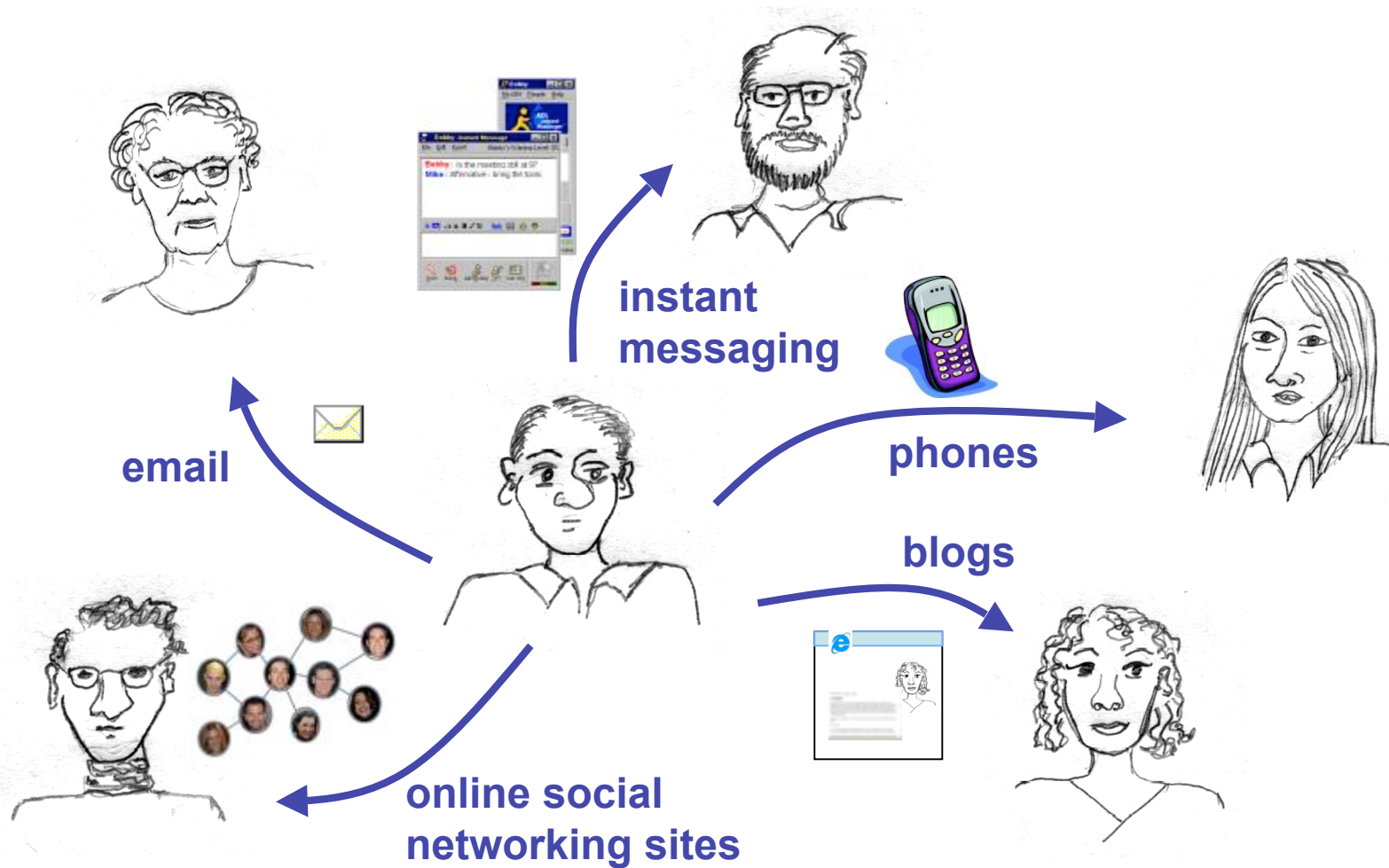# Information diffusion in online social networks
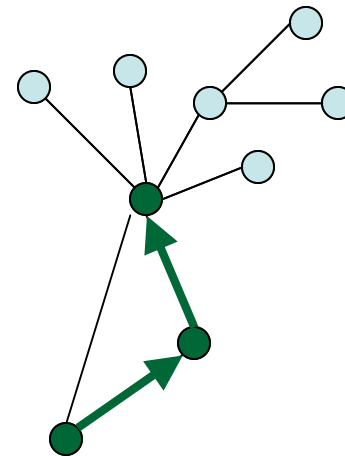