

I rate you. You rate me. Should we do so publicly?

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Ratings are an integral part of Web 2.0, but are they honest?



- Many sites use recommender/reputation systems to help users identify reliable content and services
- How can one elicit honest ratings?
 - when users review items
 - when users rate other users' reviews
 - when users rate other users
- We study a variety of sites that cover this space of rating types and various design choices



Amazon

- Amazon.com provides a platform which allows users to review products
- Users can decide to use a pen name or real name to review products
- 15 thousand article recent reviews from top 1500 reviewers (about one half using pen names)





Epinions

- Epinions.com allows users to share product reviews.
- Users can write reviews, rate other users' reviews, and specify which users they “trust” or “distrust”
 - ~800K user-to-user ratings (trust or not)
 - ~100K users and 3 million articles



CouchSurfing

- CouchSurfing is a service for travelers looking to meet new people while finding a “couch” to sleep on.
- data: 600K users, 3 million edges
- Users can do the following for other users:
 - specify friendship level (e.g. acquaintance, friend, best friend)
 - specify how much they trust them (e.g. “somewhat”, “highly”)
 - vouch for them
 - leave positive, neutral, or negative references





Structure of rating systems



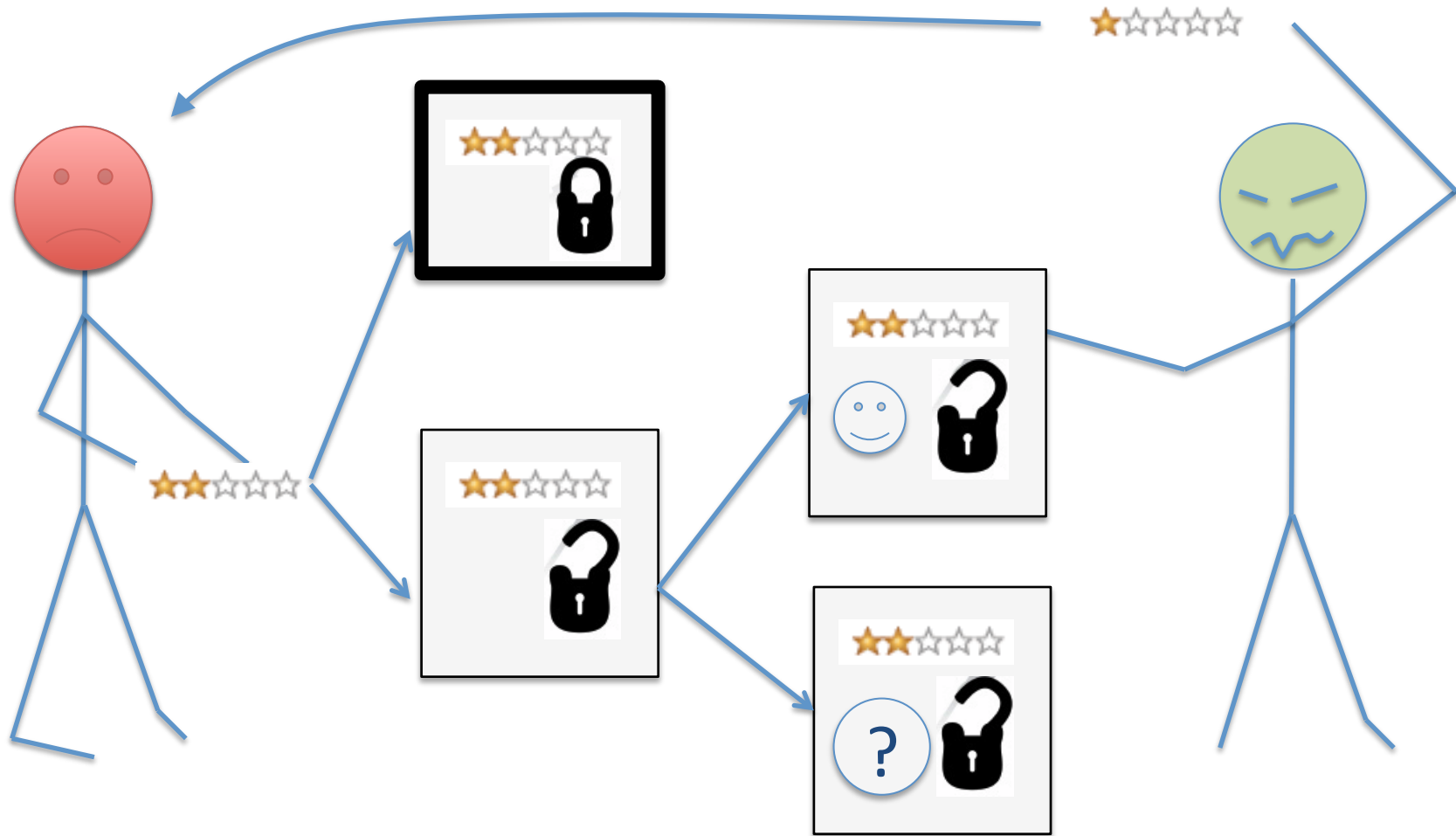


Research Questions

- How do design choices in online social networking & recommendation sites influence ratings?
- Are there other factors affecting ratings?



Design choices





Design choices: displaying ratings

- Show ratings publicly or keep private
- Amazon
 - Product reviews are public
- CouchSurfing
 - Public (friend, vouch, reference), private for trust
- Epinions
 - Public for rating of reviews
 - Public for trust links to other users
 - Private for distrust links to other users



Design choices: anonymity

- Do users have to identify themselves when giving ratings?
- Amazon
 - Choice of pen name or real name
- Epinions
 - Choice of username or staying anonymous when rating other users' reviews
- CouchSurfing
 - All public ratings are identified: friendship, references, vouches



Design choices: reciprocity

- Is there any potential for reciprocity?
- Amazon
 - Not really: products don't rate you back
- Epinions
 - Yes
- CouchSurfing
 - Yes

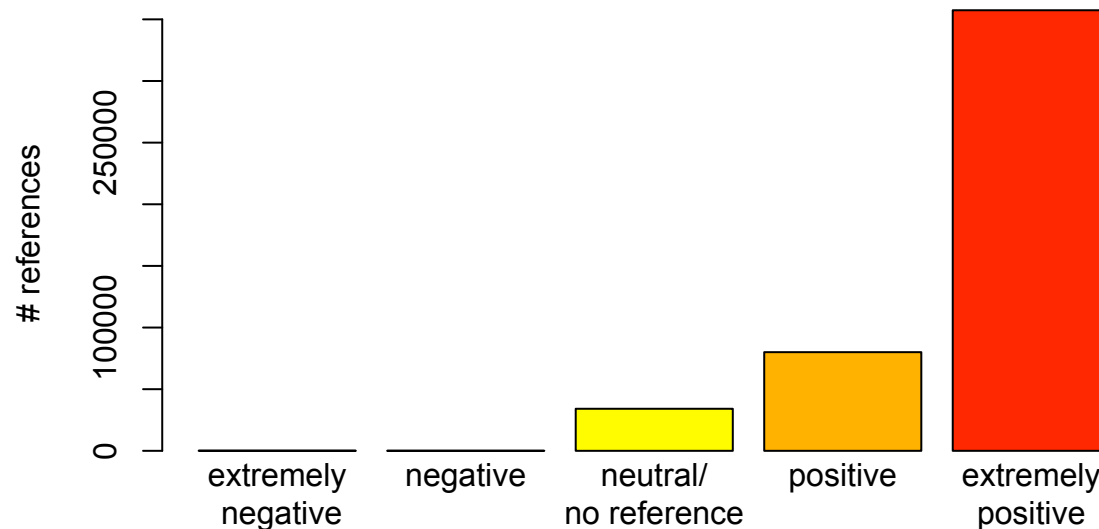


Privacy and ratings



Privacy and ratings: scarcity of public, negative ratings when identified

- CouchSurfing
 - Users leave a positive reference for 87.7 % of those they host and for 90.1% of those who host them
 - Neutral/missing references are confounded in data
 - The ratio of positive to negative references is 2500:1!



