Introduction

This project analyzes the SpeedDating dataset to understand how individuals form good romantic first impressions and potentially make second-date opportunities. We examine four research questions (RQs) that move from initial attraction (RQ1), to decision making (RQ2), to personality influences on liking (RQ3), and finally misperception-driven missed connections (RQ4). Together these questions focus on compatibility, preferences, and uncertainty in early romantic interactions.

Data Cleaning Summary

We loaded the raw **SpeedDating.rda** dataset and kept only variables relevant to attraction, perceptions, and decisions. All rating variables (1-10 scales) were converted to integers for consistency. Rows containing missing values were removed to keep models NA free. The final dataset was saved as **SpeedDatingClean.rds**, which was loaded in for all statistical analyses.

Research Question 1 - Do shared interests and sincerity jointly increase romantic attraction?

We modeled male and female attraction ratings (**LikeM, LikeF**) using multiple linear regression with an interaction term (Shared Interests x Sincerity). This allowed us to test whether the effect of one trait depends on the level of the other.

RQ1 Key Findings

Men:

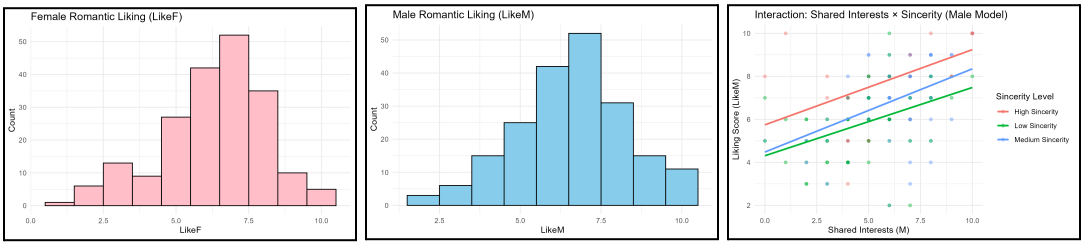
- Neither shared interests or sincerity alone significantly predicted liking.
- The interaction term was significant, meaning men's attraction increased only when both sincerity and shared interests were high.
- Adjusted R^2 = 0.35, indicating a moderately strong model.

Women:

- Shared interests and sincerity each had independent, positive effects on liking.
- The interaction term was not significant.
- Adjusted R^2 = 0.45, stronger than the male model.

Assumption Checks

Residual and QQ plots showed mild deviations but no violations severe enough to make linear modeling invalid.



Both genders show some skewed attraction distributions centered between 5-8, so it's suitable for linear regression. For men the scatter plot shows attraction rises more steeply when sincerity and shared interest are high.

Research Question 2 - Does attractiveness still predict second date decisions after controlling for personality?

We fitted logistic regression models predicting yes/no second-date decisions (**DecisionM**, **DecisionF**) from attractiveness, intelligence, and fun.

RQ2 Key Findings

Men:

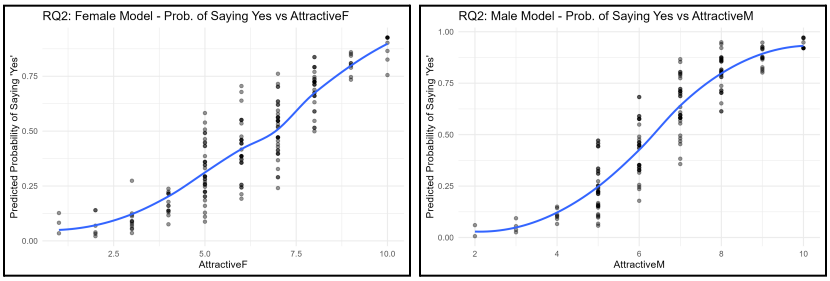
- Attractiveness was the strongest predictor (β = 1.049, Odds Ratio = 2.85)
- Higher intelligence actually reduced the odds of saying yes.
- Fun had no effect.
- The probability curve shows men's decisions were overwhelmingly appearance-driven

Women:

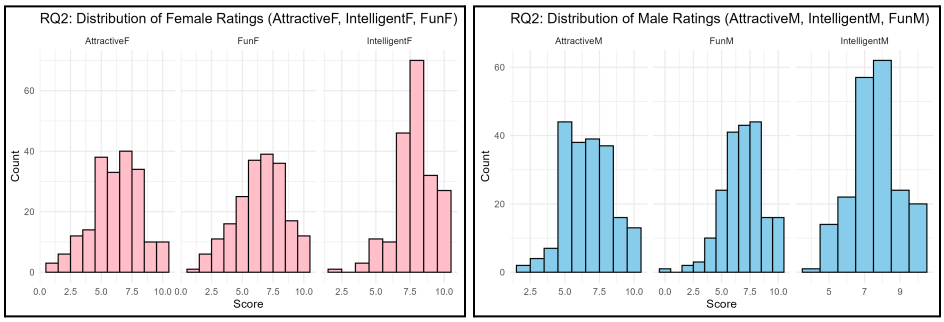
- Both attractiveness and fun significantly increased the odds of saying yes.
- Intelligence had no effect.
- Women displayed a more balanced mix of appearance and personality considerations than men

Assumption Checks

Residual vs fitted plots showed appropriate behavior for logistic models. There was no evidence of separation or multicollinearity.



