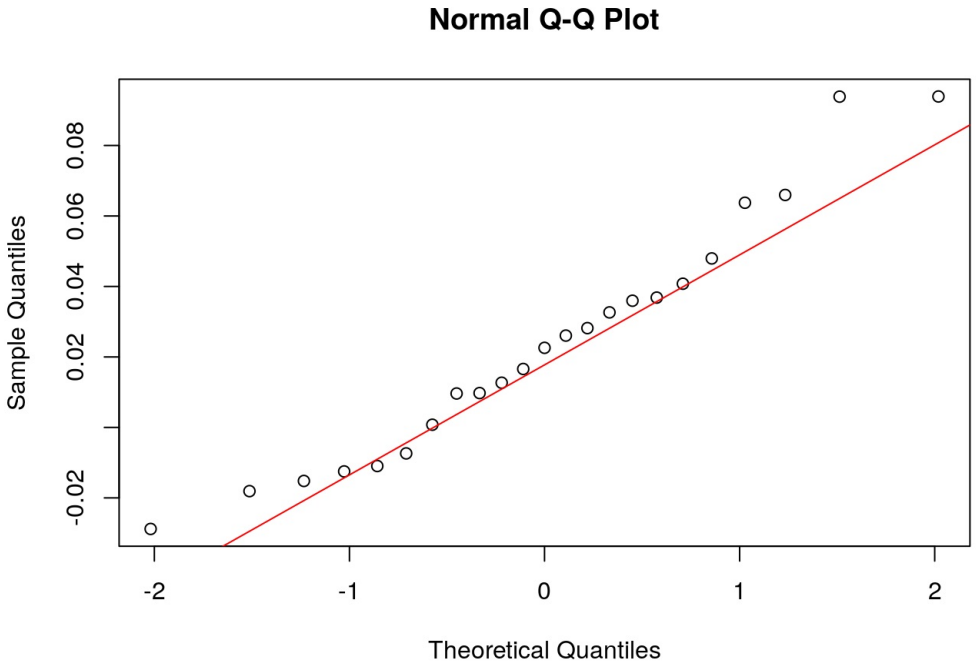
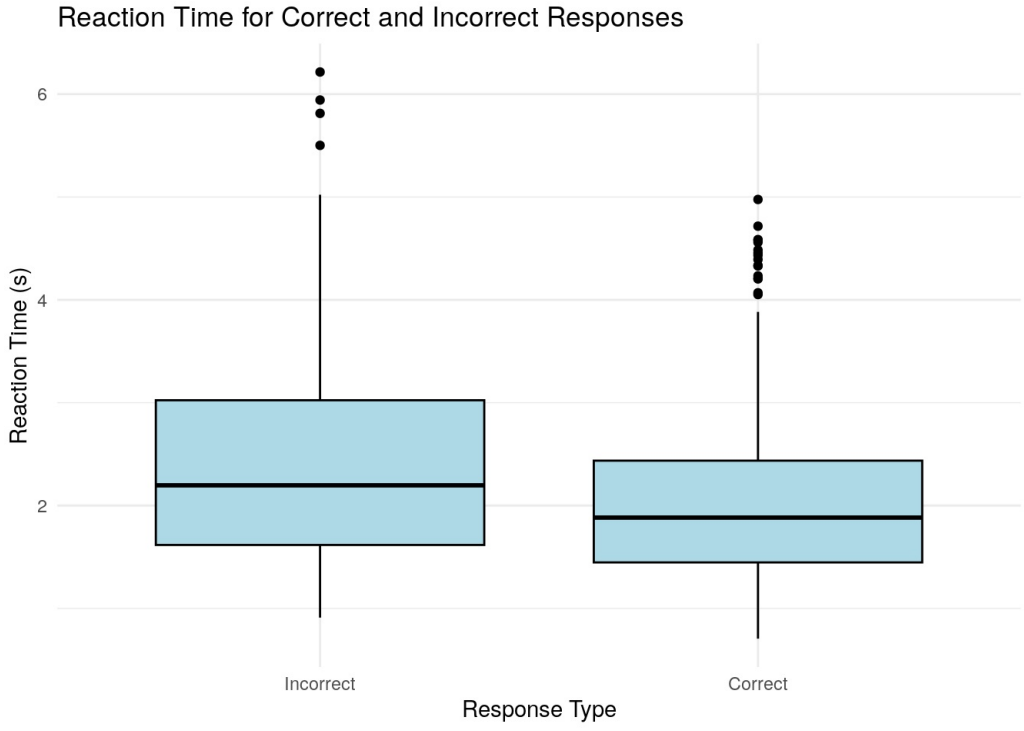



```
# The one-sample t-test shows that there is a significant difference in the means of correct and incorrect respon
ses with a p-value of 0.002816, which is well below 0.05. The 95% confidence interval does not contain 0 and this
also indicates significance. People register their correct responses faster.