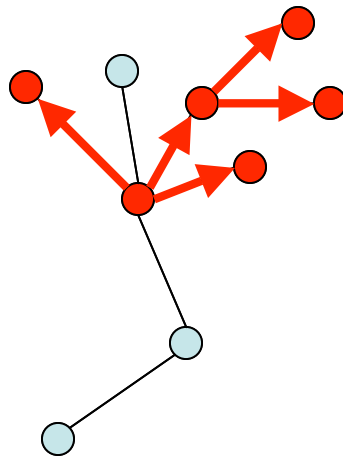
Lada Adamic
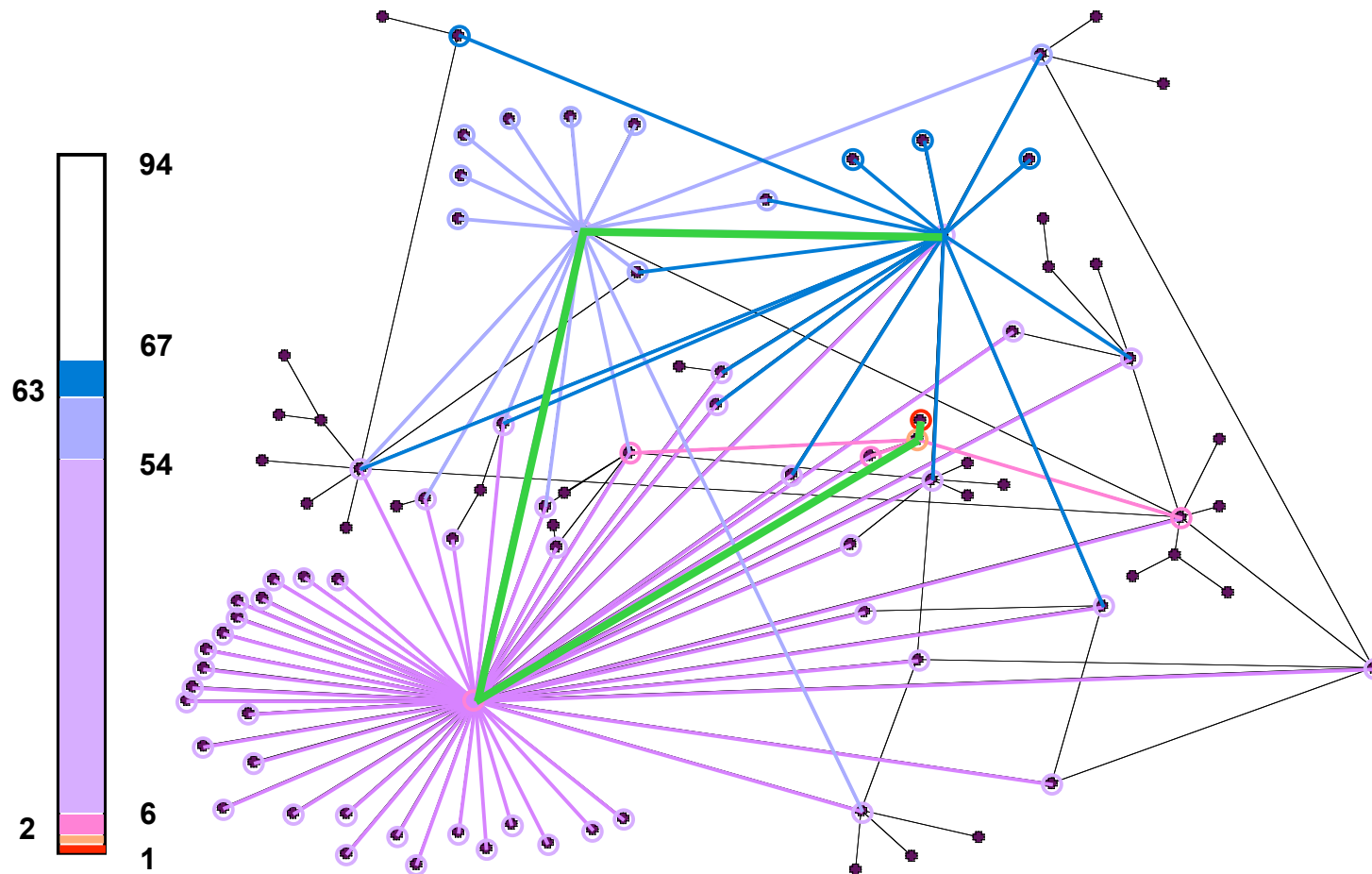**School of Information, University of Michigan, Ann Arbor**