Privacy and ratings: negative ratings do occur when they are private

- Opinions
 - Users express trust publicly and distrust privately
 - non-trivial fraction (14.7%) are “distrust” ratings.



Anonymity and ratings

amazon.com[®]


Epinions.com[™]

Anonymity and ratings in absence of reciprocity



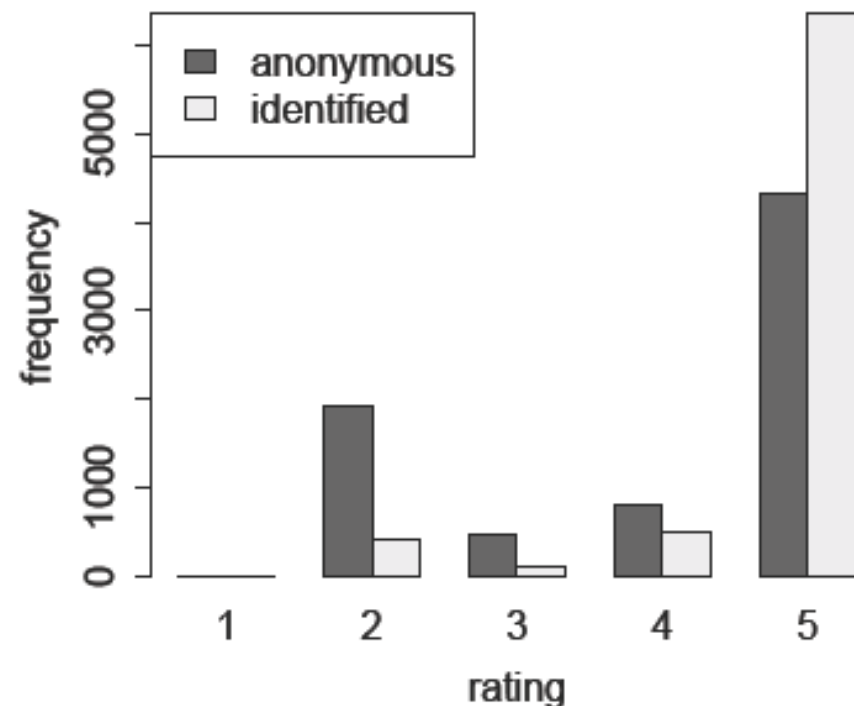
amazon.com[®]

attribute	pen name	REAL NAME™	statistically significant
product rating # stars	4.19	4.21	no
# reviews	498	551	yes
length of review (words)	364	377	yes
# of fan voters	28.6	37.1	yes

Anonymity and ratings when there is potential for reciprocity



- Anonymous ratings are lower (3.84) on average than identified ratings (4.71)
- For the same user, anonymous ratings still average lower (4.01) than identified ones (4.76)





Is there evidence of reciprocity in ratings?





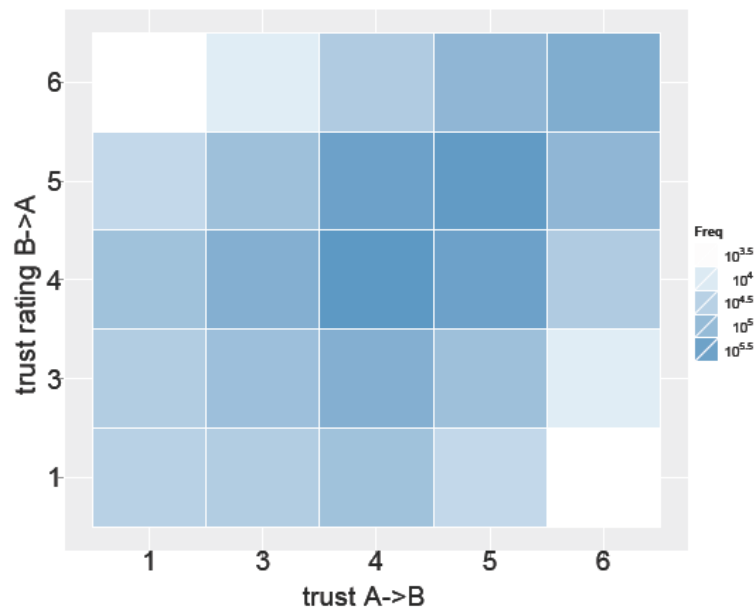
Reciprocity in Epinions

- We aggregate the user-to-article ratings into user-to-user ratings.
 - e.g.: if user A rates two of user B's articles with average rating of 4, $\text{rating}(A \rightarrow B) = 4$
- # of Ratings and rating scores show reciprocity
 - Rating from A to B is correlated with rating from B to A ($\rho = 0.475$)
 - # of ratings from A to B and B to A also displays reciprocity ($\rho = 0.49$)