The probability of saying “yes” increases with attractiveness for both genders, but men show a sharper rise.



Predictor distributions show good variability across attractiveness and personality traits.

Research Question 3 - Which Personality traits best predict romantic liking?

We used multiple linear regression to predict **LikeM** and **LikeF** from four traits: fun, sincerity, ambition, intelligence.

RQ3 Key Findings

Men:

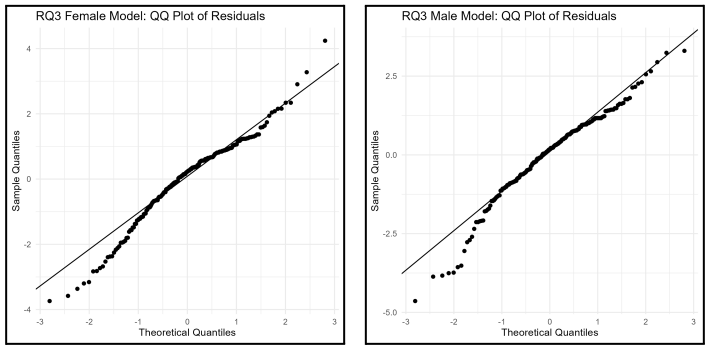
- Fun was the strongest predictor of romantic liking.
- Sincerity also added a meaningful positive effect.
- Ambition and intelligence did not influence men’s liking.
- Adjusted $R^2 = 0.38$

Women:

- Fun was the most influential predictor (largest β in both RQ3 models)
- Intelligence had a smaller but significant positive effect.
- Sincerity and ambition were not predictive.
- Adjusted $R^2 = 0.47$

Assumption Checks

Residual plots and QQ plots showed mild deviations but overall acceptable fits for linear regression.



Residual diagnostics show reasonably linear patterns and no severe violations.

Research Question 4 - Do underestimates of partner interest lead to missed connections?

This question investigates whether people lose romantic opportunities not because they lack attraction, but because they misjudge the other person's interest.

Step 1: How common are missed connections?

Among observations that were determined matchworthy (both **LikeM** and **LikeM** ≥ 7):

- 62 matchworthy pairs
- 29 missed connections
    - Missed connection: DecisionM = 1 and DecisionF = 0 or vice versa when matchworthy
- 47 % of mutually attracted pairs did not match

Step 2: Do matches and missed connections differ in perceived partner interest?

Welch t-tests showed significant differences:

Gender	Match Mean	Missed mean	p-value
Male	7.18	6.00	0.031
Female	7.61	6.14	0.007

Step 3: Logistic Model of Missed Connections

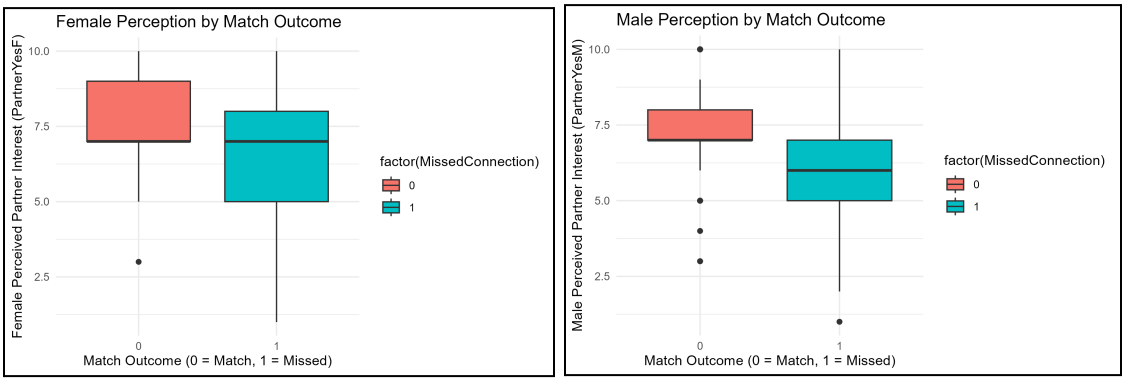
Underestimation variables predicted increased odds of missing a connection:

- **UnderestimateF:** Marginally significant (p = 0.089)
- **UnderestimateM:** Positive but not significant

Step 4: A "Perfect Information" World

Assuming people always say yes to a second date when **Like ≥ 7:**

- Actual matches: 48
- Hypothetical perfect-information matches: 62
- 14 additional matches would have formed (almost +30%)



Participants in missed connections systematically assign lower estimates of partner interest.

Overall Conclusions

Across all four questions, our results suggest that early romantic dynamics are shaped by a combination of compatibility, preference patterns, and psychological uncertainty:

- **RQ1:** Men value sincerity in combination with shared interests, while women value each trait independently
- **RQ2:** Attractiveness predicts second-date decisions for both genders, but men rely on it more heavily, while women consider fun and personality.
- **RQ3:** Fun is the strongest personality predictor of romantic liking for both genders (intelligence matters more for women)
- Misperception is a major source of lost romantic opportunities. Nearly half of mutually attracted pairs fail to match, and perfect information would create 14 new couples.

These findings highlight a consistent theme that attraction is multi-dimensional but sensitive. It also is heavily influenced by perceived traits and uncertainty about a partner's feelings.