Questions for this workshop

- How does network structure influence information diffusion?

- How does information diffusion shape networks?

Power laws and information spread on networks

Adamic, Lukose, Puniyani, Huberman, PRE 2001

Information diffusion in blogs

infer most likely information flow path

http://www-idl.hpl.hp.com/blogstuff

Giant Microbes epidemic visualization

Adar, Zhang, Adamic, Lukose, WWE 2004
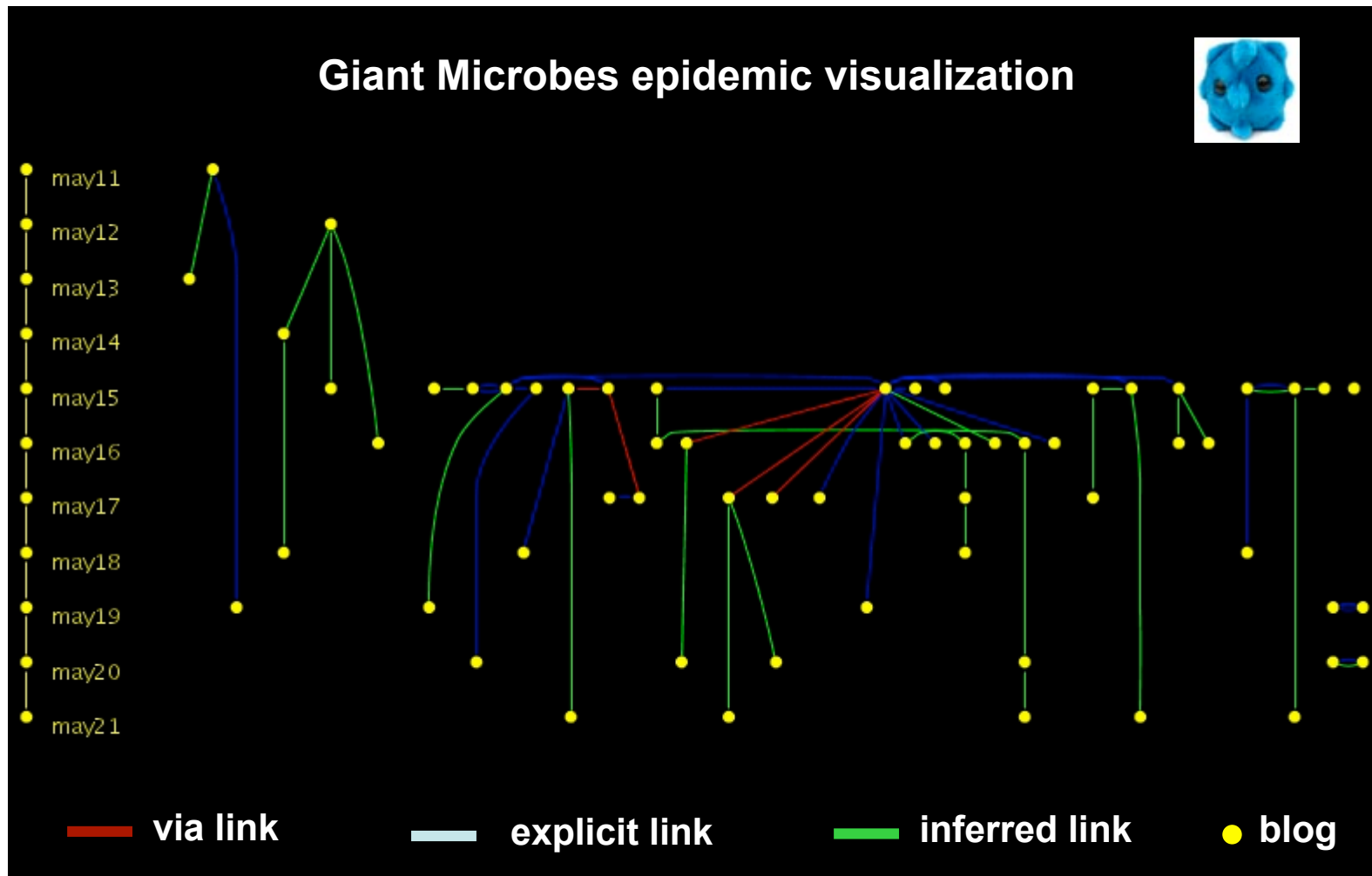
Communities and discourse

