‘The crowd within’ effect

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Answer 1:

```
#make sure to change to the folder where you stored your result!
rawdata_immediate <- read.delim("C:/my_folder/rawdata_immediate.txt")
```

Answer 2:

```
data_cleaned <- subset(x = rawdata_immediate, subset = cheated=="Nee")
```

Answer 3:

```
dim(data_cleaned)
```

```
## [1] 471  54
```

There are 471 rows in `data_cleaned`, corresponding to the 471 participants.

Answer 4:

```
names(data_cleaned)
```

```
##  [1] "day"         "time"        "age"         "nationality" "sex"
##  [6] "q1a"         "defocus_q1a" "RT_1a"       "q2a"         "defocus_q
2a"
## [11] "RT_2a"       "q3a"         "defocus_q3a" "RT_3a"       "q4a"
## [16] "defocus_q4a" "RT_4a"       "q5a"         "defocus_q5a" "RT_5a"
## [21] "q6a"         "defocus_q6a" "RT_6a"       "q7a"         "defocus_q
7a"
## [26] "RT_7a"       "q8a"         "defocus_q8a" "RT_8a"       "q1b"
## [31] "defocus_q1b" "RT_1b"       "q2b"         "defocus_q2b" "RT_2b"
## [36] "q3b"         "defocus_q3b" "RT_3b"       "q4b"         "defocus_q
4b"
## [41] "RT_4b"       "q5b"         "defocus_q5b" "RT_5b"       "q6b"
## [46] "defocus_q6b" "RT_6b"       "q7b"         "defocus_q7b" "RT_7b"
## [51] "q8b"         "defocus_q8b" "RT_8b"       "cheated"
```

Answer 5:

```
#first guess
sel_a <- startsWith(x = names(data_cleaned), "q") & endsWith(x = names(dat
a_cleaned), "a")
sel_a
```

```
##  [1] FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE  TRUE FALSE FALSE
TRUE
## [13] FALSE FALSE  TRUE FALSE FALSE  TRUE FALSE FALSE  TRUE FALSE FALSE
TRUE
## [25] FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
FALSE
## [37] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

```
FALSE
## [49] FALSE FALSE FALSE FALSE FALSE FALSE

answers_1 <- data_cleaned[, sel_a]

#second guess
sel_b <- startsWith(x = names(data_cleaned), "q") & endsWith(x = names(dat
a_cleaned), "b")
sel_b

##  [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
FALSE
## [13] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
FALSE
## [25] FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE  TRUE FALSE FALSE
TRUE
## [37] FALSE FALSE  TRUE FALSE FALSE  TRUE FALSE FALSE  TRUE FALSE FALSE
TRUE
## [49] FALSE FALSE  TRUE FALSE FALSE FALSE

answers_2 <- data_cleaned[, sel_b]

#take a sneak peek
head(answers_1)

##   q1a q2a q3a q4a q5a q6a q7a q8a
## 1  35  70  35  25  40  85  10  55
## 3  30  65  20   9  50  65  25  50
## 6  12  12   6   2  66  85  10  60
## 7   5  60  30  60  65  80  10  25
## 8  23  41  28   5  75  90  49  68
## 9  75  40  35   1  50  80   3   5

head(answers_2)

##   q1b q2b q3b q4b q5b q6b q7b q8b
## 1  60  85  40  35  55  70  10  45
## 3  30  65  10   9  50  65  25  50
## 6  15  99  58  54  23  65   5  56
## 7  10  54  35  30  70  55  15  30
## 8  35  39  27   6  65  80  42  45
## 9  60  30  32   5   3  72   1  10
```

Answer 6:

```
correct_mat <- matrix(correct_vec,
                      nrow = nrow(data_cleaned),
                      ncol = length(correct_vec),
                      byrow = TRUE)
head(correct_mat)

##      [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8]
## [1,]  6.3 43.3 32.3 13.4 53.6 54.8 26.4 22.4
## [2,]  6.3 43.3 32.3 13.4 53.6 54.8 26.4 22.4
## [3,]  6.3 43.3 32.3 13.4 53.6 54.8 26.4 22.4
```

```
## [4,]  6.3 43.3 32.3 13.4 53.6 54.8 26.4 22.4
## [5,]  6.3 43.3 32.3 13.4 53.6 54.8 26.4 22.4
## [6,]  6.3 43.3 32.3 13.4 53.6 54.8 26.4 22.4
```

Answer 7:

```
#first guess
mse_1 <- rowMeans((answers_1-correct_mat)^2)

#second guess
mse_2 <- rowMeans((answers_2-correct_mat)^2)

#look
head(mse_1)
```

```
##        1        3        6        7        8        9
## 513.3938 260.4938 572.7938 437.2688 582.5438 798.7438
```

```
head(mse_2)
```

```
##         1         3         6         7         8         9
##  770.1438  303.7438 1014.2938  108.4688  305.5188  848.2938
```

Answer 8:

