Social Capital in Networks

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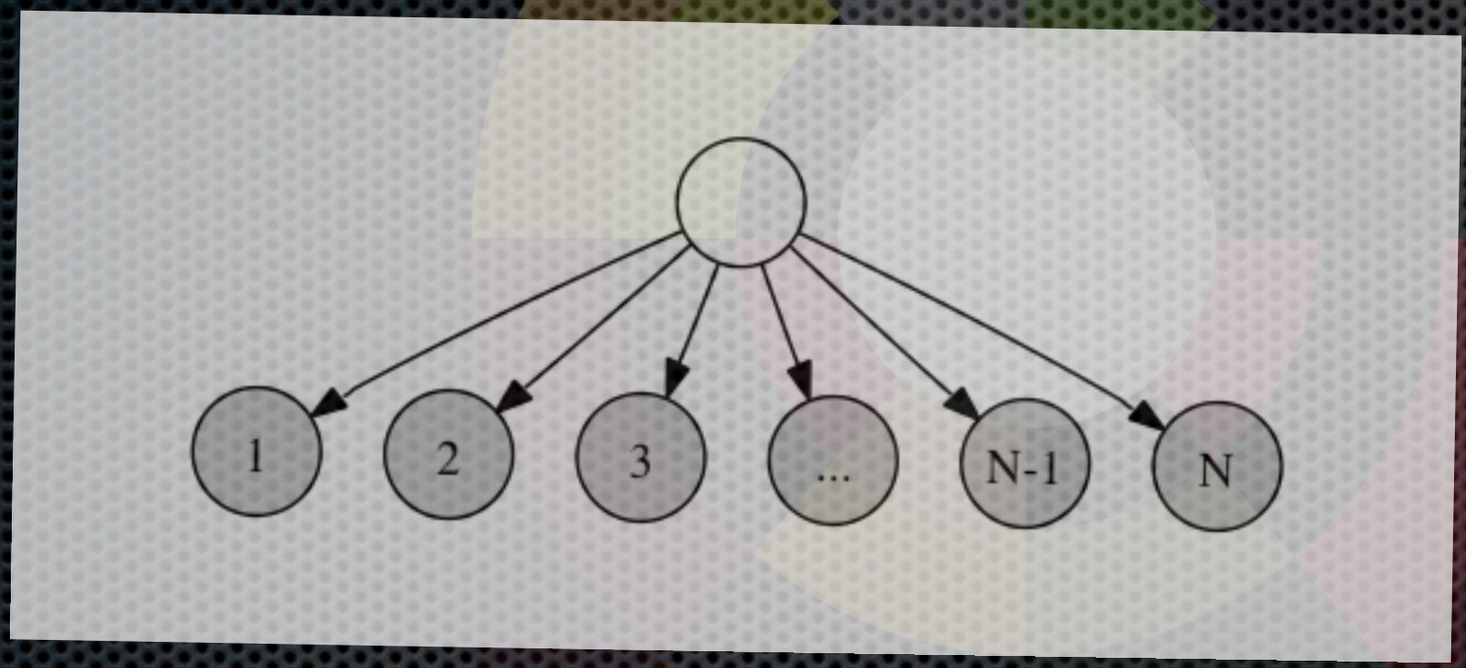
Motivation and Trends

- Prevalent shift in how people discover information
- The growth of social media is rampant
- Social analytics are increasingly important
  - Online networks can be a powerful force for good
  - How can we mobilize our networks?