comment thread parody on Jim Henley's
'Unqualified Offerings' Blog

12. *Comment by Jon H —*
April 8, 2006 @ 9:13 am

Comment flaming other commenter for spelling
error, which flame contains the requisite spelling
error of its own.

13. *Comment by Michigan J. Frog —*
April 8, 2006 @ 9:19 am

Accidental double-post.

14. *Comment by Michigan J. Frog —*
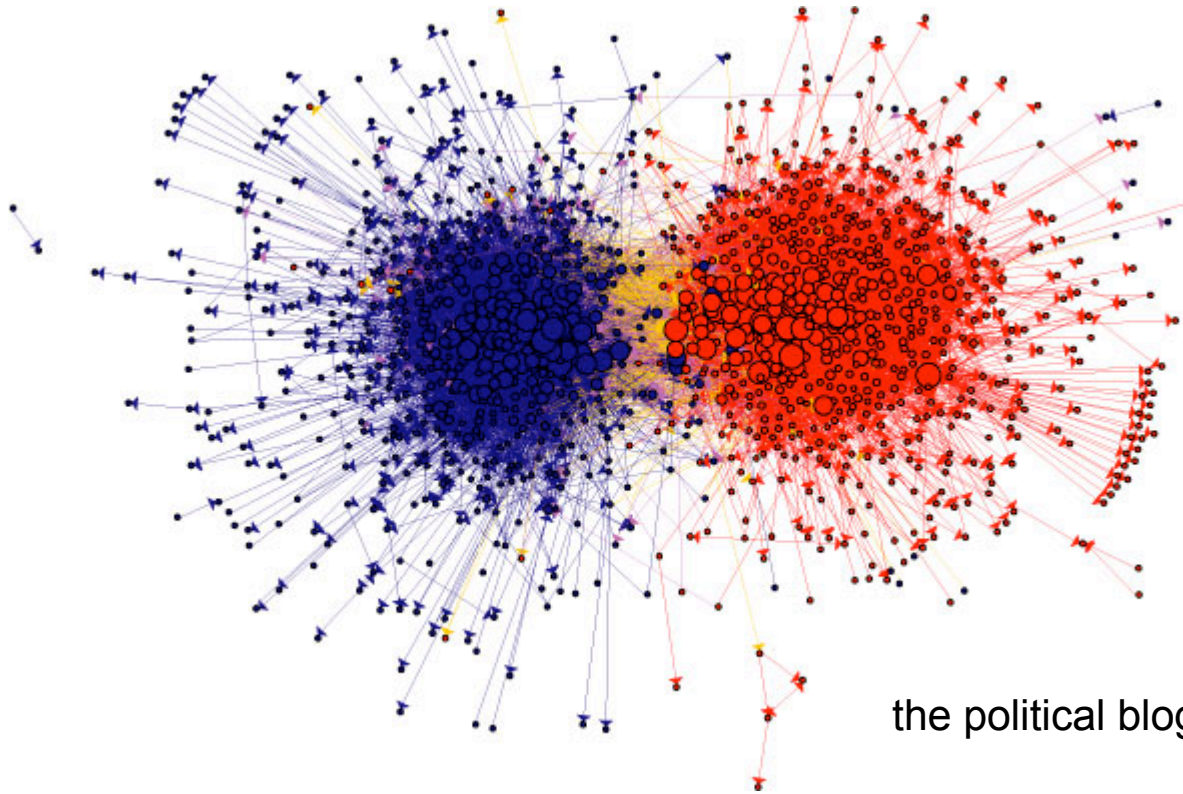*April 8, 2006 @ 9:20 am*

Accidental double-post.

