Do Social Networks Improve e-Commerce?
A Study on Social Marketplaces

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Leveraging Online Social Networks

- Online communities in the Web 2.0 era
  - Facebook – ~90 million users
  - Myspace – ~110 million users
  - Orkut – ~60 million users
- Question: can friends-of-friends networks be leveraged outside social networks?
- Examples
  - Internet Search
  - Spam Filtering
  - Online marketplaces…?
    - Enhanced reputation systems
    - Sybil Protection

What's Wrong With Online Marketplaces?

- *Man arrested in huge eBay fraud* – MSNBC 2003
  - http://www.msnbc.msn.com/id/3078461/
- *eBay urged to tackle fraud better* – BBC 2006
  - http://news.bbc.co.uk/1/hi/uk/4749806.stm
- *Fraud abroad remains 'uphill battle' for eBay* – CNET 2008
  - http://news.cnet.com/Fraud-abroad-remains-uphill-battle-for-eBay/2100-7348_3-6233893.html
- *Tacoma woman's house emptied after Craigslist hoax* – The Seattle Times 2007
  - http://seattletimes.nwsource.com/html/localnews/2003652872_webhouse05m.html
- *Escrow fraud ruining Craigslist?* – ZDNet 2008
  - http://blogs.zdnet.com/threatchaos/?p=519

- **Bottom Line –**
  - Online markets plagued by fraud
  - Feedback-based reputation systems ineffective

Social Marketplaces and Overstock.com

- Online marketplaces that incorporate social networks
- Hypothesis: transactions with social friends will have higher satisfaction.
  - Are people actually using this capability?
    - Measure transaction volume vs. path length
  - Do social networks actually improve satisfaction?
    - Measure satisfaction vs. path length
- Overstock Auctions
  - Started in 2004
  - Similar to eBay
    - Buyers leave feedback after each transaction
  - Incorporates social components
    - Comment and leave ratings on friend's profiles
    - Message boards
    - "How am I connected?" button

overstock.com®

Methodology

- Analyze overall network structure of Overstock
  - Connectivity of all 431,705 users provided by Overstock
  - Two networks:
    - "Personal" – connecting friends
    - "Business" – automatically connects users who transact
- Correlating structure with transactions
  - Two questions:
    1. What correlates transactions: Business or Social connectivity?
    2. What is the impact of path length on transaction satisfaction?
  - Crawled transaction history of ~10,000 users
  - ~18,000 total transactions
    - Overall feedback for each user
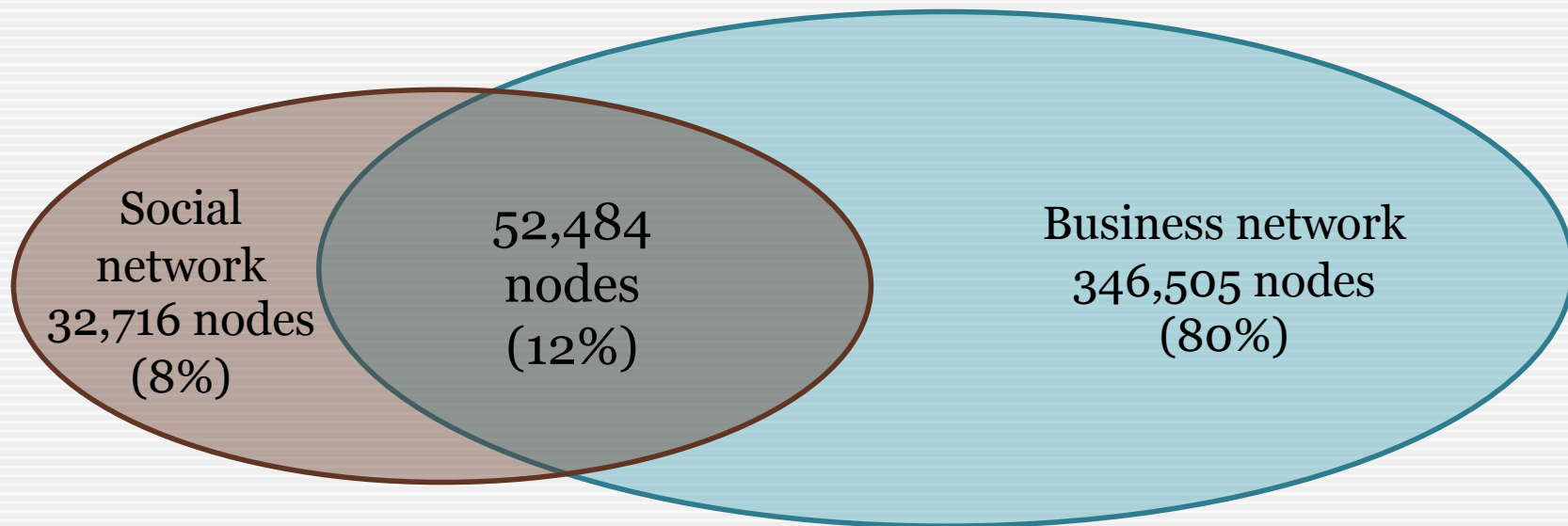   - Feedback for individual transactions