# There are not any severe outliers and the observations between different participants are independent. These tw
o assumptions are met.

# The assumption of normality of the differences in reaction times is met. This is reflected in a p-value of 0.35
53 and a reasonable QQ-plot and histogram. I can safely accept the results of the t-test. The difference between
the means is of 0.0237, meaning that participants, on average, take around 23.7 milliseconds longer to respond wh
en giving an incorrect answer as opposed to when they give a correct answer.

# Below I will plot both non-transformed reaction time for correct and incorrect responses to see if it aligns.

ggplot(df, aes(x = factor(accuracy_numeric), y = reaction_time)) +
  geom_boxplot(fill = "lightblue", color = "black") +
  labs(
    title = "Reaction Time for Correct and Incorrect Responses",
    x = "Response Type",
    y = "Reaction Time (s)"
  ) +
  scale_x_discrete(labels = c("Incorrect", "Correct")) +
  theme_minimal()
```



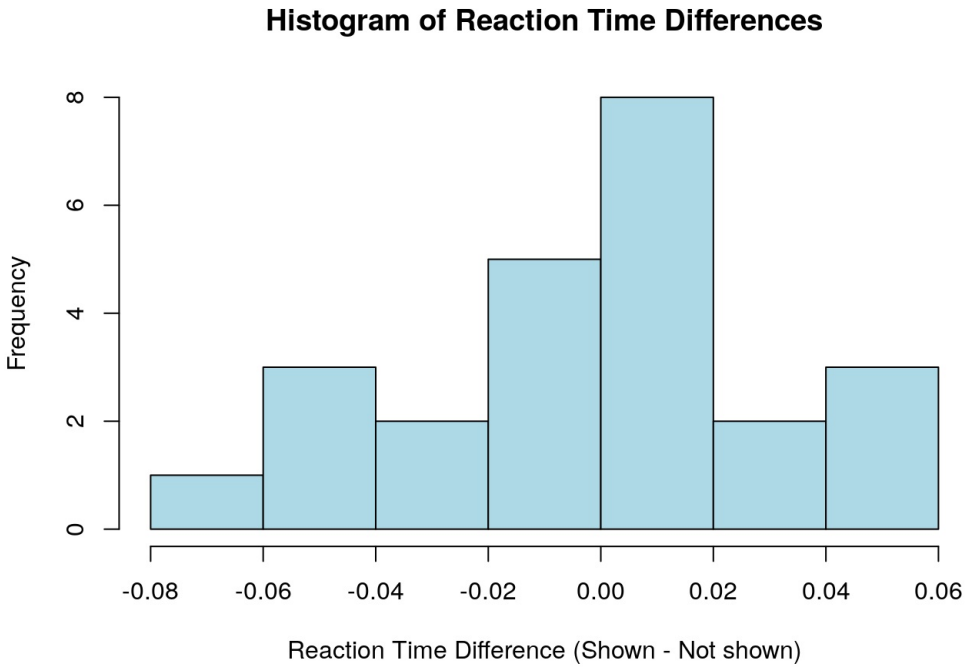
```
# Below I am going to look if people, on average, respond more quickly when looking at a previously seen or unsee
n headline, and, if there is a difference, I want to know if it reaches significance. I will create a data frame
where I have the mean reaction time for both seen and unseen headlines, forming a pair for each participant. The
data between participants will of course be independent.

df_shown_or_not <- df %>%
  group_by(ID, shown_or_not) %>%
  summarise(mean_rt = mean(inverse_power_rt, na.rm = TRUE))

df_shown_or_not_final <- df_shown_or_not %>%
  spread(shown_or_not, mean_rt) %>%
  rename(shown = `shown`, not_shown = `not_shown`)

# I will create an additional column where I calculate the difference between the mean reaction time for their co
rrect responses and that of their incorrect responses.

df_shown_or_not_final$rt_difference <- df_shown_or_not_final$shown - df_shown_or_not_final$not_shown

# I will remove points in my data more than 3 standard deviations away from the mean to ensure that I do not have
any outliers that distort the data.