Broadcast Network Utility

- Sarnoff's law



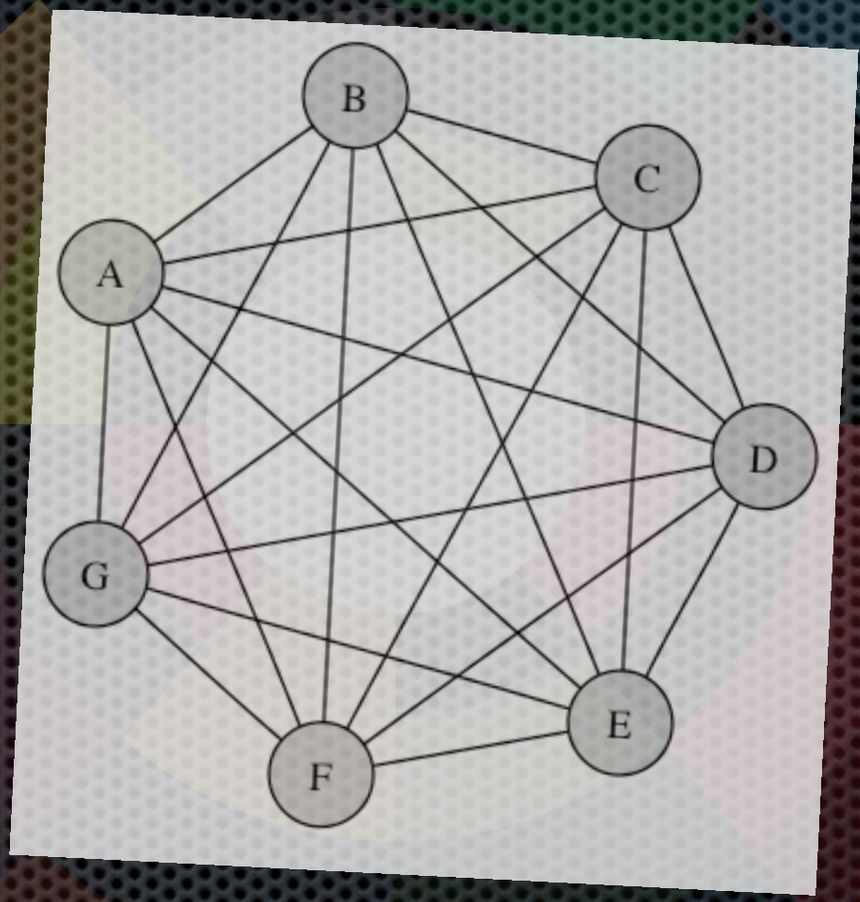
Broadcast Network
utility proportional to the number of viewers N

- Example: television or radio network

Interesting Statistic
31.1 million US TV viewers watched Michael Jackson's memorial (millions more watched online)

Peer Connecting Network Utility

- Metcalfe's Law



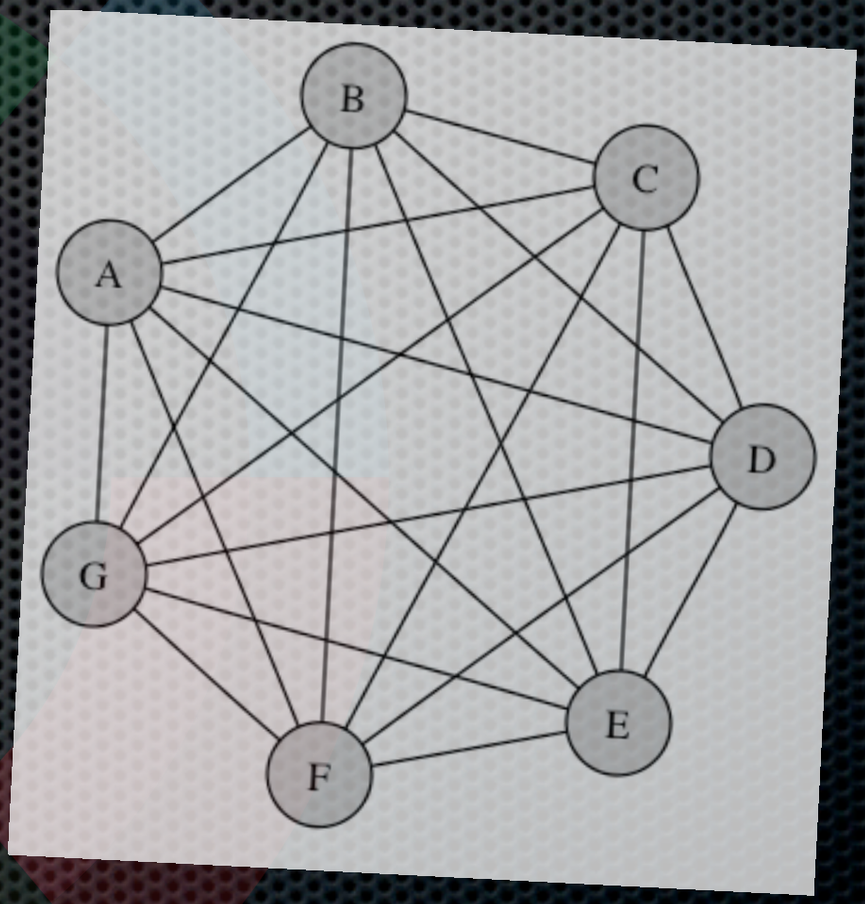
Peer Connecting Network
utility proportional to $N(N-1)/2$