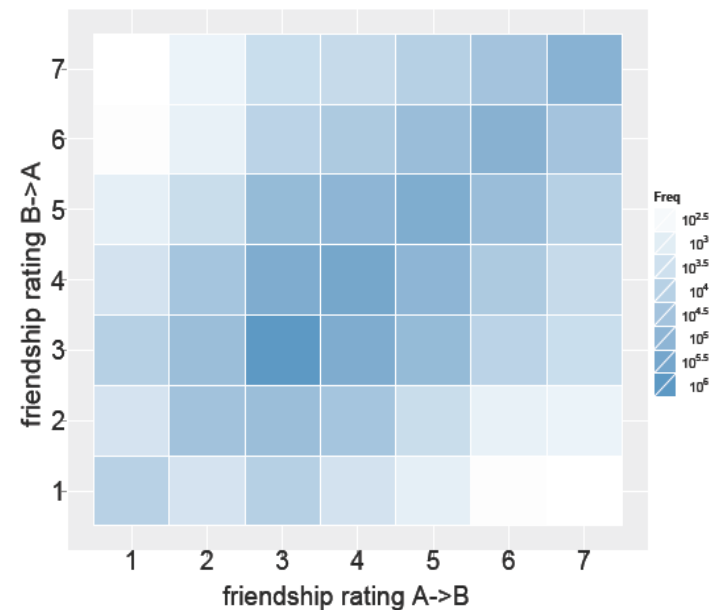


Reciprocity in CouchSurfing

- *Public* friendship ratings are more highly correlated ($\rho = 0.73$) than *private* trust ratings ($\rho = 0.39$)



(a) alignment of trust ratings between user pairs



(b) alignment of friendship ratings between user pairs

We omit trust rating of 2 (I don't know the person)



Reciprocity in CouchSurfing

- Vouching also demonstrates reciprocity
 - If A vouched for B, 70% of the time B also vouched for A
 - Mean *private* trust score for reciprocated vouches was higher (4.47) than unreciprocated ones (4.19)
 - ➔ lack of rating could signal lower trust



Are truthful ratings reliable?

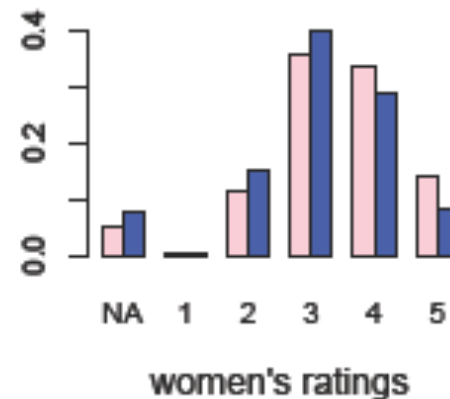
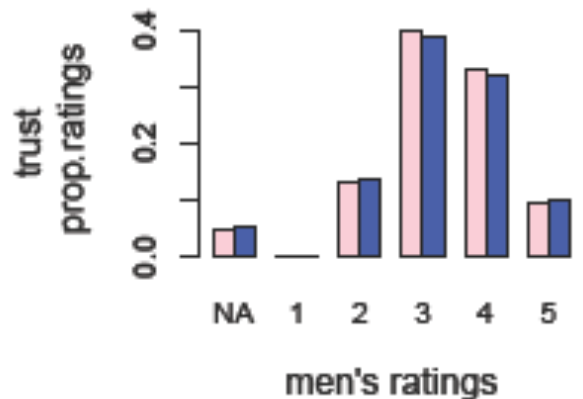
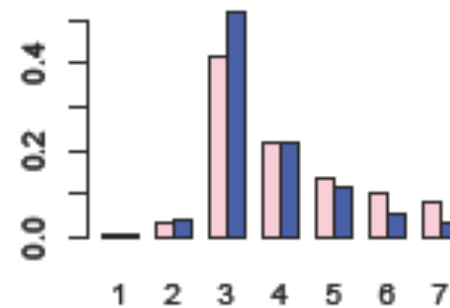
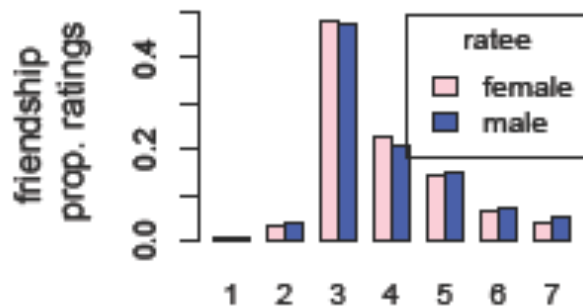
- Even if one were able to elicit truthful ratings, would there still be biases?
- To answer this we used demographic information from CouchSurfing.com