Outline

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1. **Connectivity graph analysis**
2. What correlates transactions?
   o Social vs. Business path lengths
3. Impact of path lengths on transaction satisfaction
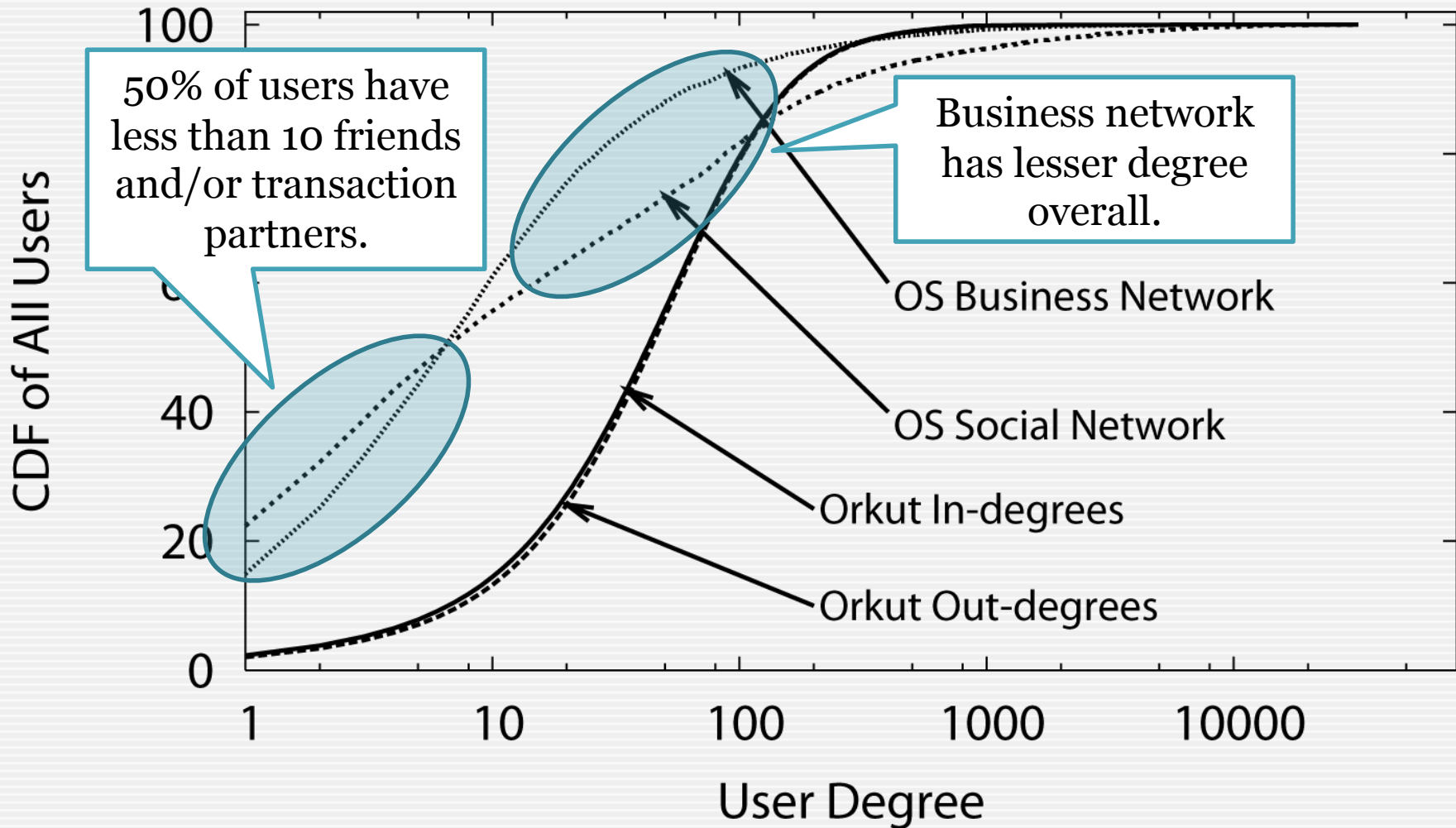
Connectivity Graph Analysis