- Example: telecommunications network

Group Forming Network Utility

- Reed's Law

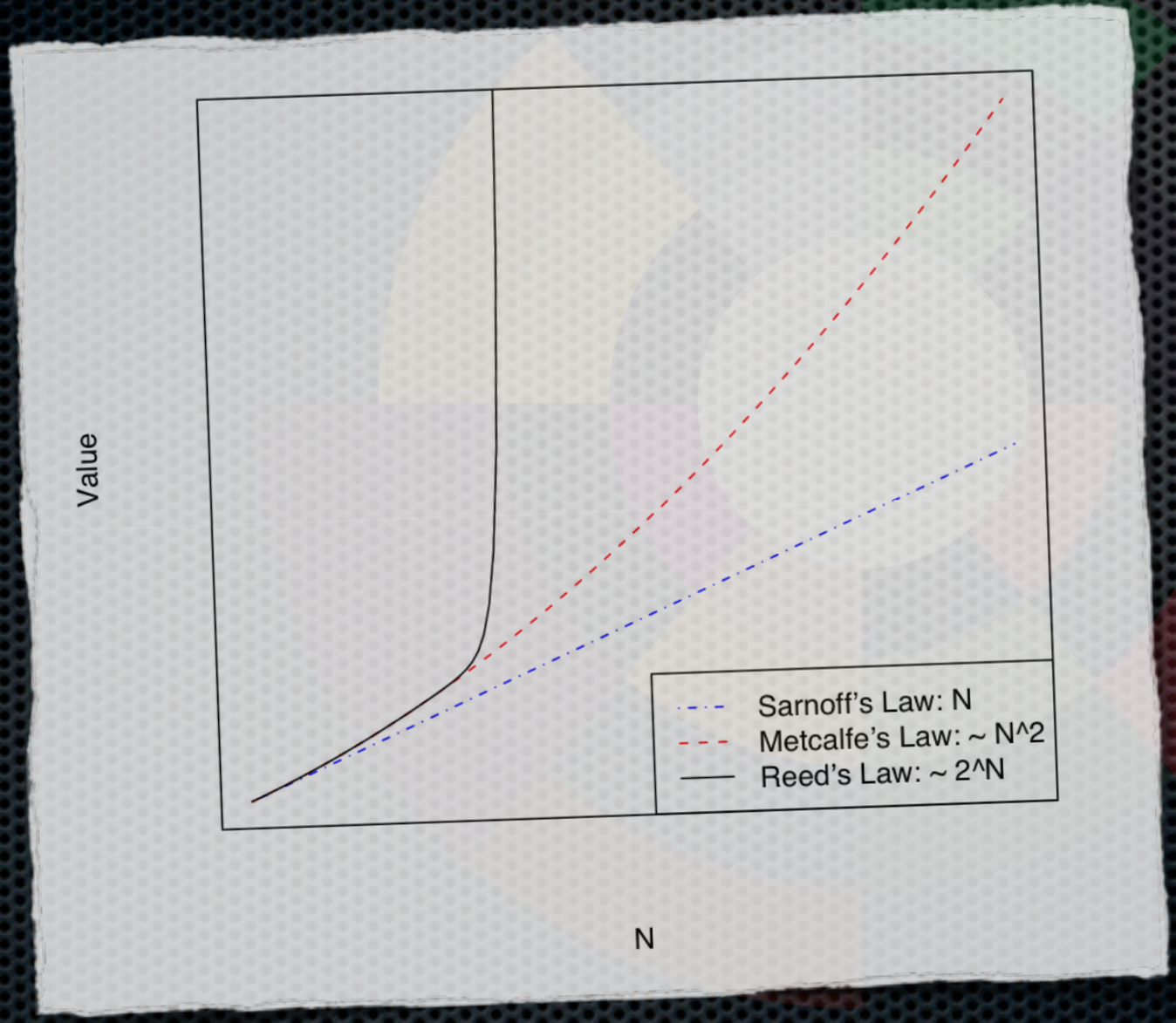
Size	Groups	#
2	{A,B}, {A,C}, {A,D}, ..., {F,G}	21
3	{A,B,C}, {A,B,D}, ..., {E,F,G}	35
4	{A,B,C,D}, {A,B,D,E}, ..., {D,E,F,G}	35
5	{A,B,C,D,E}, ..., {C,D,E,F,G}	21
6	{A,B,C,D,E}, ..., {B,C,D,E,F,G}	7
7	{A,B,C,D,E,F,G} *(shown above)*	1
	Total groups:	120