Gender effects for trust & friendship



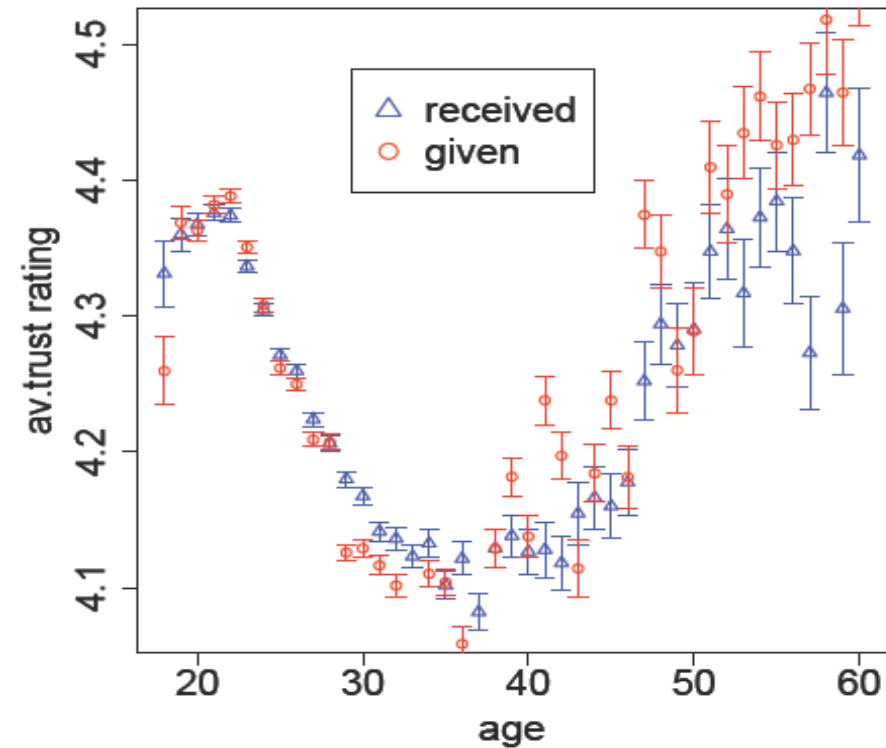
- Men rate both men and women about equally on trust and friendship
- Women rate other women more highly on both





Age

- Trust is very slightly higher the smaller the age difference between rater and ratee ($\rho = -0.06$)
- Trust depends on age of ratee – typical CouchSurfing demographic preferred?