15. *Comment by Michigan J. Frog —*
April 8, 2006 @ 9:20 am

Apology for accidental double post, wasting even
more space.

Can we understand community dynamics?

the political blogosphere, early 2005

- detecting polarization
- analyzing discourse
- learning what brings communities together online

Adamic & Glance, LinkKDD 2005

1 Digby's Blog
2 James Walcott
3 Pandagon
4 blog.johnkerry.com
5 Oliver Willis
6 America Blog
7 Crooked Timber
8 Daily Kos
9 American Prospect
10 Eschaton
11 Wonkette
12 Talk Left
13 Political Wire
14 Talking Points Memo
15 Matthew Yglesias
16 Washington Monthly
17 MyDD
18 Juan Cole
19 Left Coaster
20 Bradford DeLong
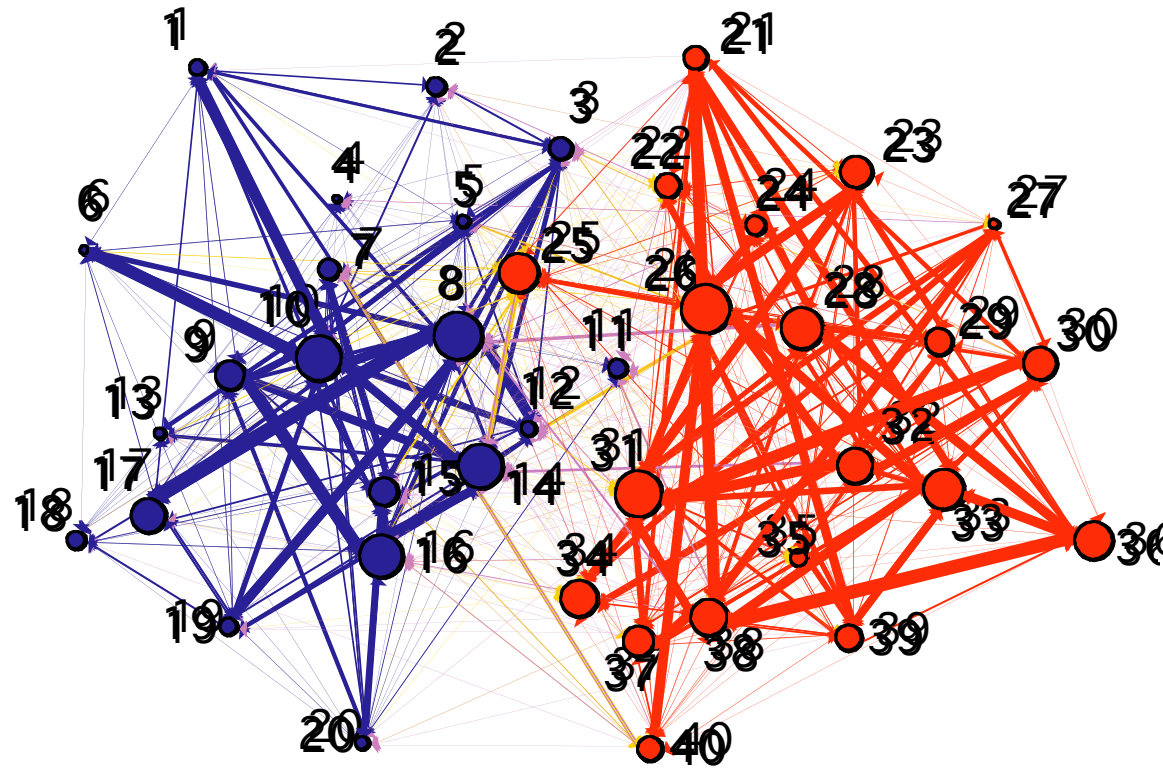
21 JawaReport
22 Vodka Pundit
23 Roger L Simon
24 Tim Blair
25 Andrew Sullivan
26 Instapundit
27 Blogs for Bush
28 LittleGreenFootballs
29 Belmont Club
30 Captain's Quarters
31 Powerline
32 Hugh Hewitt
33 INDC journal
34 Real Clear Politics
35 Winds of Change
36 Allahpundit
37 Michelle Malkin
38 Wizbang
39 Dean's World
40 Volokh