- Example: online social networks

Group Forming Network (GFN)
utility proportional to 2^N

Utility Comparison

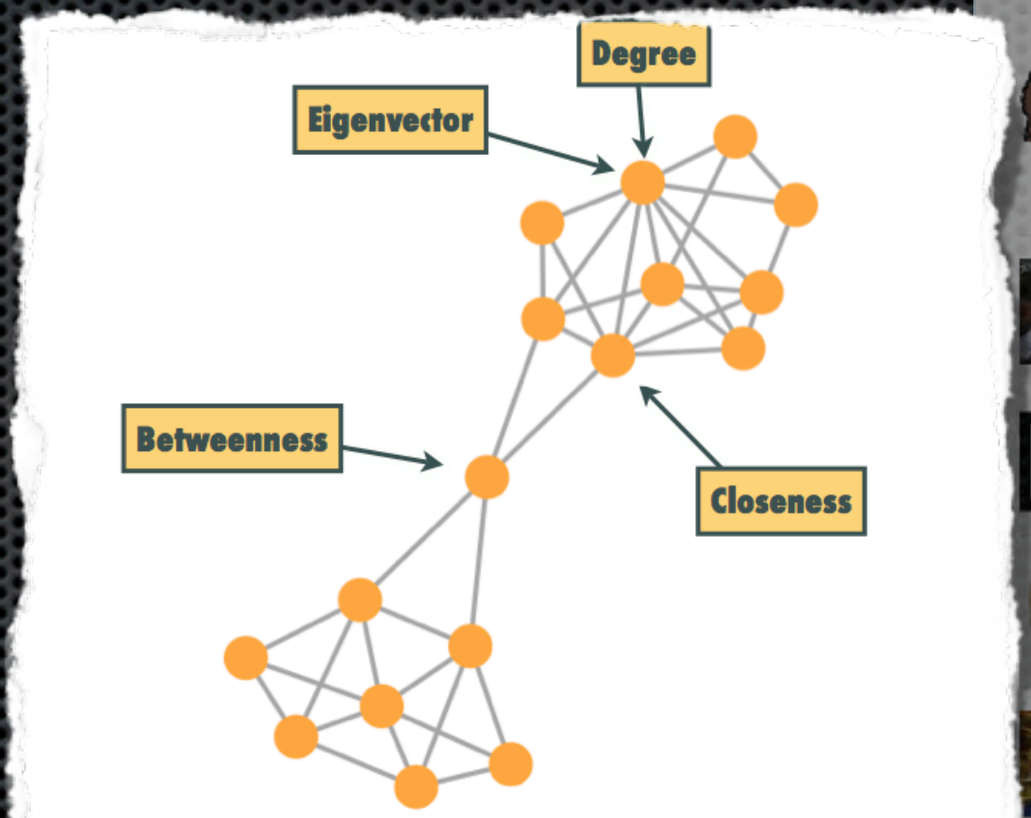


