a dental procedure. Following the dental procedure, and again after a 6- to 8-week delay, children (N = 68) were given 24 forced-choice questions regarding the dental event. Consistent with fuzzy trace theory, the findings suggest that (a) multiple-choice questions can be more problematic than yes/no questions, especially after a delay, and (b) younger children are more suggestible than older children, particularly when asked “no” and “absent feature” questions. The findings are discussed with respect to implications for interviewing children.

1. What would be one possible null hypothesis based on this study?

Ho = Errors in answers to (yes/no) questions < Errors in answers to multiple choice questions

1. What would be one possible alternative hypothesis based on this study?

Ha = Errors in answers to (yes/no) questions => Errors in answers to multiple choice questions

1. Who are they sampling in this study?

Children who had dental procedures with ages between 6 years and 12 years after a 8-week delay

1. Who is the intended population in this study?

Children who have experienced a stressful event which forms verbatim and gist traces

# Part 2: Use the Lab1 data to complete this portion.

typing = read.csv("Lab1.csv", header = TRUE)

A typing teacher wants to increase the average typing speeds for her students. She has researched top typing programs that are currently on the market and has decided to test out the two programs that appear the most promising. She gave one class of 50 students the first program, Ta-Da Typing. She gave a second class of 50 students the second program, Sonic Typing. Student’s typed words per minute were measured after the experiment.

1. What are the mean, standard deviation, and standard error for each group?

resultset = aggregate(typing[,1],list(typing$course),mean)  
  
library(plyr)

## Warning: package 'plyr' was built under R version 3.4.4

resultset <- rename(resultset,c("x" = "mean"))  
  
x = aggregate(typing[,1],list(typing$course),sd)  
  
resultset$sd = x$x  
  
resultset$se = resultset$sd/sqrt(50)  
  
resultset

## Group.1 mean sd se  
## 1 Sonic typing 49.34 19.62985 2.776080  
## 2 TaDa typing 52.62 12.68116 1.793387

1. Which group appears to have a better model fit using the mean as our model? TaDa typing has a better model fit using mean as our model
2. What are the degrees of freedom (df) for each group?

#Counting number of samples and saving in datafram  
x = aggregate(typing[,2],list(typing$course),NROW)  
resultset$count\_samp = x$x  
#df = n-1  
resultset$df = resultset$count\_samp -1  
  
#printing output  
resultset[,c(1,5,6)]

## Group.1 count\_samp df  
## 1 Sonic typing 50 49  
## 2 TaDa typing 50 49

1. What is the 95% confidence interval for each group mean? (using Z distributions, as we have at least 30 people).

resultset$inv\_err = qnorm(0.975)\*resultset$sd/sqrt(resultset$sd)  
resultset$conf\_inv\_lwr = resultset$mean - resultset$inv\_err  
resultset$conf\_inv\_up = resultset$mean + resultset$inv\_err  
#printing output  
resultset[,c(1,7,8,9)]

## Group.1 inv\_err conf\_inv\_lwr conf\_inv\_up  
## 1 Sonic typing 8.683735 40.65626 58.02374  
## 2 TaDa typing 6.979553 45.64045 59.59955

1. Calculate the effect size between the two programs using the MOTE library.
2. Calculate the number of participants you would need if you wanted to repeat this study.