# Assessing the impact of Gender & Educational background on employee's satisfaction

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## 1 INTRODUCTION

I will be using the built-in dataset of Job Satisfaction from the datarium package in R. The dataset contains the job satisfaction scores of 58 employees of a certain company. The dataset consists four coloumns :

1. id : id of the participant

2. gender : the gender of the employee - 2 levels (I. male, II. female)

3. education level : highest institution of learning attended - 3 levels(I. school, II. college, III. university)

4. score : how satisfied is the employee with their job.

### 1.1 AIM OF ANALYSIS

The aim of this analysis is to find out if there are differences between employees of different education groups and gender with regards to how they scored.

## 2 DESCRIPTIVE STATISICS

### 2.1 GENDER AND EDUCATION LEVEL

We had 58 employees participating in the study and 48% of them were men and the remaining 52% was women. Among the employees, there were 33% whom their highest qualification is from School, another 33% had college qualifications, and the remaining 34% had university qualifications. The average employee scored 6.96 satisfaction, with the minimum being 4.78 and the maximum being 10.

**Table 1** : Descriptive statistics

| Characteristic | N = 58[1] |
|---|---|
| **gender** | |
| male | 28 (48%) |
| female | 30 (52%) |
| **education_level** | |
| school | 19 (33%) |
| college | 19 (33%) |
| university | 20 (34%) |
| **score** | 6.96 (4.78,10.00) |

[1]n (%); Mean (Min,Max)

## 2.2 EDUCATION LEVEL BY GENDER

Among these employees, we can see a particular pattern. Women are more likely to have school or college qualifications(17% > 16%). There is no difference between men and women who have university qualifications.

**Table 2** : Contingency table of education by gender

| | gender | | |
|---|---|---|---|
| | male | female | **Total** |
| **education_level** | | | |
| school | 9 (16%) | 10 (17%) | 19 (33%) |
| college | 9 (16%) | 10 (17%) | 19 (33%) |
| university | 10 (17%) | 10 (17%) | 20 (34%) |
| **Total** | 28 (48%) | 30 (52%) | 58 (100%) |

The bar graph below on Figure 1 is a visualization supporting the above table. It supports the numbers discussed in the previous table as we can see that there are less men with qualifications from school or college as compared to women in those categories as well as men with university qualifications.

**Figure 1** : Employees by education and gender
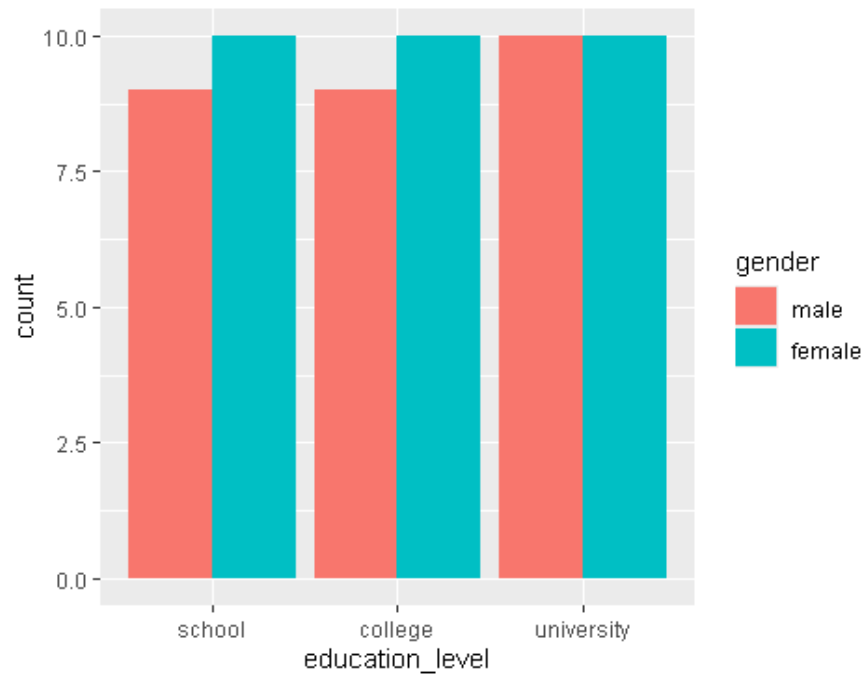
## 2.3 SCORE

### 2.3.1 SCORE BY GENDER

Figure 2 below shows that men score more as compared to women. This would suggest that generally, men might possibly be happier than women. However, it is worth noting that the scores of men have a wider range, meaning they're scattered all over as compared to those of women. The average of men and women represented by the black lines in the middle are close to each other.

