

# Understanding Online Reviews and Recommendations

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# Improving Online Recommendations



- ### My Research
- Define a new evaluation metrics: *Stability*
  - Develop novel approaches to improve stability of recommendations
  - Impact of recommendations on *products sales diversity*
  - How consumption patterns affect future *recommendation accuracy*

# *"Recommended just for you"*



# Customers are overloaded



**Today a person is subjected to more new information in a day than a person in the middle ages in his entire life!**

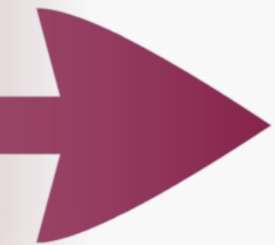
**But they really need  
and consume only a  
few of the products!**



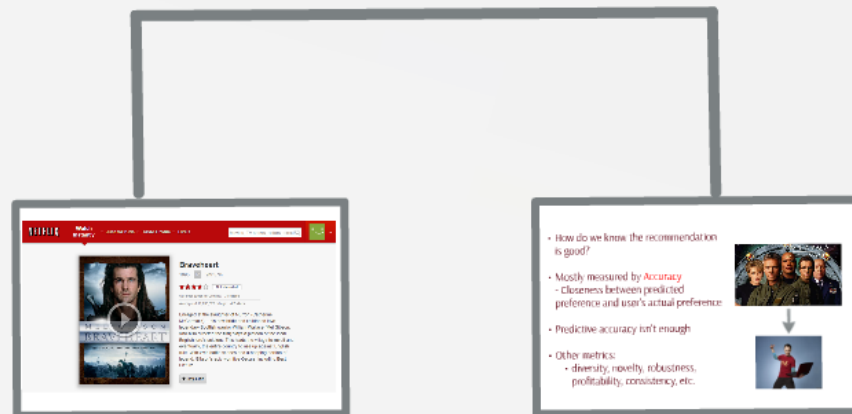
# The idea of Recommender Systems

To recommend products customers may like

- Amazon: > 30% of sales
- Netflix: 75% of watched videos



# Evaluating Recommendations







## Braveheart

1995 R 2hr 57m



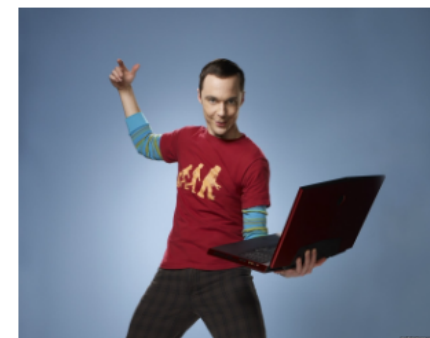
Our best guess for Jingly: 3.8 stars

Average of 11,038,522 ratings: 4.2 stars

Enraged at the slaughter of Murron (Catherine McCormack) -- his new bride and childhood love -- legendary Scottish warrior William Wallace (Mel Gibson, who also directed the film) slays a platoon of the local English lord's soldiers. This leads the village to revolt and, eventually, the entire country to rise up against English rule. With vivid battle scenes and a heaping portion of legend, Gibson's epic won five Oscars, including Best Picture.

+ My List

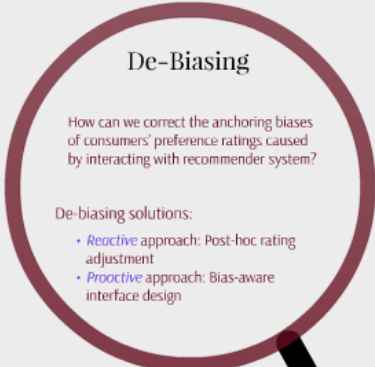
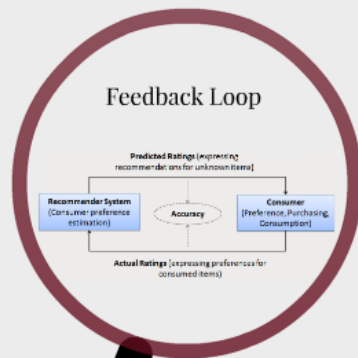
- How do we know the recommendation is good?
- Mostly measured by **Accuracy**
  - Closeness between predicted preference and user's actual preference
- Predictive accuracy isn't enough
- Other metrics:
  - diversity, novelty, robustness, profitability, consistency, etc.