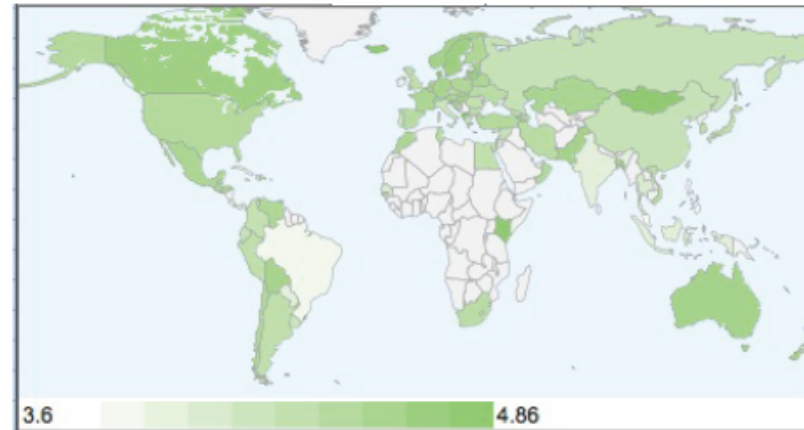


Geography

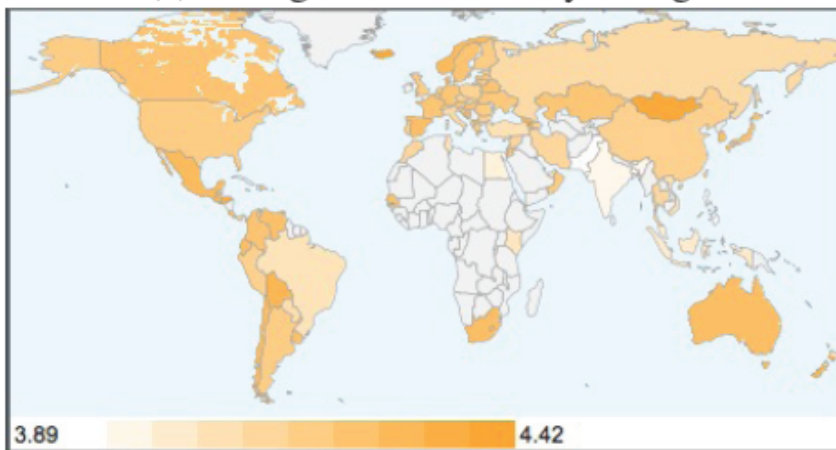
- Closer friends tend to be geographically proximate
 - Friendship for one's countrymen (4.19) is higher than foreigners (3.65)
 - Trust for one's countrymen is higher than for foreigners (4.33 vs 4.16)



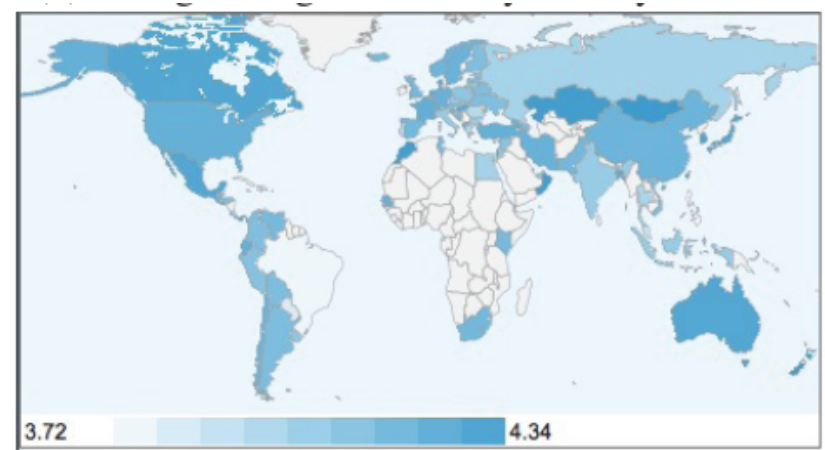
Geography



(a) average within-country ratings



(b) average ratings received by country residents



(c) average ratings given by country residents



Geography

- Countries with similar cultural background tend to be trusting of one another (e.g. Austria and Germany)
- Sharing a border does not always correspond to greater trust (e.g. Canadians did not rate US contacts more highly)



Conclusion

- Ratings should not be taken at face value
- Public, identified ratings tend to be positive when there is potential for reciprocity
- Demographics are tied to how users give ratings



Future work

- Survey users as to when and why they choose to rate anonymously
- Identify the criteria users use in rating others
- Develop trust prediction algorithms accounting for biases

more info

- <http://netsi.org>