*Figure 2* : Scores by gender
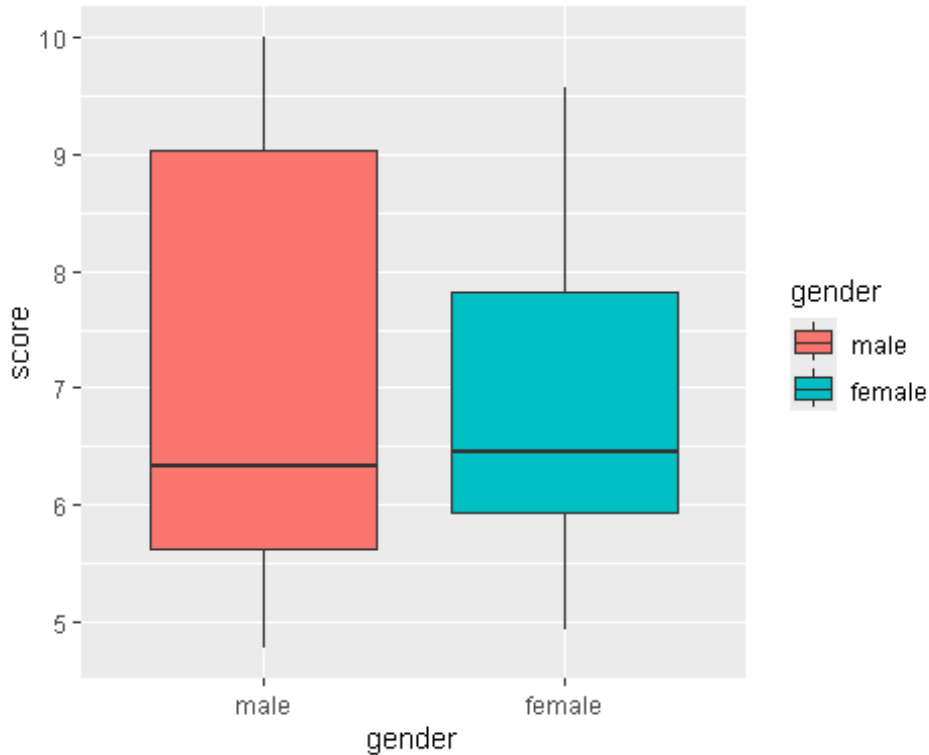


### 2.3.2 SCORE BY EDUCATION LEVEL

Figure 3 shows that employees with university qualifications score more, making them more happier than the two other groups and those with college qualifications are more happier than those with school qualifications. This might suggest that the more educated an employee is, the more likely they are to be satisfied with their role. The black dot at 6.5 is an outlier from the university group.