	Business Network	Social Network
Total Nodes	398,989	85,200
Total Links	1,926,553	1,895,100
Avg. Node Degree	4.82	22.24

Social network 32,716 nodes (8%)

52,484 nodes (12%)

Business network 346,505 nodes (80%)

- 82% of users have < 1% overlap

Connectivity is Heterogeneous

Outline

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1. Connectivity graph analysis
2. **What correlates transactions?**
   - **Social vs. Business path lengths**
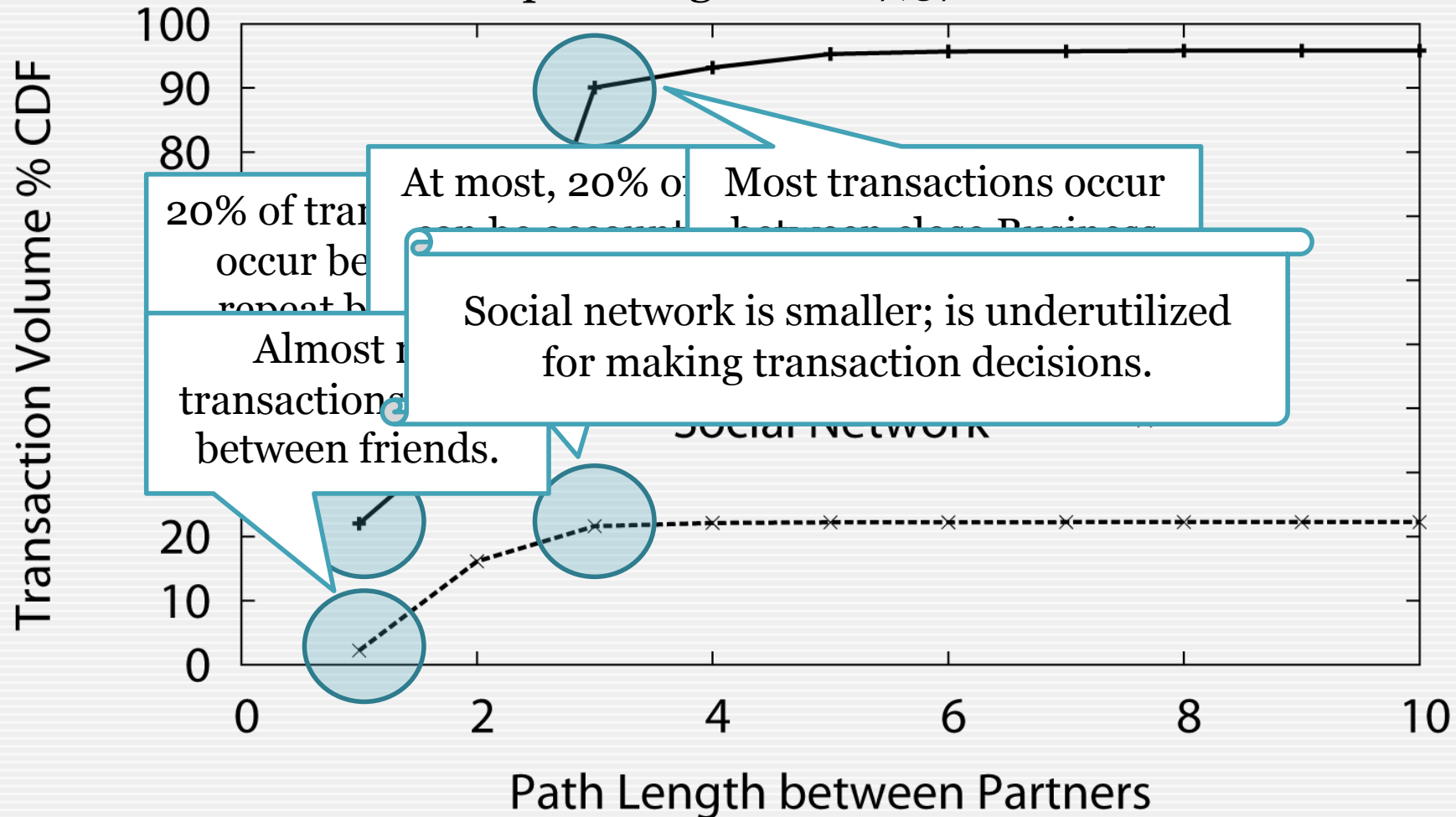3. Impact of path lengths on transaction satisfaction

