# Is there a relation between women attractivness and their perceived intelligence?

## Hypothesis

There is an opinion that the more attractive women, the less they are burdened by their intelligence. Author's private experince didn't find a confirmation of such a thesis, however, it appeared to be interesting to refute it using a larger sample. The goal of this reasearch is to verify a hypothesis that attracive women are actually percevied to be more intelligent by men than their less attractive fellows.

## Dataset overview

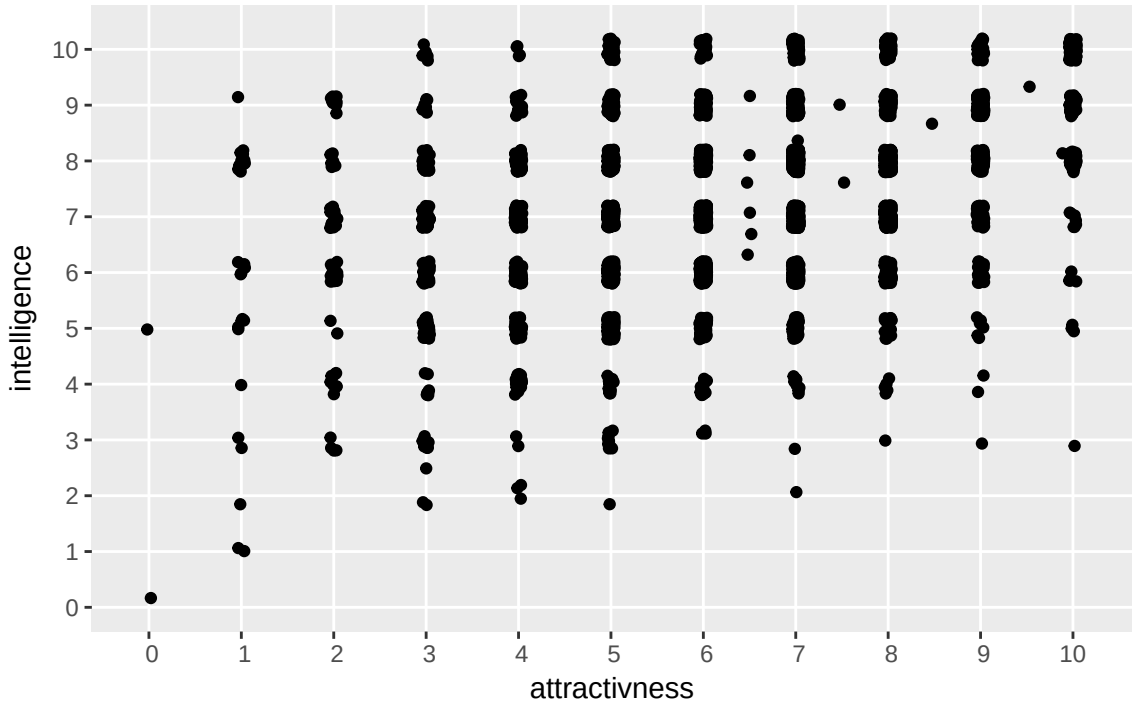
To verify a hypothesis an appropriate dataset was chosen. The dataset [1] was gathered by Columbia Business School from multiple speed dating [2] events from 2002-2004 in USA and consists from 8378 rows. Each row in the dataset represents a short 4 minute date. A date has 195 various attributes, but only a few will be of our interest: *gender* to distinguish women, *attr_o*- attractiveness rated by the partner and *intel_o*- intelligence rated by the partner. To allow easier analysis let's extract from the dataset only rows containing women attributes rated by men and select only two columns we're interested in: *attr_o* and *intel_o*. For the sake of readability let's rename them to *attractiveness* and *intelligence* respectively. Finally, let's remove rows which have NA values. As a result, we have a dataset with 4029 rows and 2 columns: *attractiveness* and *intelligence*.

## Dataset visualisation

Let's first visualise our dataset and see if we can find any insights. Since our variables are discrete, a standard scatter plot may be misleading because points would be overlapping. To prevent overplotting we'll apply jittering [3] to the points. *Figure 1* shows a relation between female attractivness and intelligence. Apparently, there is no strong linear correlation between attractivness and inteligence (correlation coefficient is 0.42 with p-value close to 0). However, we can observe that there is a pattern- the further we go by *attractivness* axis, the less low scores for *intelligence* we can see. And vice versa- the lower score for *attractivness*, the less high scores for *intelligence*. Let's find out if this observation is statistically significant.