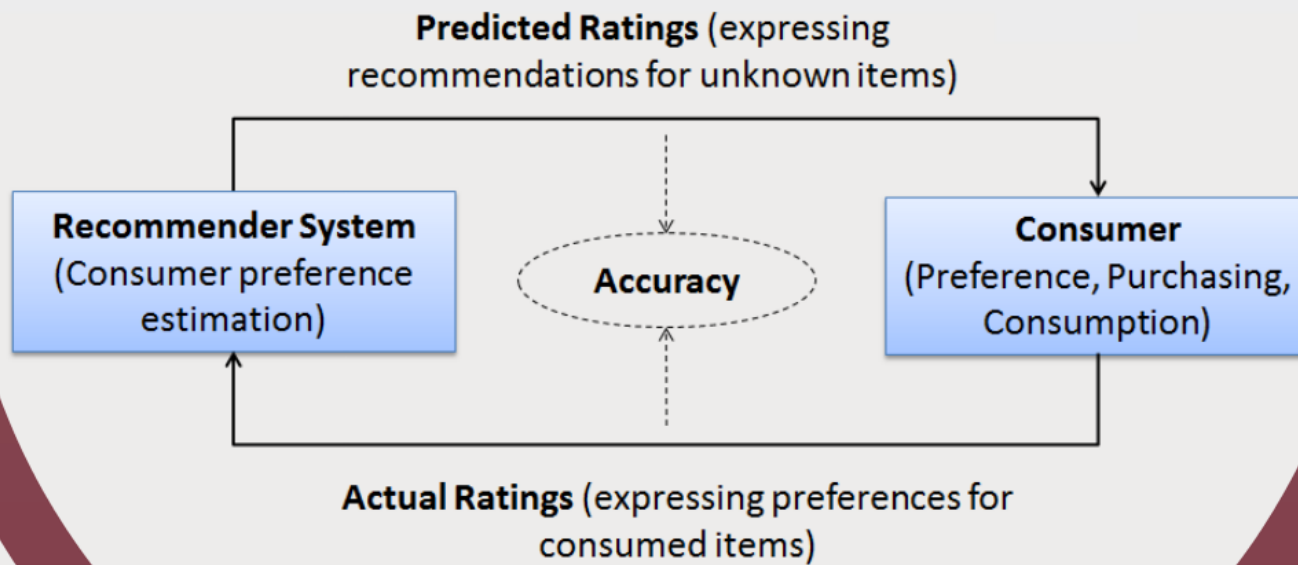
# My Research

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# Consumer Biases in Online Marketplace

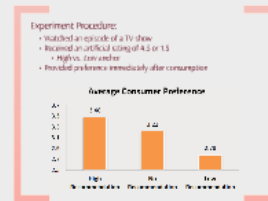


# Feedback Loop

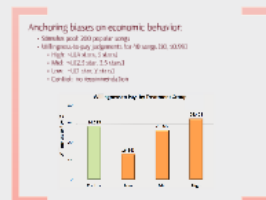


General research question: How do recommendations affect consumers' decision making?