Transaction Volume vs. Path Length

- Question: is there a correlation between social distance and buying decisions?

- Compare transaction volume to network path length
  - For each transaction, compute hops between buyer and seller
  - Business network – Connectivity is almost guaranteed
    - For partners with multiple transactions, path length = 1
    - Otherwise, remove 1-hop edge and calculate distance
  - Social network – Connectivity is NOT guaranteed!
    - Not all users are present in the Social Network

Observations on Transaction Volume

Volume vs. path lengths for 17,376 transactions

20% of transactions occur between repeat buyers.

At most, 20% of transactions can be accounted between close Business partners.

Most transactions occur between close Business partners.

Almost no transactions occur between friends.

Social network is smaller; is underutilized for making transaction decisions.

Transaction Volume % CDF

Path Length between Partners

Outline

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3. **Impact of path lengths on transaction satisfaction**
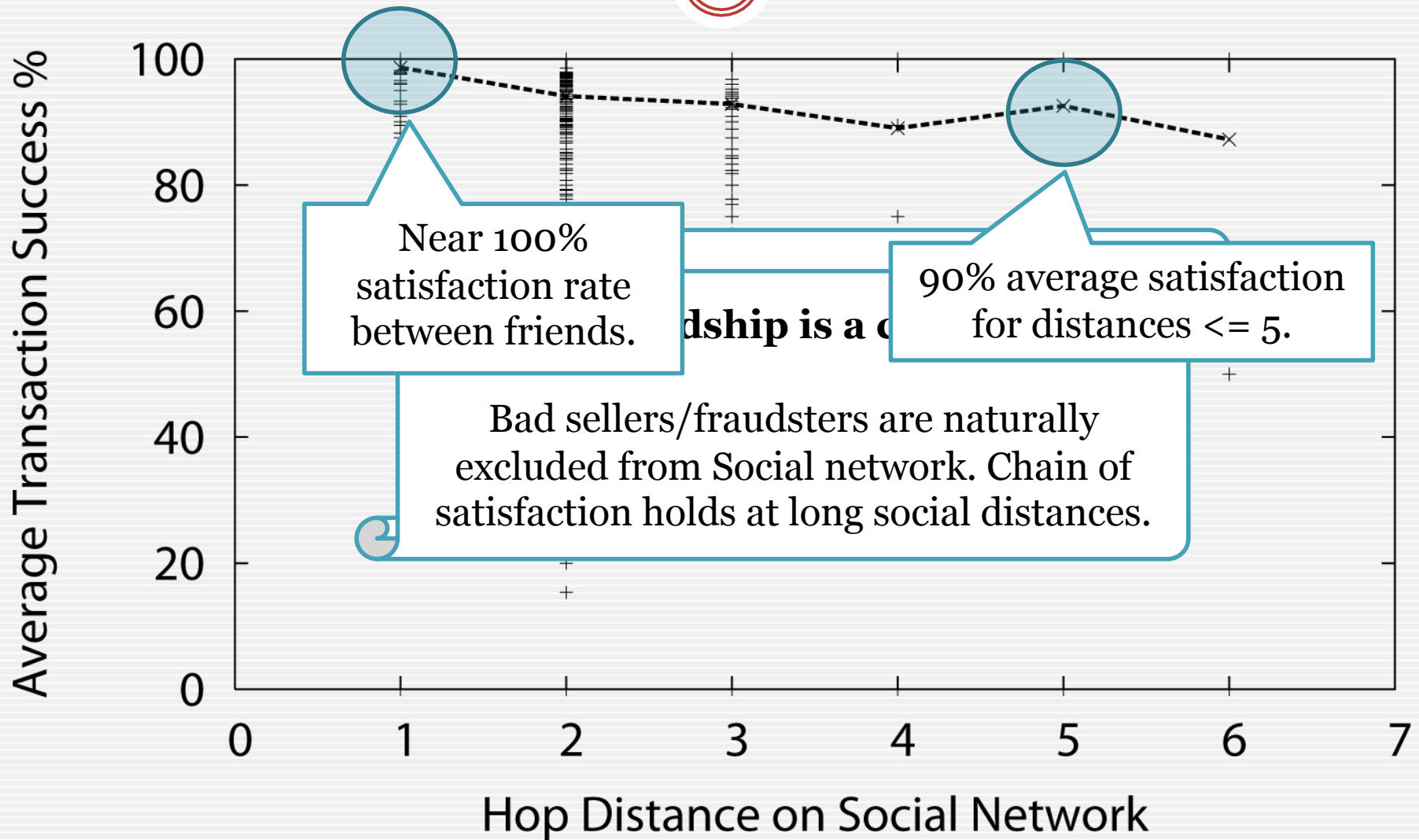
Impact of Path Lengths on Satisfaction

- Question: does social distance influence transaction satisfaction?
  - Transaction success percentage vs. path lengths for 17,376 transactions
- Example transactions:

Seller	Buyer	Transaction ID	Date	Rating (-2 to +2)
A	B	123	2/19/2005	+2
A	B	234	12/17/2004	+2
A	C	345	12/15/2004	0
B	D	456	12/2/2004	-1

- Satisfied = [+1, +2]

Observations on Personal Network

Near 100% satisfaction rate between friends.

90% average satisfaction for distances <= 5.

Friendship is a c...

Bad sellers/fraudsters are naturally excluded from Social network. Chain of satisfaction holds at long social distances.