```
answers_A <- (answers_1 + answers_2)/2
head(answers_A)
```

```
##    q1a  q2a  q3a  q4a  q5a  q6a  q7a  q8a
## 1 47.5 77.5 37.5 30.0 47.5 77.5 10.0 50.0
## 3 30.0 65.0 15.0  9.0 50.0 65.0 25.0 50.0
## 6 13.5 55.5 32.0 28.0 44.5 75.0  7.5 58.0
## 7  7.5 57.0 32.5 45.0 67.5 67.5 12.5 27.5
## 8 29.0 40.0 27.5  5.5 70.0 85.0 45.5 56.5
## 9 67.5 35.0 33.5  3.0 26.5 76.0  2.0  7.5
```

```
mse_A <- rowMeans((answers_A-correct_mat)^2)
head(mse_A)
```

```
##        1        3        6        7        8        9
## 594.1125 278.9938 316.1688 220.1813 415.0313 740.6438
```

Answer 9:

```
data_cleaned$mse_1 <- mse_1
data_cleaned$mse_2 <- mse_2
data_cleaned$mse_A <- mse_A
```

Answer 10:

```
#compute the values to be plotted
values <- c(mean(data_cleaned$mse_1),
            mean(data_cleaned$mse_2),
```

```
            mean(data_cleaned$mse_A)
            )
values
```

```
## [1] 589.2927 614.9216 541.4940
```

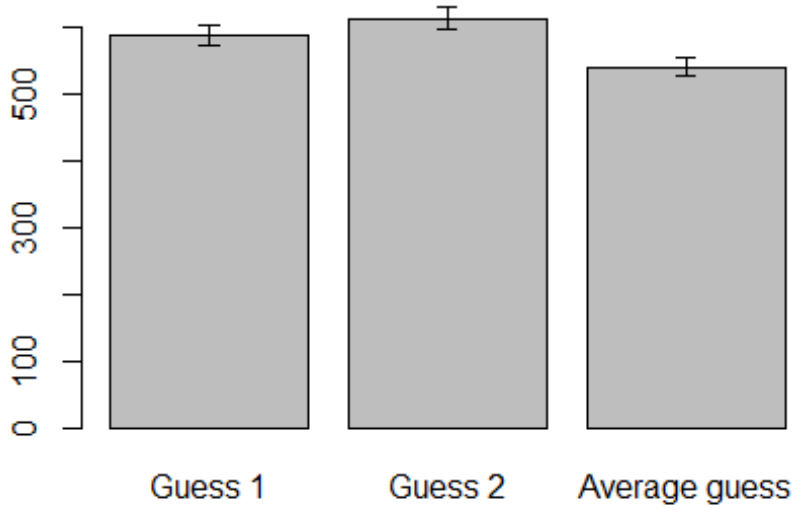
```
#compute the errors
errors <- c(sd(data_cleaned$mse_1),
            sd(data_cleaned$mse_2),
            sd(data_cleaned$mse_A)
            )/sqrt(nrow(data_cleaned))

errors
```

```
## [1] 15.48860 16.15364 14.44104
```

```
# create a basic bar plot and store the mid points
midpoints <- barplot(values,
                     ylim = c(0, max(values + errors)),
                     names.arg = c("Guess 1", "Guess 2", "Average guess"))

# add error bars
arrows(x0 = midpoints,
       y0 = values - errors,
       x1 = midpoints,
       y1 = values + errors,
       length = 0.05,    # length of the arrow heads
       angle = 90,       # orientation of the arrow heads
       code = 3)         # both ends have arrow heads
```



Answer 11:

```r
library(pwr)

pwr.t.test(n = 255,
           d = NULL,
           sig.level = 0.05,
           power = 0.33,
           type = "paired",
           alternative = "greater")

##
##      Paired t test power calculation
##
##               n = 255
##               d = 0.07565037
##       sig.level = 0.05
##           power = 0.33
##     alternative = greater
##
## NOTE: n is number of *pairs*
```

Answer 12:

```r
#first guess
t.test(x = data_cleaned$mse_1 - data_cleaned$mse_A,
       alternative = "greater")

##
##  One Sample t-test
##
## data:  data_cleaned$mse_1 - data_cleaned$mse_A
## t = 8.6878, df = 470, p-value < 0.00000000000000022
## alternative hypothesis: true mean is greater than 0
## 95 percent confidence interval:
##  38.73116      Inf
## sample estimates:
## mean of x
##  47.79869

#second guess
t.test(x = data_cleaned$mse_2 - data_cleaned$mse_A,
       alternative = "greater")

##
##  One Sample t-test
##
## data:  data_cleaned$mse_2 - data_cleaned$mse_A
## t = 10.262, df = 470, p-value < 0.00000000000000022
## alternative hypothesis: true mean is greater than 0
## 95 percent confidence interval:
##  61.63545      Inf
## sample estimates:
## mean of x
##  73.42756
```