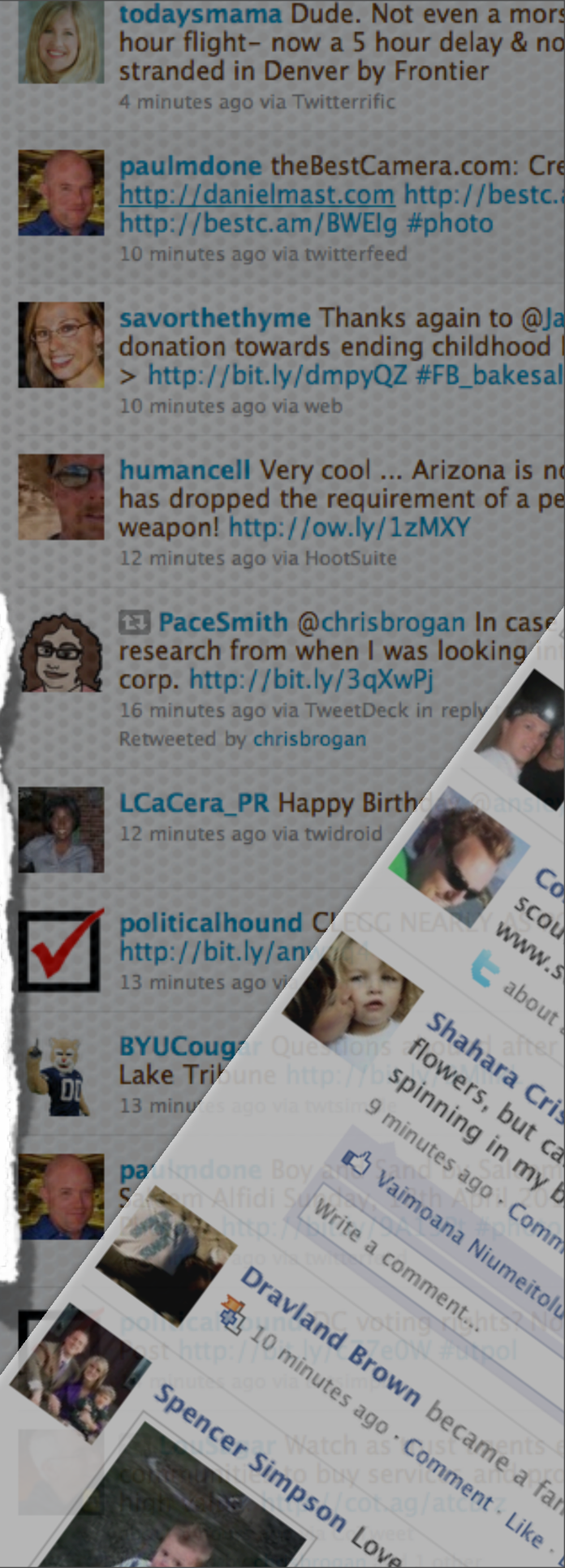
Reed's Law

The utility associated with facilitating group affiliations (Reed's Law) far surpasses both the other laws