## Consumer Preference



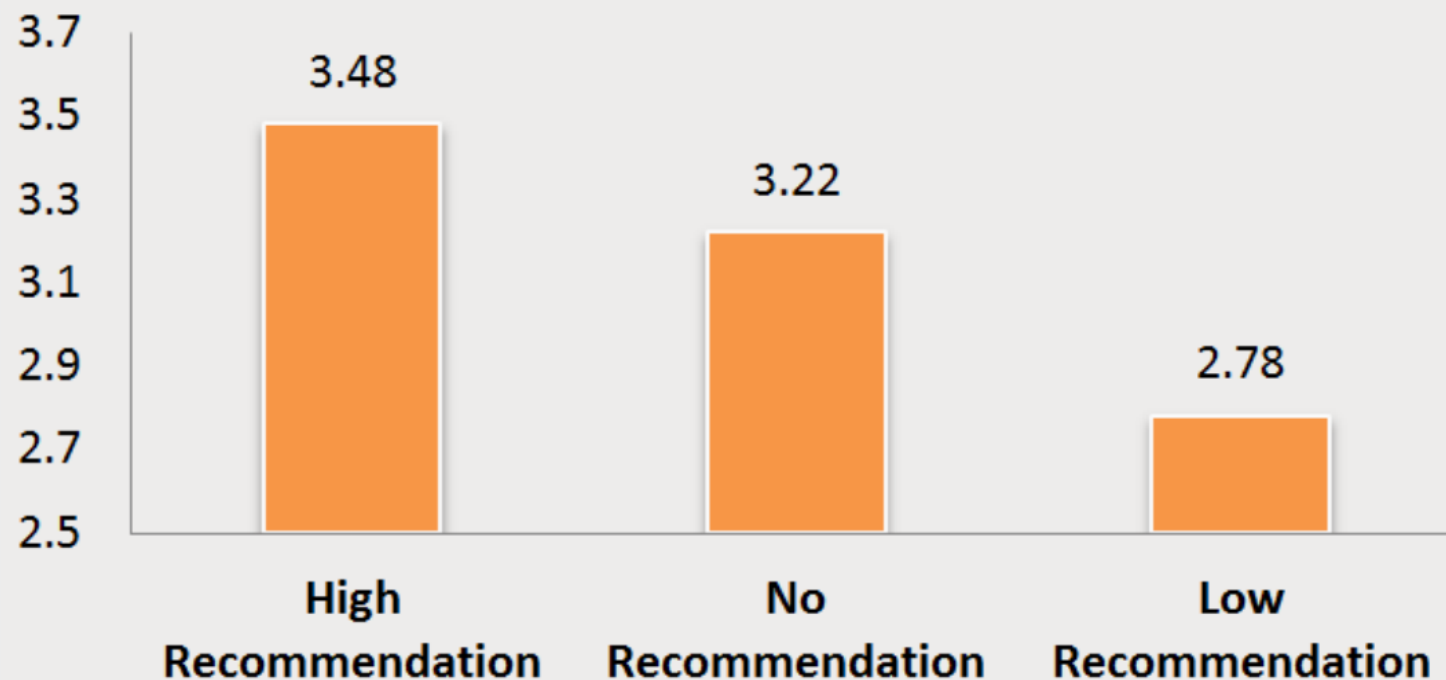
## Economic behavior



## Experiment Procedure:

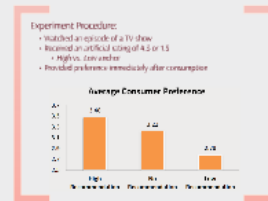
- Watched an episode of a TV show
- Received an artificial rating of 4.5 or 1.5
  - *High vs. Low anchor*
- Provided preference immediately after consumption