*Figure 3* : Scores by education
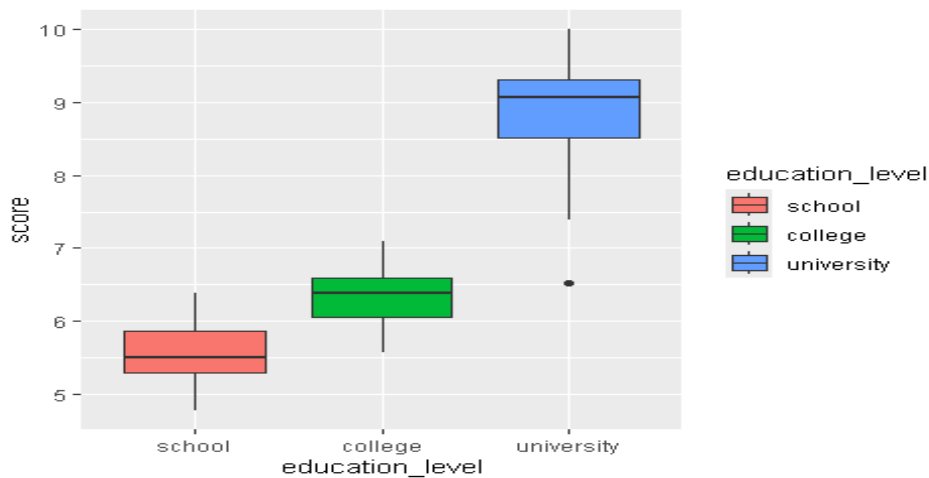
### 2.3.3 SCORE BY EDUCATION LEVEL AND GENDER

Figure 4 below suggests that men from university are more satisfied as compared to the other males of the other groups as well as females from university. In contrast, the males from the other two groups(school and college) score lesser as compared to women of their corresponding group.

***Figure 4*** : Scores by education & gender
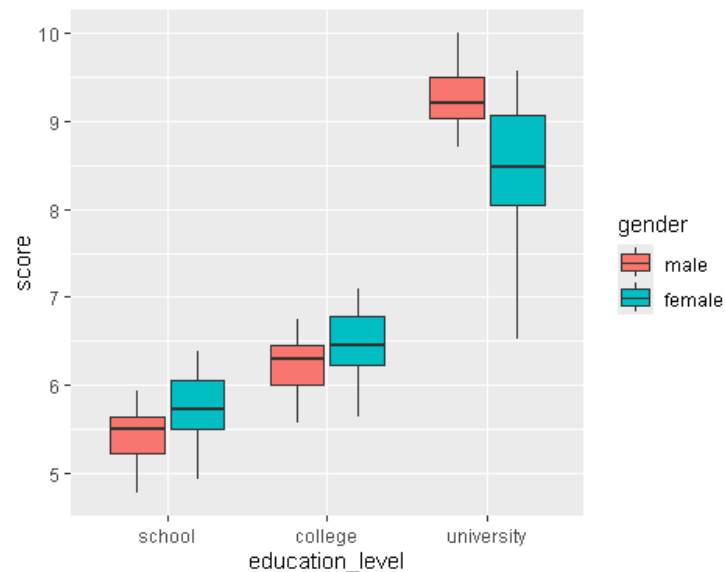


## 2  MODEL FITTING

Figure 5 below shows that there is a significant interaction between education level and gender, seen by the crossing lines of males and females at college level. This suggests that we should include an interaction term in our model.
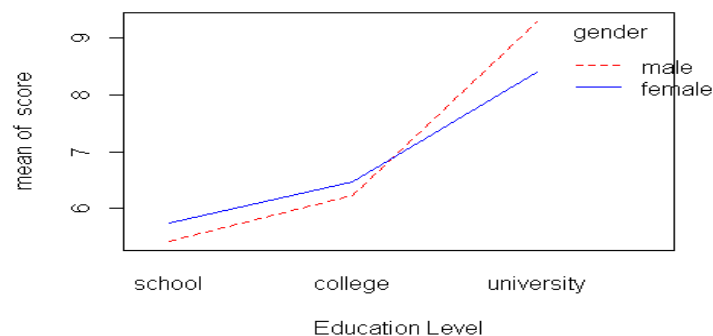
***Figure 5*** : Interaction plot

Table 3 below shows the main analysis of our goal. To observe if there are differences in scores, we used the famous and celebrated  Analysis of Variance(ANOVA) along with the non-parametric alternative — the Aligned Rank Transform(ART) so to avoid testing the assumptions of ANOVA. The results were close to each other and showed consistency, thus we'll only report the ANOVA findings in Table 3. The bold p-values of Education Level and the interaction term(Education Level & Gender) are statistically significant, implying that there are differences between the scores of people with different educational background and those with specific educational background and gender. This further outlines that there is no difference between the scores of men and women. None is happier than the other group.