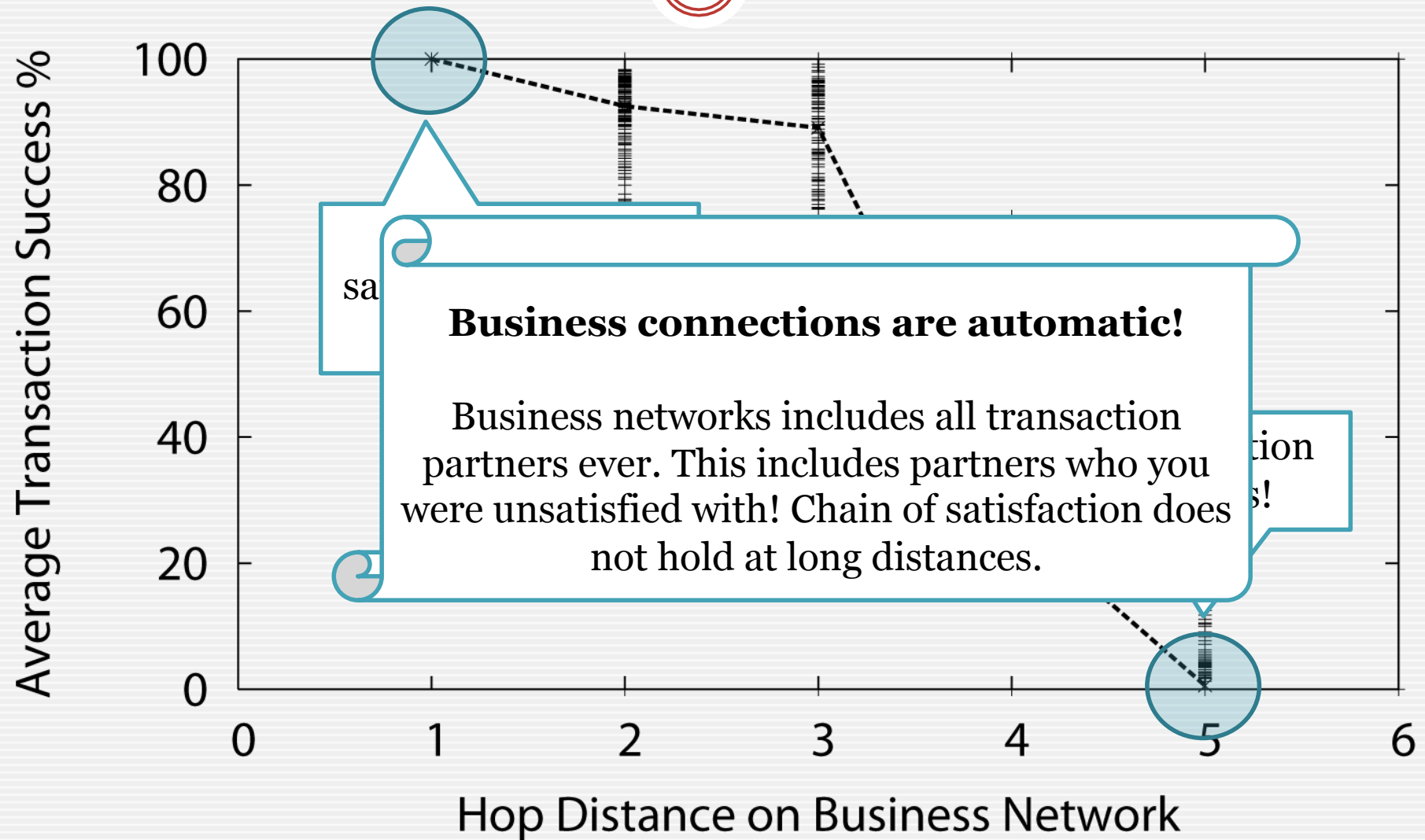(Chart: y-axis "Average Transaction Success %" from 0 to 100; x-axis "Hop Distance on Social Network" from 0 to 7)

Observations on Business Network

Conclusions

- Social links underutilized for making transaction decisions
  - Most users do not participate in the social marketplace
    - 8% of users are purely social
    - 80% users not present in the Social network
  - Those who do separate business from friends
    - Very few transactions between friends
    - Little overlap of between Social and Business networks
- Room for growth!

Conclusions, cont.

- Social networks increase user satisfaction
  - Success rates at long distances are higher on Social network
  - Social linkage is a choice, cheaters are quickly excluded
    - Fraudsters necessarily must use many fake accounts
    - These accounts rarely become well connected in Social network

Conclusions, cont.

- Social networks are an excellent way to avoid bad sellers
  - User education is needed
    - Get more people involved socially
    - Encourage businesses to interact socially
  - Better advertising, more features for existing services
    - Ebay: Favorite sellers and Neighborhoods
    - Amazon Profiles
    - Facebook Marketplace

Questions?

Thanks for Listening!