Friendship Paradox Redux: Your Friends are More Interesting Than You

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It is reasonable to suppose that individuals use the number of friends that their friends have as one basis for determining whether they, themselves, have an adequate number of friends. This article shows that, if individuals compare themselves with their friends, it is likely that most of them will feel relatively inadequate. Data on
Related Work

friendship paradox

- In "meatspace" (Feld 1991; Zuckerman and Jost 2001)
- Facebook (Ugander et al. 2011)
- Twitter* (Garcia-Herranz et al. 2012)

*One direction only

friends as detectors

- Virtual Outbreaks (Garcia-Herranz et al. 2012)
- Pathogenic Outbreaks (Christakis and Fowler 2010)

social perception and decision making

- Alcohol and Drug Abuse (Tucker et al. 2011; Wolíson 2000)
- Wealth (Morselli and Tremblay 2004; Amuendó-Dorantes 2007)
- Extraversion (Pollet et al. 2011; Querca et al. 2012)
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Our Contribution

• Confirm and Explore the Friendship Paradox on Twitter
• Demonstrate New Paradoxes: Activity Paradox and Virality Paradox
• Implications: Information Overload and Altered Propagation
Friendship Paradoxes on Twitter
Friendship Paradoxes on Twitter: Does Directionality Matter?

Does the Friendship Paradox hold on Twitter in all directions?
Friend = Followee

friends-of-friends

friends

followers-of-friends

user

followers-of-followers

followers

followers-of-followers
Does the Friendship Paradox hold on Twitter in all directions?
476 Million Tweets (Random Sample of Firehose) from June to December 2009 (Yang and Leskovec 2011) +

Follower Graph of 40 Million Users as of Summer 2009 (Kwak et al. 2010)

5.8 Million Users w/ ~200 Million links

Users active over a two month window

3.4 Million Users sending 37 Million Tweets
Follower Graph of 40 Million Users as of Summer 2009 (Kwak et al. 2010)

5.8 Million Users w/ ~200 Million links

Users active over a two month window

3.4 Million Users sending 37 Million Tweets
The Friendship Paradox holds in Every Direction!

"friends are better connected"  "followers are better connected"

"friends are more popular"  "followers are more popular"
"friends are better connected"  

"followers are better connected"

[Graphs showing distribution of friends-of-friends and friends-of-followers]
"friends are more popular"  
"followers are more popular"
New Paradoxes

Activity Paradox

"Your friends are more active than you are."

Virality Paradox

"Your friends send and receive higher virality content than you do."
Activity Paradox

"Your friends are more active than you are."

Avg. Posted Tweets Per Friend / Posted Tweets by User

88% or 99%
Virality Paradox

"Your friends send and receive higher virality content than you do."
Paradoxes and Information Overload
Is information overloaded inevitable?
Flux of Incoming Information Grows Faster Than User Engagement
Correlation between Number of Friends and Activity
Incoming Tweets Scale Super-Linearly!
Paradox worsens with connectivity
Consequence of Information Overload

<table>
<thead>
<tr>
<th>Category</th>
<th>Unprocessed</th>
<th>Processed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>12.76</td>
<td>30.98</td>
</tr>
<tr>
<td>SMS</td>
<td>80.78</td>
<td>132.91</td>
</tr>
<tr>
<td>Calls</td>
<td>119.75</td>
<td>160.99</td>
</tr>
<tr>
<td>Total</td>
<td>213.39</td>
<td>304.86</td>
</tr>
</tbody>
</table>

Diagram: Information Overload

- Take a digital technology break
- Account for all distractions
- Plan work
- Don't multitask
- Manage email
- Set aside time to focus
- Use an agenda for upcoming tasks
HOW TO FOCUS IN THE AGE OF DISTRACTION

MANAGING YOUR SPACE
- Clear away all distractions
- Use an intray for incoming paper
- Use a timer
- Spend 10 mins each day decluttering
- Work in focused bursts
- Get away from the computer

HOW TO WORK
- Create rituals/habits
- Take a digital technology detox
- Say no to...

MANAGING EMAIL
- Use only a notepad and pen
- Use a digital assistant
- Check email at set points in the day
- Turn off email alerts

MANAGING ME
- Have a healthy breakfast
- Go for a walk
- Stretch
- Read
- Meditate

BEDTIME
- Clean all dishes/empty your sink
- Take a shower
- Wash face
- Read

READ MORNING PAGES
- Write
- Morning quiet
- Morning shower

TIME TO REFLECT AND REVIEW
- First thing in the morning
- At the end of the day
- What worked?
- What can be improved?
- What did I do?
- What will I focus on tomorrow?
- What are the 3 most important things to do today?

2-3 TIMES PER DAY
- Disconnection times
- 8am-10am

SAY YES TO...
- Creating
- Spending time with family & friends
- Reading a book

HELP FOR ADDICTS
- Create blocker programs
- Locks you out of specific sites

SELF CONTROL
- Typewriter
- Write room
- Locks you out of the internet

FREEDOM
- Writing programs

TAKE TIME TO REFLECT AND REVIEW
- WHAT WILL I FOCUS ON TOMORROW?
- AT THE END OF THE DAY
- WHAT CAN BE IMPROVED?
- WHAT DID I DO?

LEARNING FUNDAMENTALS
www.learningfundamentals.com.au
Finding "Overloaded Users"

Bin users into activity levels:
- <5 Tweets over 2-month window
- 5-19 Tweets
- 20-59 Tweets
- >= 60 Tweets

- Top 33% of users in each category, based on received tweets, we call "Overloaded"
- Bottom 33% of users in each category, based on received tweets, we call "Underloaded"
<table>
<thead>
<tr>
<th>Category</th>
<th>Underloaded</th>
<th>Overloaded</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5 Tweets</td>
<td>12.56</td>
<td>104.96</td>
</tr>
<tr>
<td>5-19</td>
<td>40.78</td>
<td>132.94</td>
</tr>
<tr>
<td>20-59</td>
<td>119.75</td>
<td>160.99</td>
</tr>
<tr>
<td>≥60</td>
<td>145.44</td>
<td>202.86</td>
</tr>
</tbody>
</table>

**Dilemma: Popularity vs. Overload**
Most Active Users

Least Active Users
Overloaded users SEND and RECEIVE more popular content
Conclusions

Your Friends and Followers...
- have more Friends and Followers,
- are more Active,
- and send and receive more Viral content than you.

"Your friends are more interesting than you are!"
Incoming information scales super-linearly with the number of friends.
Overloaded Users receive a more popular content than Underloaded Users, on average
Implications
Implications

Researchers

- Users are not uniformly sampling interesting content
- Unexplained systematic biases stem from connectivity-activity correlations

Practitioners

- Increasing engagement with social media exacerbates observed paradoxes.
- Decreasing engagement decreases exposure to popular content.
• Unexplained systematic biases stem from connectivity-activity correlations

Practitioners

• Increasing engagement with social media exacerbates observed paradoxes.
• Decreasing engagement decreases exposure to popular content
• Challenge: build compelling social network w/o information overload
Many Thanks

Co-Authors

• Farshad Kooti
• Prof. Kristina Lerman

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