[1] http://www.stat.columbia.edu/~gelman/arm/examples/speed.dating/
[2] https://en.wikipedia.org/wiki/Speed_dating
[3] http://ggplot2.tidyverse.org/reference/geom_jitter.html

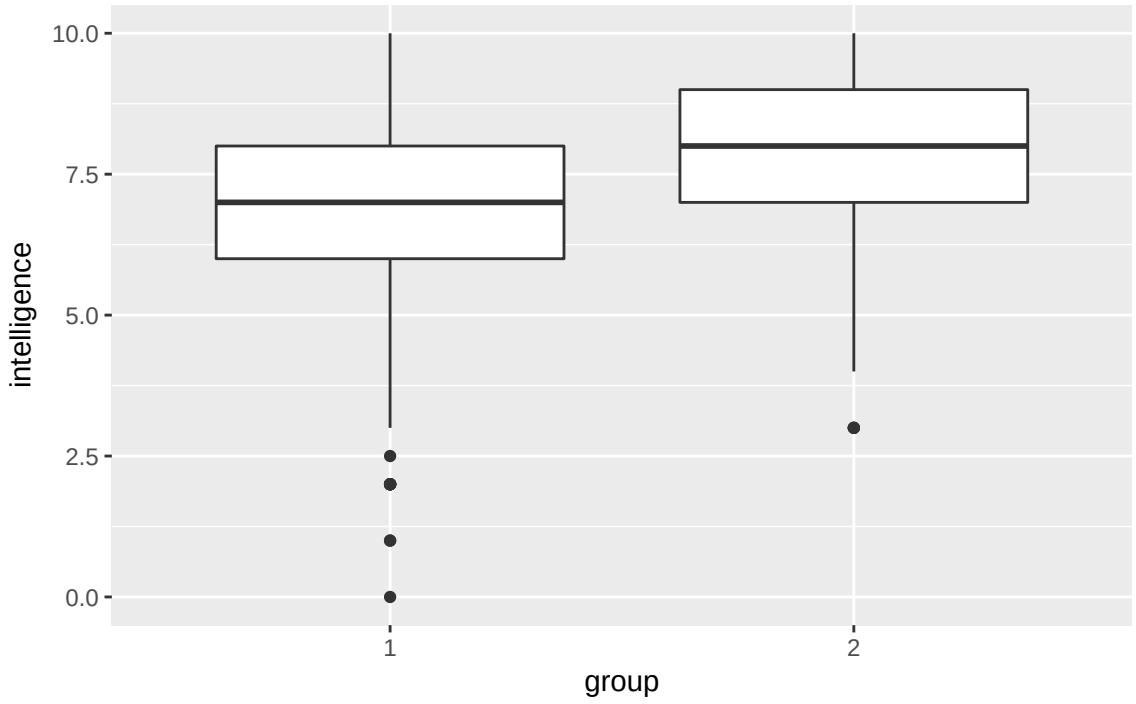
Figure 1. Relation between female attractivness and intelligence




## Hypothesis testing

To test our hypothesis let's select two, approximately equally sized, groups from our dataset. The first group will be consisting of women whoes appearence was rated from 0 to 5, and the second group with appereance from 8 to 10. Distribution characteristics of both groups are depicted in *Figure 2*.

Figure 2. Comparison of female intelligence in two groups



Now it is time to formalise our hypothesis.

*Null hypothesis*- there is no difference in mean perceived intelligince between two groups of women- less and more attractive.

*Alternative hypothesis*- mean perceived intelligence in the group with more attractive women is greater than in the group with less attractive women.

Let's perform a two-sample one-tailed Student's t-test with 95% confidence level. Mean intelligence in the first group appears to be 6.59, in the second group- 8.07. p-value is $2.4089975 \times 10^{-120}$ which is much less than 0.05 (for 95% confidence level) thus allowing us to reject the null hypothesis in favour of the alternative hypothesis.

## Conclusion

Even though there is no strong linear correlation between women attractivness and their intelligence, on average, more attractive women are perceived by men to be more intelligent.