

# Data Analysis Project 1 — Team Report

**Dataset:** Wallisch & Whritner (2017) Movie Ratings Replication Set  
 $\alpha = 0.005$

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## Q1 — Are popular movies rated higher than unpopular ones?

### D (Do):

To examine whether popularity is associated with higher enjoyment, the number of valid ratings (non-missing values) was calculated for each of the 400 movies.

Movies were then split into two groups using a **median split** on the number of ratings:

- **Popular** (above median number of ratings)
- **Unpopular** (below median number of ratings)

Mean enjoyment scores were computed for each movie and compared using **Welch's independent-samples t-test**.

### Y (Why):

Welch's t-test was chosen because it compares mean values between two independent groups without assuming equal variances or equal sample sizes, conditions appropriate for this dataset since popular films naturally have more ratings.

### F (Find):

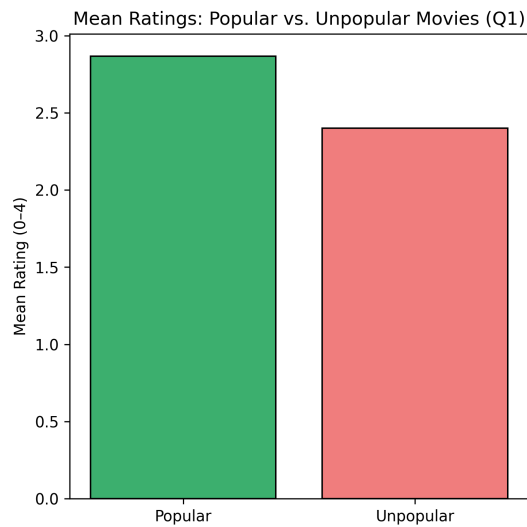
Popular movies had a **mean rating of 2.87**, while unpopular movies had a **mean rating of 2.40**.

The difference was **highly significant**,  $t(398) = 17.76$ ,  $p < 0.001$ .

### A (Answer):

Popular movies were rated significantly higher than unpopular movies.

This finding suggests that films which attract more viewers also tend to be perceived as higher quality or more enjoyable, aligning with the idea that widespread appeal often correlates with positive reception.



*(See Figure Q1: “Mean Ratings — Popular vs. Unpopular Movies” for visualization.)*

## Q2 — Are newer movies rated differently than older ones?

### D (Do):

Each movie title included its release year (e.g., “The Matrix (1999)”).

These years were extracted and used to classify films as **new** or **old** using a **median split**.

The mean rating for each group was compared using Welch’s t-test.

### Y (Why):

This analysis tests whether movie recency (a proxy for cultural or production-value differences) affects perceived quality.

Again, Welch’s t-test was appropriate because the two groups differ in sample size and variance.

### F (Find):

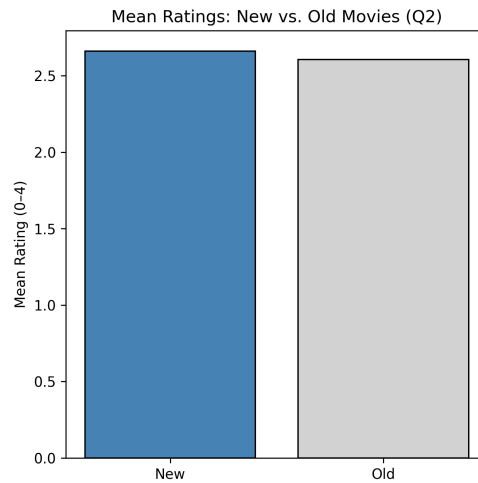
Newer movies had a **mean rating of 2.66**, while older movies had a **mean rating of 2.61**.

The difference was **not statistically significant**,  $t(398) = 1.61$ ,  $p = 0.109$ .

### A (Answer):

There is **no evidence** that newer movies are rated differently from older ones.

This suggests that, within this dataset, **movie age does not systematically influence enjoyment ratings** — viewers seem to appreciate both classic and modern films similarly.



(See Figure Q2: “Mean Ratings — New vs. Old Movies” for visualization.)