mean_rt_diff <- mean(df_shown_or_not_final$rt_difference, na.rm = TRUE)
sd_rt_diff <- sd(df_shown_or_not_final$rt_difference, na.rm = TRUE)

threshold_upper <- mean_rt_diff + 3 * sd_rt_diff
threshold_lower <- mean_rt_diff - 3 * sd_rt_diff

df_shown_or_not_final <- df_shown_or_not_final %>%
  filter(rt_difference >= threshold_lower & rt_difference <= threshold_upper)

# As I have my data ready, I will conduct a one-sample t-test. I will see if the difference between the means is
significantly different from zero.

t_test_result <- t.test(df_shown_or_not_final$rt_difference, mu = 0)
t_test_result
```

```
##
##  One Sample t-test
##
## data:  df_shown_or_not_final$rt_difference
## t = -0.094204, df = 23, p-value = 0.9258
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  -0.01340700  0.01223911
## sample estimates:
##     mean of x
## -0.0005839438
```

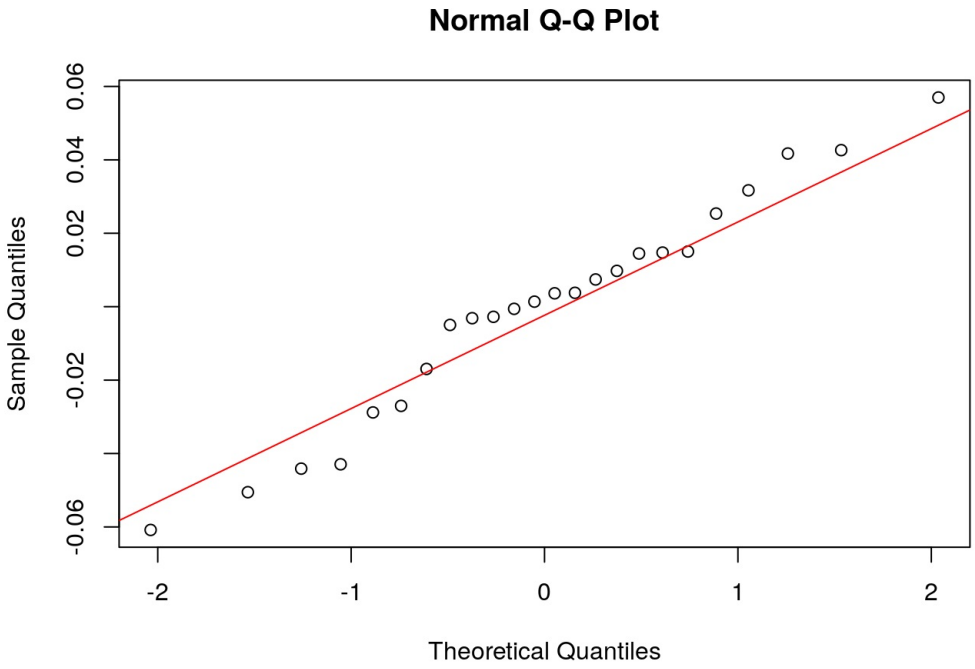
```
# One assumption is that the difference in reaction times has to be normally distributed. I will use both a numer
ic indicator, the p-value from a Shapiro-Wilk test, and visual means of checking for normality (histogram and QQ-
plot).

shapiro.test(df_shown_or_not_final$rt_difference)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  df_shown_or_not_final$rt_difference
## W = 0.97072, p-value = 0.6849
```

```
hist(df_shown_or_not_final$rt_difference, main = "Histogram of Reaction Time Differences",
     xlab = "Reaction Time Difference (Shown - Not shown)", col = "lightblue")
```




```
qqnorm(df_shown_or_not_final$rt_difference)
qqline(df_shown_or_not_final$rt_difference, col = "red")
```




```
# The one-sample t-test shows that there is not a significant difference in the means of correct and incorrect re
sponses with a p-value of 0.9258, which is extremely high. The 95% confidence interval contains 0 and this also s
hows that the difference is not significant.

# There are not any severe outliers and the observations between different participants are independent. These tw
o assumptions are met.

# The assumption of normality of the differences in reaction times is met. This is reflected in a p-value of 0.68
49 and a reasonable QQ-plot and histogram. I can safely accept the results of the t-test. I will conclude that th
e difference between the means is not significant.
```