### Average Consumer Preference

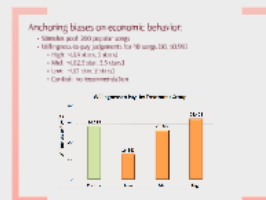


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## Consumer Preference



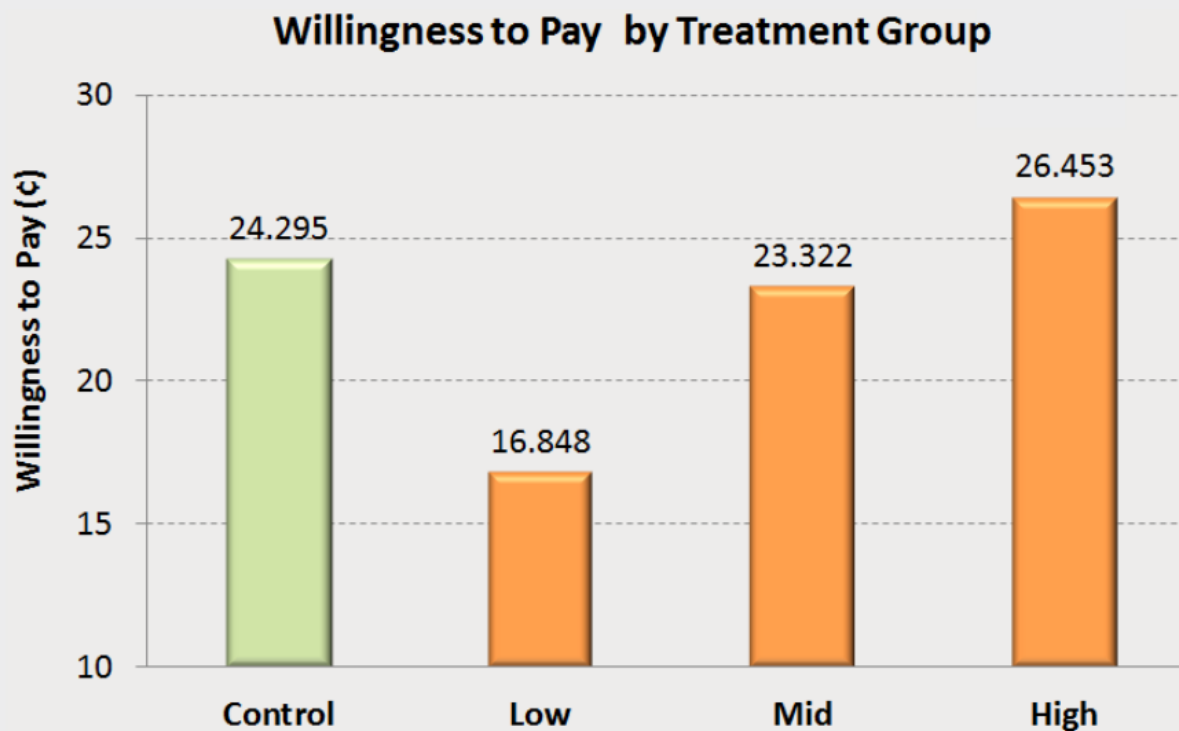
## Economic behavior





# Anchoring biases on economic behavior:

- Stimulus pool: 200 popular songs
- Willingness-to-pay judgements for 40 songs [\$0, \$0.99]
  - High:  $\sim U[4 \text{ stars}, 5 \text{ stars}]$
  - Mid:  $\sim U[2.5 \text{ star}, 3.5 \text{ stars}]$
  - Low:  $\sim U[1 \text{ star}, 2 \text{ stars}]$
  - Control: no recommendation



# Implications

- Recommendations not only impact preference ratings, but also economic behavior
- Effects observed with artificial recommendations, and also with perturbed system-based recommendations
- Effects is linear

# De-Biasing

How can we correct the anchoring biases of consumers' preference ratings caused by interacting with recommender system?

De-biasing solutions:

- *Reactive* approach: Post-hoc rating adjustment
- *Proactive* approach: Bias-aware interface design

## Mining Online Reviews

- Analyze consumer's personality traits based on online reviews
- Incorporate personality traits in enhancing recommendations

- Mobile Apps: app life cycle management
  - Version update strategy
  - What version updates to release?
  - When to release version updates?

- Healthcare:
  - Online support network for weight loss community
  - Impact of hospital IT systems

## Other Research Topics

# Mining Online Reviews

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