## Question 4 — Gender Differences Across All Movies

### D (Do):

Performed Welch’s independent-samples  $t$ -tests comparing male (code 2) and female (code 1) ratings for each of the 400 movies. Excluded missing data and self-described gender responses.

### Y (Why):

The Welch’s  $t$ -test was chosen because it does not assume equal variances and is robust to unequal sample sizes. This test identifies whether gender significantly affects movie ratings.

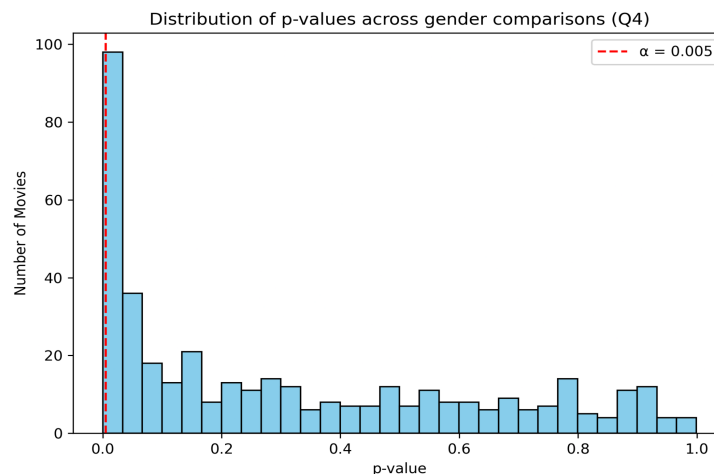
### F (Find):

Out of 400 movies, **45 (11.25%)** showed statistically significant differences between male and female viewers at  $\alpha = 0.005$ .

As shown in **Figure 1**, most  $p$ -values cluster above 0.005, suggesting few meaningful gender-based rating differences.

### A (Answer):

Since only 11.25% of movies differed by gender, we conclude that movie enjoyment is **largely not gendered**. This aligns with Wallisch & Whritner (2017), who found weak demographic effects on movie



taste.

Figure 1. Distribution of  $p$ -values across gender-based comparisons ( $\alpha = 0.005$ ).

## Question 5 — “Only Child” Effect for *The Lion King* (1994)

### D (Do):

Compared mean ratings of *The Lion King* (1994) between participants who are only children (coded 1) and those with siblings (coded 0) using Welch’s  $t$ -test.

### Y (Why):

The Welch’s  $t$ -test was used to compare group means while accounting for unequal variances and sample sizes.

### F (Find):

Mean rating (only children) = 3.35; mean rating (with siblings) = 3.48.

$t(df \approx \text{variable}) = -1.792, p = 0.0746 > 0.005$ .

See **Figure 2** for a visual comparison.

### A (Answer):

Since  $p > 0.005$ , there is **no statistically significant difference** between only children and participants with siblings in their enjoyment of *The Lion King* (1994).

Both groups rate the film highly and similarly.

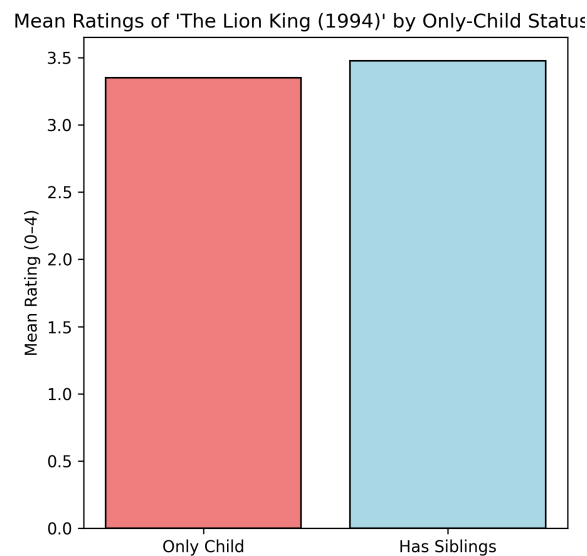


Figure 2. Comparison of *The Lion King* (1994) mean ratings by only-child status.

## Question 6 — “Only Child” Effects Across All Movies

### D (Do):

Repeated Welch’s  $t$ -tests from Question 5 for each of the 400 movies, comparing only children and participants with siblings.

### Y (Why):

This systematic approach estimates how widespread “only child” effects are across the entire dataset.