***Table 3*** : Analysis of Variance(ANOVA) of Score by education & gender

|  | Df | Sum Sq | Mean Sq | F value | Pr(>F) |
| --- | --- | --- | --- | --- | --- |
| Education level | 2 | 114.00 | 57.00 | 188.413 | **< 2e-16** |
| Gender | 1 | 0.23 | 0.23 | 0.745 | 0.39212 |
| Education level:Gender | 2 | 4.44 | 2.22 | 7.338 | **0.00156** |
| Residuals | 52 | 15.73 | 0.30 | | |

To investigate which groups are different we apply the Tukey Post-Hoc test which is given by the results below. Table 4a suggests that all the education level groups are different, suggesting that the more educated one is, there more likely they are to be happier with their role.

***Table 4a*** : Tukey Post-Hoc of Education

|  |  | diff | lwr | upr | p adj |
| --- | --- | --- | --- | --- | --- |
| Education Level | college-school | 0.7573684 | 0.3268386 | 1.187898 | **0.0002637** |
| | university-school | 3.2568947 | 2.8317806 | 3.682009 | **< 1e-05** |
| | university-college | 2.4995263 | 2.0744121 | 2.924641 | **< 1e-05** |
| Gender | male-female | 0.1246855 | -0.1653332 | 0.4147041 | 0.3922627 |

Furthermore, Table4b , the bold and colored rows show groups that are different. Looking at the *diff*  column that represents the difference of the respective groups, it is apparent that the greatest difference can be seen at 3.865, suggesting that men with university qualifications are more happier than men with only school leaving qualification. The second largest gap at 3.551 suggests that men with university qualifications are happier than women who couldn't further their studies into college, while there is no difference between men and women who only have a school qualification.

***Table 4b*** : Tukey Post-Hoc of Education by Gender

| Education Level:Gender | diff | lwr | upr | p adj |
|---|---|---|---|---|
| school:female-school:male | 0.3143333 | -0.4333580 | 1.0620247 | 0.8132166 |
| college:male-school:male | 0.7966667 | 0.0295514 | 1.5637819 | **0.0374890** |
| college:female-school:male | 1.0363333 | 0.2886419 | 1.7840247 | **0.0019203** |
| university:female-school:male | 2.9793333 | 2.2316419 | 3.7270247 | **< 1e-05** |
| university:male-school:male | 3.8653333 | 3.1176419 | 4.6130247 | **< 1e-05** |
| college:male-school:female | 0.4823333 | -0.2653580 | 1.2300247 | 0.4086560 |
| college:female-school:female | 0.7220000 | -0.0057493 | 1.4497494 | 0.0529764 |
| university:female-school:female | 2.6650000 | 1.9372506 | 3.3927494 | **< 1e-05** |
| university:male-school:female | 3.5510000 | 2.8232506 | 4.2787494 | **< 1e-05** |
| college:female-college:male | 0.2396667 | -0.5080247 | 0.9873581 | 0.9317495 |
| university:female-college:male | 2.1826667 | 1.4349752 | 2.9303581 | **< 1e-05** |
| university:male-college:male | 3.0686667 | 2.3209752 | 3.8163581 | **< 1e-05** |
| university:female-college:female | 1.9430000 | 1.2152506 | 2.6707494 | **< 1e-05** |
| university:male-college:female | 2.8290000 | 2.1012506 | 3.5567494 | **< 1e-05** |
| university:male-university:female | 0.8860000 | 0.1582506 | 1.6137494 | **0.0087499** |

## 3   CONCLUSION

The limitation of this analysis is that it does not include the role the employees are occupying. The results given by the analysis could potentially be influenced by different roles as it is known that people with less education are more likely to work hard labour jobs that pay little, and could also potentially be working in an unhealthy work environment. These are factors that could be looked into to fully understand the dynamics and relations of how different factors influence an employee's satisfaction to their role. This could also suggest that there need to be some intervention done to not abuse low-earning workers or those without a privileged educational background.