

COGS 118D PROJECT FINAL REPORT

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Dataset, Motivation, and Preprocessing

The dataset we decided to use for our project was compiled by Columbia Business School professors Ray Fisman and Sheena Iyengar. The data was gathered from participants in 21 speed dating events from 2002 to 2004. During those events, the participants would go on four minute “dates” with everyone from the opposite sex at the event. The participants would fill out a questionnaire about demographics, dating habits, self-perception across key attributes, beliefs on what others find valuable in a mate, etc. At the end of the four minutes, the participants were asked to whether they wanted to see their date again and to rank their dates on attractiveness, sincerity, intelligence, fun, ambition, and shared interests.

After deleting the NaNs we were left with 7,138 rows. However, the events (“waves”) were ranked differently according to which speed dating wave the participants went to. Waves 6-9 would rate the importance of the key attributes on a scale of 1-10 and the rest of the wave have 100 points to distribute among the attributes with more points on an attribute meaning more importance. For our project, we ended up only using the data with the 100 points distributed among the attributes which further cut our number of rows to 5,576.

For some of the research questions, we were comparing self scores to the scores given by others. The scores given by others included the “Shared Interest” attribute while the self scores did not. This meant that we were comparing 5 attributes to 6 and that we needed to get rid of the “shared interest” and renormalize the scores on the attributes to better compare the self scoring results with the scores given by others.

The interestingness and usefulness of this investigation lies in its relevance to understanding how people go about looking for romantic partners. By understanding which attributes or lack thereof are important in the search for partners, we hope to shed some light on the uncertainty that surrounds the dating world of men and women. It will also help us comprehend whether there is a match between self perception of attraction and attractiveness perceived by others.

Research Question 1

Does gender influence how men and women think the other gender attaches importance to certain attributes and whether it influences how they themselves rate these attributes?

We considered attractiveness, ambition, fun, sincerity, intelligence and shared interests while analyzing the influence of gender. After dividing the dataset for each attribute by gender, we need to determine if the divided datasets are normally distributed in order to decide on a suitable comparison method. We do the Kolmogorov-Smirnov single sample test for each attribute to test for normality in both cases.

H_0 : Ratings for an attribute (divided by gender) are normally distributed

H_1 : H_0 is not true

For the first and second dataset respectively:

Attribute	Attractiveness	Sincerity	Fun	Intelligence	Ambition
Decision	Reject H_0	Reject H_0	Reject H_0	Reject H_0	Reject H_0
p-value	6.6504e-27	1.3300e-25	3.2713e-28	3.8765e-26	3.5974e-24

Attribute	Attractiveness	Sincerity	Fun	Intelligence	Ambition
Decision	Reject H_0	Reject H_0	Reject H_0	Reject H_0	Reject H_0
p-value	3.2073e-27	3.2073e-27	1.3641e-26	1.3344e-29	3.0769e-25

Since we fail to reject the null hypothesis for the test for normality in all cases, we do a Rank Test (Wilcoxon Rank Sum Test) to determine if the continuous datasets in comparison have the same median.

H_0 : Ratings for an attribute (divided by gender) belong to a continuous distribution with the same median

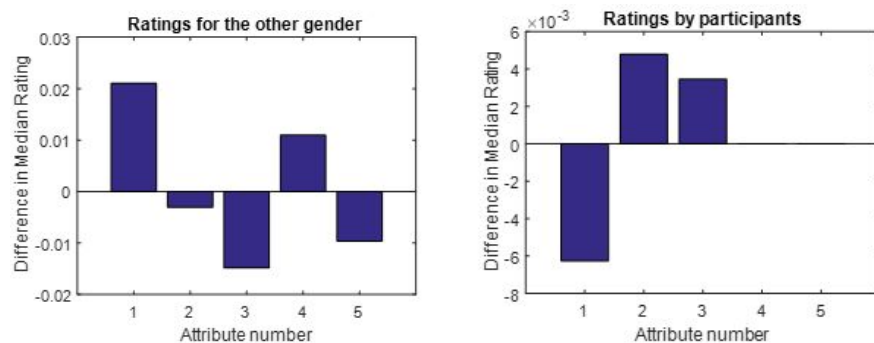
H_1 : H_0 is not true

For the first and second dataset respectively:

Attribute	Attractiveness	Sincerity	Fun	Intelligence	Ambition
Decision	Reject H_0	Reject H_0	Reject H_0	Reject H_0	Reject H_0
p-value	1.8427e-11	9.5061e-04	0.0273	2.8168e-05	3.8197e-07

Attribute	Attractiveness	Sincerity	Fun	Intelligence	Ambition
Decision	Cannot reject H_0	Cannot reject H_0	Cannot reject H_0	Cannot reject H_0	Cannot reject H_0
p-value	0.4526	0.4474	0.4581	0.0570	0.9512

As is evident from the tables above, we can conclude that we have statistically significant evidence that men and women think the other gender rates the five attributes with different median ratings since we reject the null hypothesis for all attributes in the first dataset. We can conclude that we don't have statistically significant evidence that men and women themselves rate these attributes with different median ratings, that is they seem to rate these attributes with similar median ratings. This can be further visualized in the graphs below where the difference in median ratings in the second plot is of the order 10^{-3} :



Research Question 2

Is an individual's score on one attribute a good predictor of another attribute?