### F (Find):

Only **5 movies (1.25%)** showed significant differences ( $\alpha = 0.005$ ).

As seen in **Figure 3**, the  $p$ -value distribution is heavily skewed above 0.005, indicating minimal systematic effects.

### A (Answer):

Because only 1.25% of movies exhibit significant differences, we conclude that **“only child” status rarely affects movie ratings**. This suggests personal taste rather than family structure drives enjoyment patterns.

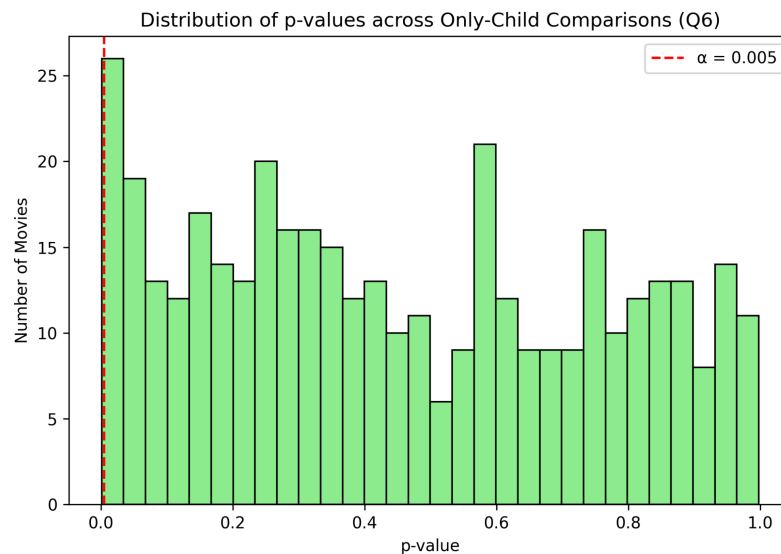


Figure 3. Distribution of  $p$ -values across “only child” comparisons ( $\alpha = 0.005$ ).

## Question 7 — Social Watching Preference and *The Wolf of Wall Street* (2013)

### D (Do):

Compared *The Wolf of Wall Street* (2013) ratings between participants who prefer watching movies socially (coded 0) versus those who prefer to watch alone (coded 1) using Welch's  $t$ -test.

### Y (Why):

This test determines whether social viewing preference relates to enjoyment of a socially charged, intense film, accounting for unequal group variances.

### F (Find):

Mean rating (social watchers) = 3.03; mean rating (prefer alone) = 3.15.

$t(df \approx \text{variable}) = -1.604, p = 0.1092 > 0.005$ .

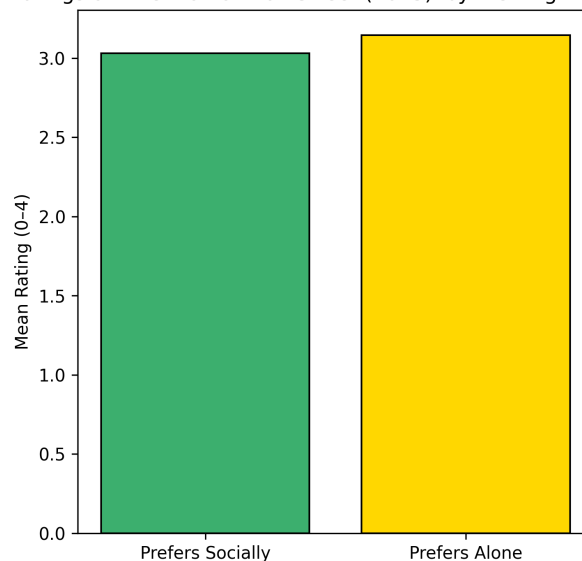
See **Figure 4** for a comparison.

### A (Answer):

Since  $p > 0.005$ , there is **no significant relationship** between social viewing preference and enjoyment of *The Wolf of Wall Street* (2013).

Both groups rated the film similarly, suggesting that viewing context preference does not influence appreciation for this movie.

1 Ratings of 'The Wolf of Wall Street (2013)' by Viewing Preference



*Figure 4. Mean ratings of The Wolf of Wall Street (2013) by viewing preference.*

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