Social Stream Data

- Twitter
- Facebook
- Blogosphere
- YouTube
- Flickr

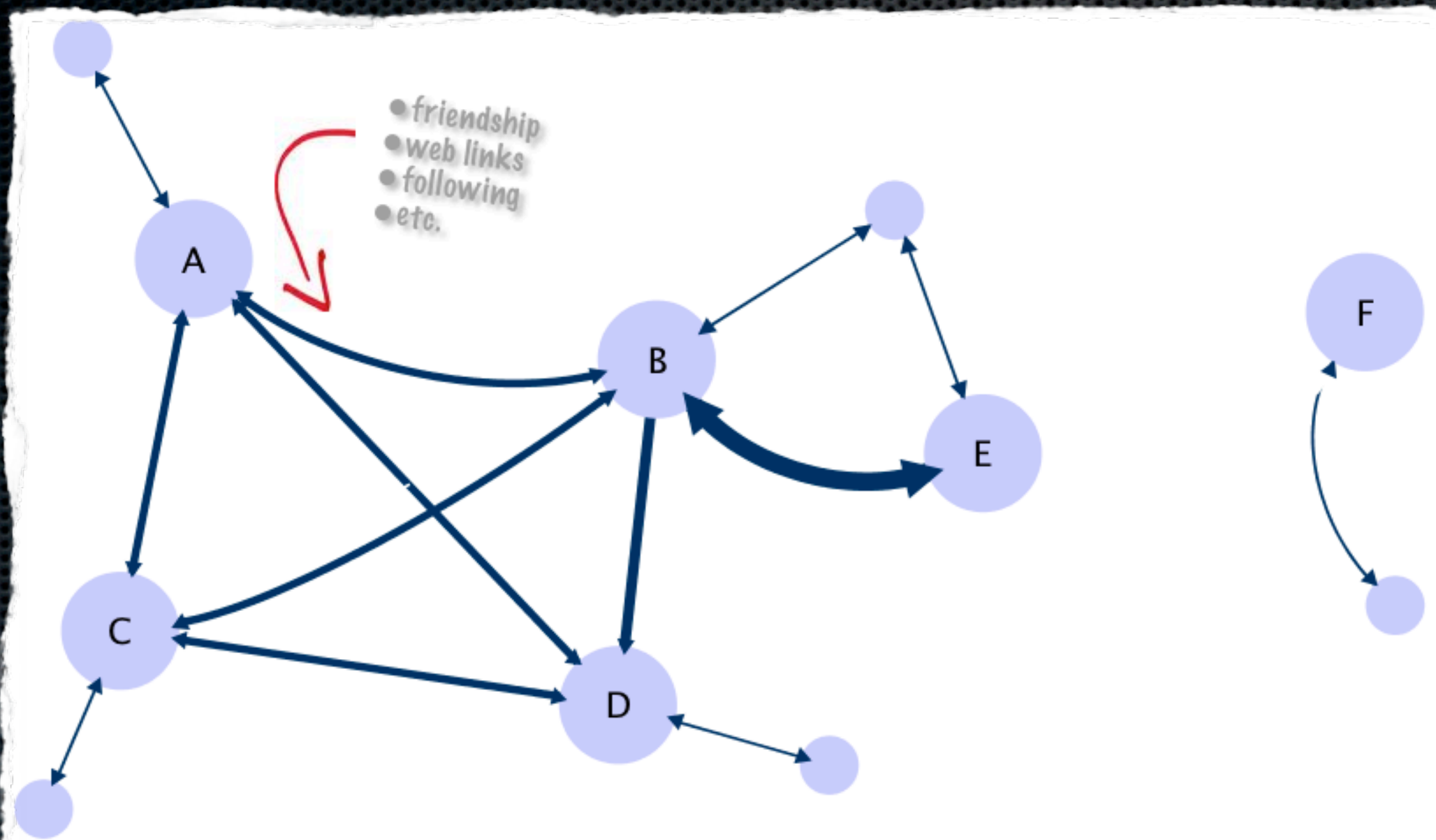




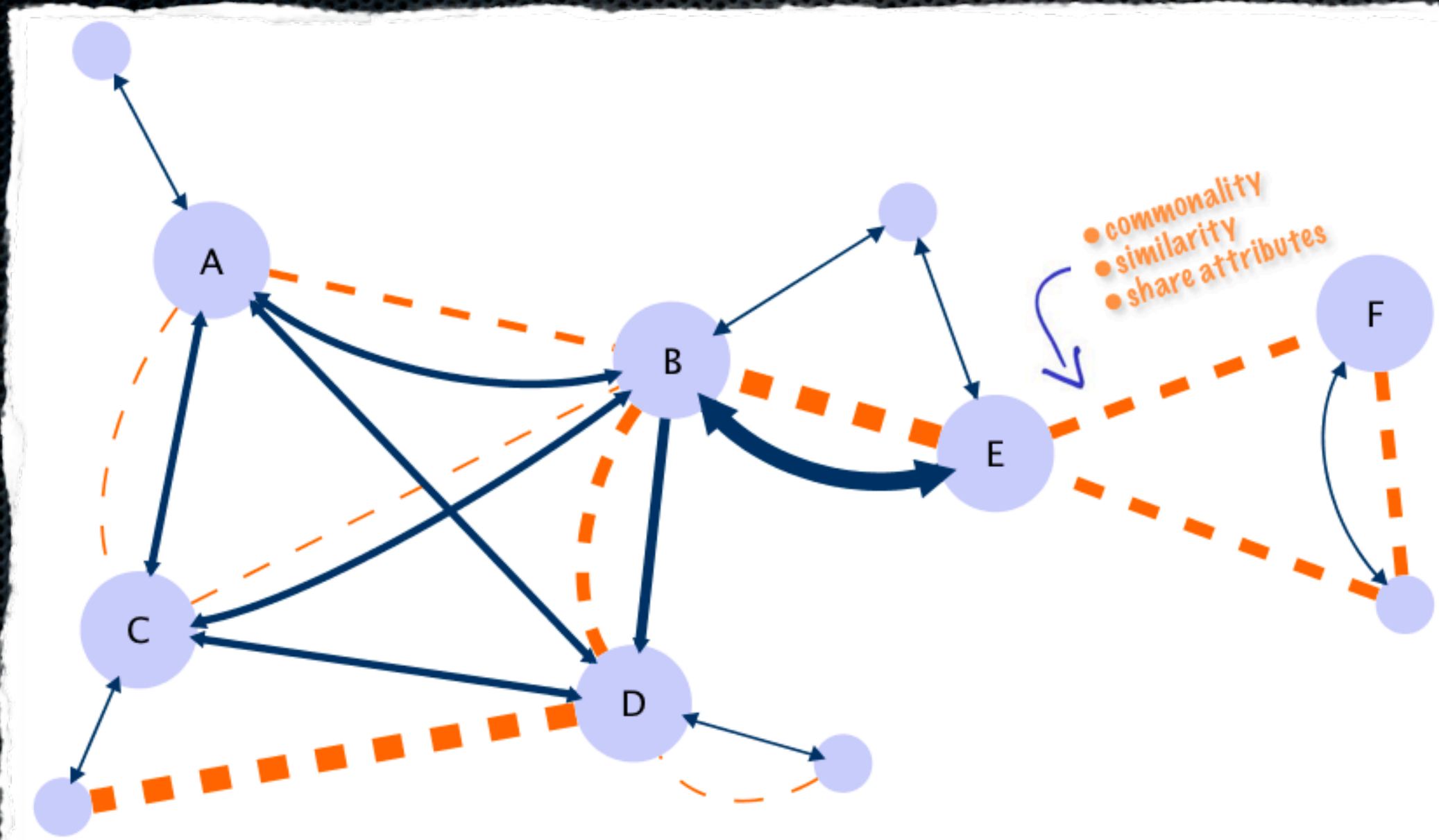
Types of Network Links

- **Explicit Link** (Relationship)
  - Direct knowledge, interaction, or communication
  - Ex. friends, web links, and club members
  - Explicit Social Networks (ESNs)
- **Implicit Link** (Affinity)
  - Inherent similarities or affinities
  - Ex. attributes, hobbies, interests, and background
  - Implicit Affinity Networks (IANs)