We considered ambition, attraction, fun, intelligence, shared interests and sincerity and performed SLR and calculated the linear correlation coefficients and p-values for all combinations using the following set of hypotheses:

H_0 : No relationship between the 2 variables or alternatively, $\beta_1 = 0$

H_1 : H_0 is not true

Following is a table that shows the value of the correlation coefficient and the p-values corresponding to the above mentioned set of hypotheses for the 6 attributes.

r, p	Ambition	Attraction	Fun	Intell.	Shared interests	Sincerity
Ambition	1, 1	0.35, 4.9e-158	0.48, 2.0e-323	0.62, 0	0.42, 3.2e-242	0.44, 1.4e-268

Attraction	0.35, 4.9e-158	1, 1	0.58, 0	0.38, 1e-193	0.49, 0	0.41, 1.6e-225
Fun	0.48, 2e-323	0.58, 0	1, 1	0.50, 0	0.62, 0	0.52, 0
Intell.	0.62, 0	0.38, 1e-193	0.50, 0	1, 1	0.40, 1.3e-212	0.65, 0
Shared interests	0.42, 3.2e-242	0.49, 0	0.62, 0	0.40, 1.3e-212	1, 1	0.40, 1.1e-215
Sincerity	0.44, 1.4e-268	0.41, 1.6e-225	0.52, 0	0.65, 0	0.40, 1.1e-215	1, 1

We found all the correlation coefficients to be positive and the minimum observed value was 0.35 (corresponding to *Attraction* and *Ambition*). It's corresponding p-value, 4.9×10^{-158} , was the largest p-value. We reject all 15 pairs of hypotheses ($6 \text{ choose } 2 = 15$) at 0.01 level of significance and conclude that **there is at least some relationship within each of the pairs of attributes.**

Research Question 3

We wanted to investigate **whether there was a significant difference between the ratings participants gave themselves (out of 10) and the relative importance (out of 100) they gave to an attribute based on what they thought the opposite sex would find attractive.** Each participant gave both ratings across the attributes physical attractiveness, sincerity, ambition, fun and intelligence prior to going on the dates. Normalization helped us compare the ratings which were on two different scales. In addition, this dataset contained duplicate copies of each pair of ratings and after removing those and a NAN, **n = 101** ratings remained.

Since both ratings were given by the same participant, we decided to use a **Paired T-Test** to test whether there was a significant difference in the mean ratings for each of the 5 attributes. We conducted 5 tests and the Null and Alternative Hypotheses for each of those is as follows:

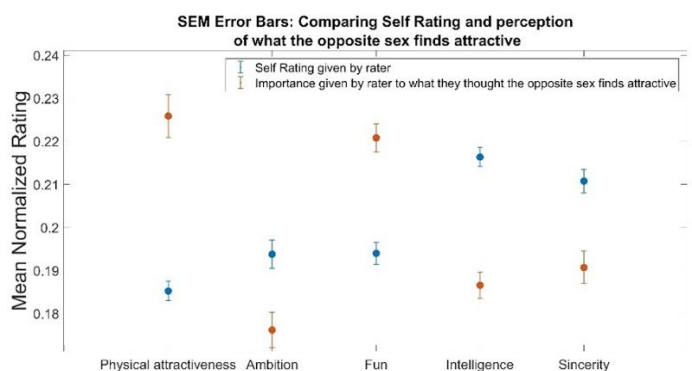
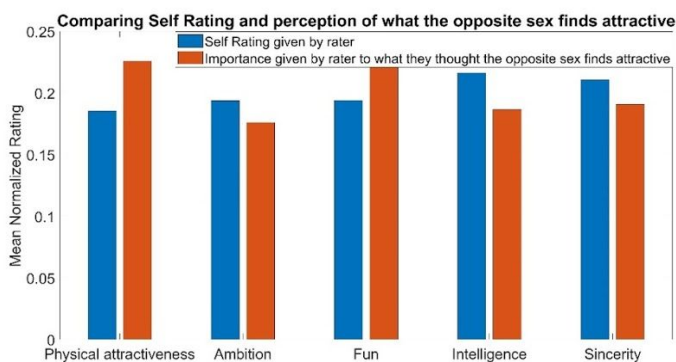
H_0 : No significant difference in means of both ratings OR $u = u_0$ where $u_0 = 0$ and $u = u_1 - u_2$.

