# Lab 9

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## Contents

# Problem 1

The following paper links to open data, and describes a design where two chi-square tests are performed for Experiment 1.

Silver, A. M., Stahl, A. E., Loiotile, R., Smith-Flores, A. S., & Feigenson, L. (2020). When Not Choosing Leads to Not Liking: Choice-Induced Preference in Infancy. Psychological Science, 0956797620954491.

Obtain the data from the online repository, show your code for loading it into R, then conduct the same tests reported in Experiment 1 that the authors conducted. These include one binomial test, and two chi-square tests. Briefly report your re-analysis, and discuss whether you obtained the same values as the authors did (6 points).

## Reading in the data

```
my.data <- read.csv("lab9data.csv")
```

## Experiment 1a: Gender

```
exp_1a <- my.data %>%
  filter(ExperimentNumber == "1")

sum_C <- sum(exp_1a$Infant.Chose.C)
total_C <- length(exp_1a$Infant.Chose.C)

binomial_p <- (pbinom(q= total_C - sum_C,
       size = total_C,
       prob= .5,
       lower.tail = TRUE)*2)

exp_1a_gender <- exp_1a%>%
  group_by(Gender, Infant.Chose.C) %>%
  summarize(counts = n()) %>%
  pivot_wider(names_from = c(Gender),
            values_from = counts)


gender_table <- exp_1a_gender[,2:3]

(gender_Xsq <- chisq.test(gender_table))
```

```
## Warning in chisq.test(gender_table): Chi-squared approximation may be incorrect
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  gender_table
## X-squared = 4.9416e-32, df = 1, p-value = 1
```

```
uncorrected_Xsq <- sum((gender_Xsq$observed-gender_Xsq$expected)^2/gender_Xsq$expected)

gender_Xsq_unc <- pchisq(uncorrected_Xsq,1,lower.tail = FALSE)
```

## Experiment 1a : Age

```
age_table <- exp_1a %>%
  group_by(AgeMonths, Infant.Chose.C) %>%
  summarize(counts = n()) %>%
  pivot_wider(names_from = c(AgeMonths),
              values_from = counts)
age_table[is.na(age_table)] <- 0
age_table <- as.matrix(age_table[,2:21])
(age_xs <- chisq.test(age_table))
```

```
## Warning in chisq.test(age_table): Chi-squared approximation may be incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  age_table
## X-squared = 18.244, df = 19, p-value = 0.5062
```

Silver et al. (2020) reported "16 of 21 infants (76.2%) chose the new block (block C; Fig. 1)—a percentage significantly different from chance, according to a two-tailed binomial test, p = .026, 95% exact confidence interval (CI) = [52.83%, 91.78%], relative risk ratio = 1.52. A chi-square test of independence indicated no significant effect of age or gender on infants' choices, 2(19, N = 21) = 18.24, p = .506, and 2(1, N = 21) = 0.15, p = .696, respectively." In effort to replicate the results of the study I found, 16 of 21 infants (0.7619048%) chose the new block (block C; Fig. 1)—a percentage significantly different from chance, according to a two-tailed binomial test, p = 0.027, 95% exact confidence interval (CI) = [52.83%, 91.78%], relative risk ratio = 1.52. A chi-square test of independence indicated no significant effect of age or gender on infants' choices, $\chi^2$ (19, N= 21) =18.24375,p=0.506,and $\chi^2$ (1,N=21)=0.1527273,p= 0.696, respectively.

Confidence = 75