Social Analytics Framework

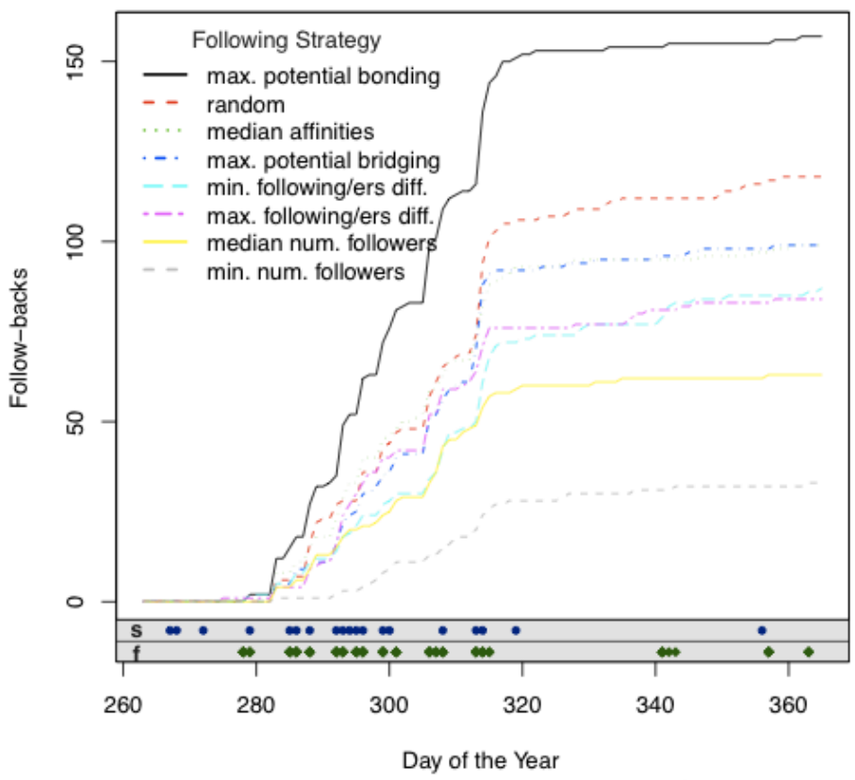


Social Analytics Framework



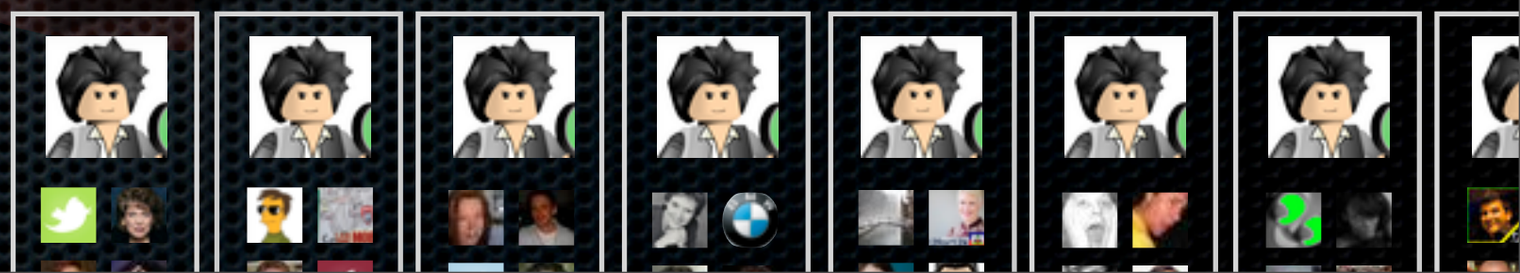
Experiment - Twitter Networking

rank_f	strategy	following	follow-backs	↓ followers	rejects	churn	follow_{total}	follower_{total}
1	*max. potential bonding* (A)	500	158 (32%)	202 (40%)	12	127	512	329
2	*max. following/ers diff.* (F)	500	84 (17%)	172 (34%)	12	324	512	496
3	*random* (D)	500	118 (24%)	154 (31%)	20	103	520	257
4	*median affinities* (C)	500	99 (20%)	123 (25%)	25	93	525	216
5	*max. potential bridging* (B)	500	99 (20%)	120 (24%)	25	91	525	211
6	*min. following/ers diff.* (E)	500	87 (17%)	99 (20%)	50	55	550	154
7	*median num. followers* (G)	500	63 (13%)	86 (17%)	31	51	531	137
8	*min. num. followers* (H)	500	33 (07%)	42 (08%)	79	29	579	71
9	*follow nobody* (I)	0	0 (—%)	3 (—%)	0	24	0	27



strategy	significantly different
(A) *max. potential bonding*	B, C, E, F, G, H
(B) *max. potential bridging*	A, H
(C) *median affinities*	A, G, H
(D) *random*	G, H
(E) *min. following/ers diff.*	A, H
(F) *max. following/ers diff.*	A, H
(G) *median num. followers*	A, D, C
(H) *min. num. followers*	A, B, C, D, E, F

Table 3: **Followback-to-Following**: Pairwise Proportion Test Results. ($\alpha = 0.01$, Bonferroni corrected p-values)



Experiment - Blogophere

- Niche focused
- Bonding beneficial
- Track overtime
- Identify uncapitalized affinities

Conclusions

- The growth of social media is rampant
- Technology enabling Group Forming Networks (GFNs)
- Social capital framework provides useful social analytics
- We can test sociological hypotheses

Questions & Comments

Ask me now:

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