(u_1 = mean rating given for self, u_2 = mean relative score given by self for what they thought the opposite sex deemed attractive. Both mean ratings were based on the normalized scores.)

H_1 : H_0 is false.

Attribute	Attractiveness	Sincerity	Fun	Intelligence	Ambition
Decision	Reject H_0	Reject H_0	Reject H_0	Reject H_0	Reject H_0
p-value	9.7044e-12	0.0019	3.85e-09	4.1841e-11	3.7249e-05

Since all p-values were less than 0.01, **we rejected all Null Hypotheses at the 0.01 level of significance.** This means that there was definitely a significant difference between the two ratings.



Moreover, based on the above plots it is evident that there is indeed some difference between the mean self rating and the mean importance given to an attribute based on what the participant thought the opposite sex would find attractive. As is evident from the orange points (SEM plot), the raters thought that the opposite sex would attribute the most importance to physical attractiveness and the least to ambition. Based on the blue points, the raters rated themselves the highest on intelligence and the lowest on physical attractiveness.

This indicates that for this sample, participants did not rate themselves higher or lower based on what they thought the opposite sex would find attractive; that is, their **self perception was not influenced by what they thought others' would perceive as attractive in their sex**.

Research Question 4

The last question that we want to analyze is **whether there is any correlation or difference between self scoring across five attributes and the scores given by members of the opposite sex for the same attribute**. Both of the scores were measured out of 10. Each participants were asked to give ratings for themselves and their partners in the same wave with respect to five attributes - ambition, intelligence, fun, sincerity and attractiveness. We normalized and removed duplicates similar to question 3 and were left with 101 ratings for each unique member.

Since both ratings were given for the same participant, we performed a **Paired T-test** to see if there was a significant difference between the mean self rating and mean rating given by others across those five attributes for all participants. Our null hypothesis and is alternative hypotheses for Hypothesis testing are as follows:

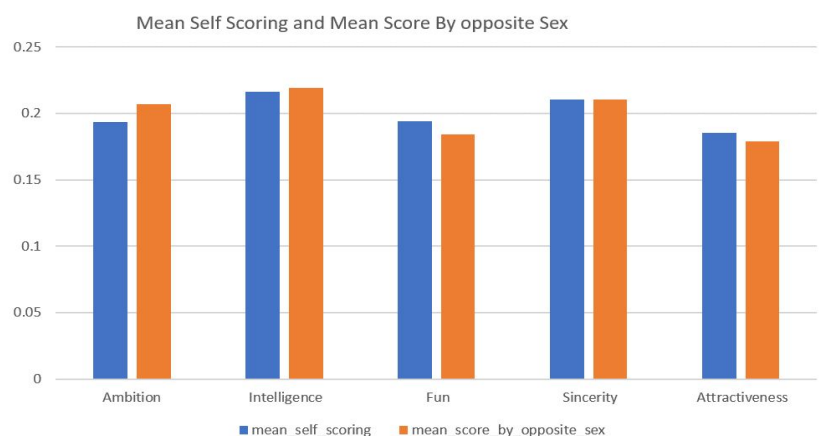
$$H_0: \mu_1 = \mu_2$$

$H_1: \mu_1 \neq \mu_2$ where μ_1 is the mean self-score for an attribute, μ_2 is the mean of scores given by members of opposite sex for the same attribute.

Attribute	Ambition	Intelligence	Fun	Sincerity	Attractiveness
p value	0.0104	0.4416	0.0417	0.9692	0.1309
Decision	Reject H_0	Fail to reject H_0	Reject H_0	Fail to reject H_0	Fail to reject H_0

We can see from the table that the p-values for **ambition and fun** are smaller than 0.05 implying that we can **reject the null hypothesis for these attributes**. However, for **intelligence, sincerity and attractiveness**, we got large p values and **failed to reject the null hypothesis at the 0.05 level of significance**.

The bar graph shows the mean ratings for self-scoring and scores given by the members of the opposite sex for the same attribute across the five attributes. There is an observable difference between the means for ambition and fun but the difference is less pronounced for the mean scores for intelligence, sincerity, and attractiveness.



Our results indicate that for **ambition and fun**, there is a significant difference in the rating given by a participant to themselves and the rating given to them by other people; that is, **there is a disparity between self-perception and others' perception for these two attributes**. However, the data suggests that for **physical attractiveness, intelligence and sincerity**, there is no significant difference between how people view themselves and how other people view them.