Liberals and conservatives differ in the topics they discuss

Discussion of "forged documents"
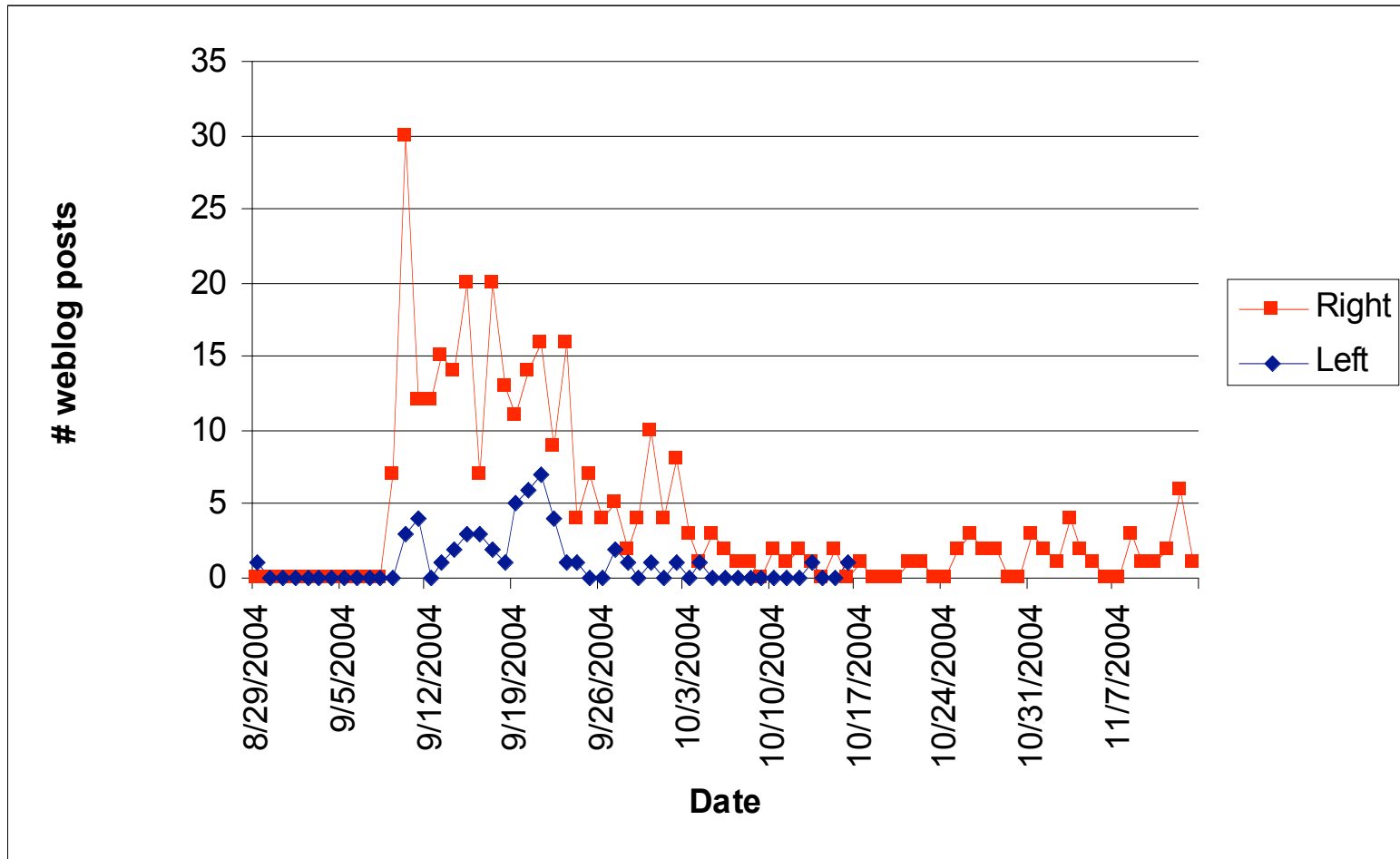
Network of phrases found on the same blogs
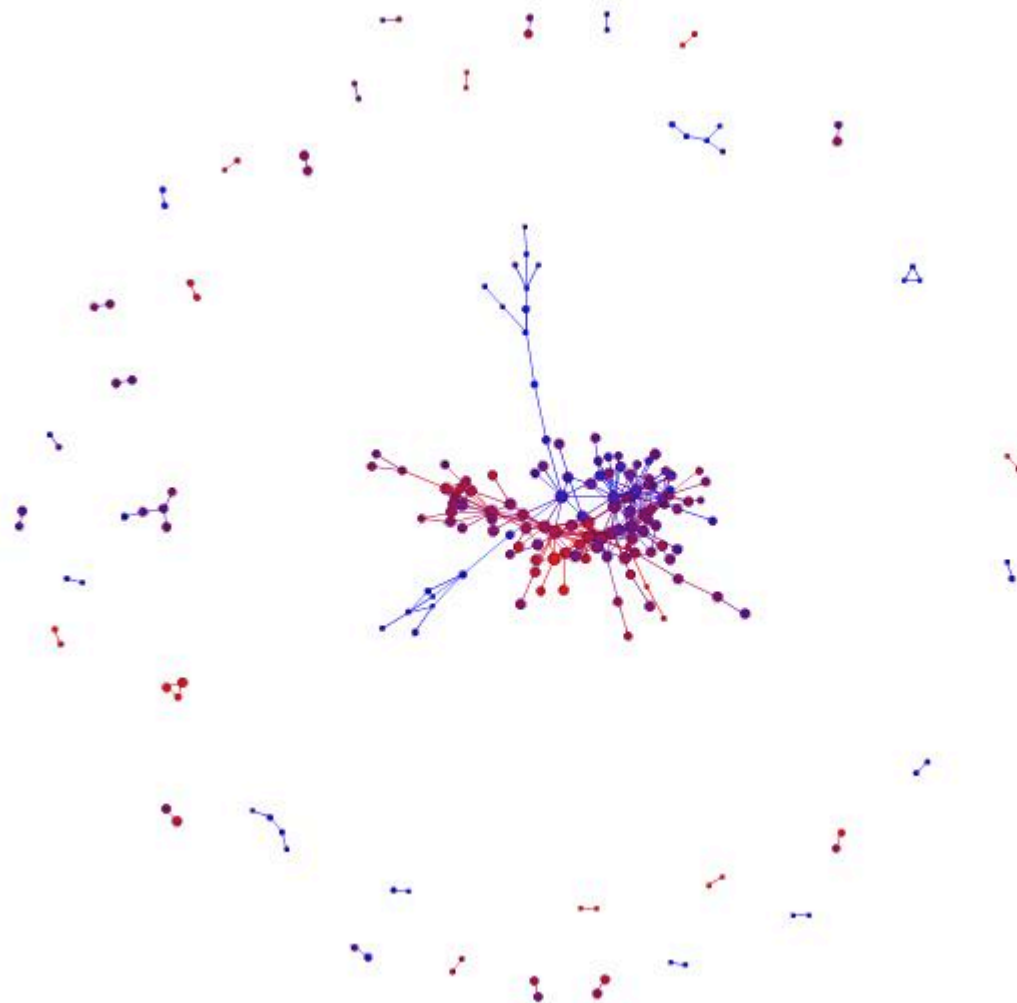
Trying to bridge the divide
Opposition to the bankruptcy bill (March 2005)

- ● conservative blog post
- ● liberal blog post
- ● uncategorized blog post
- ● news article
- ● government website

→ link between posts/pages

↔ posts/pages belonging to same blog/site
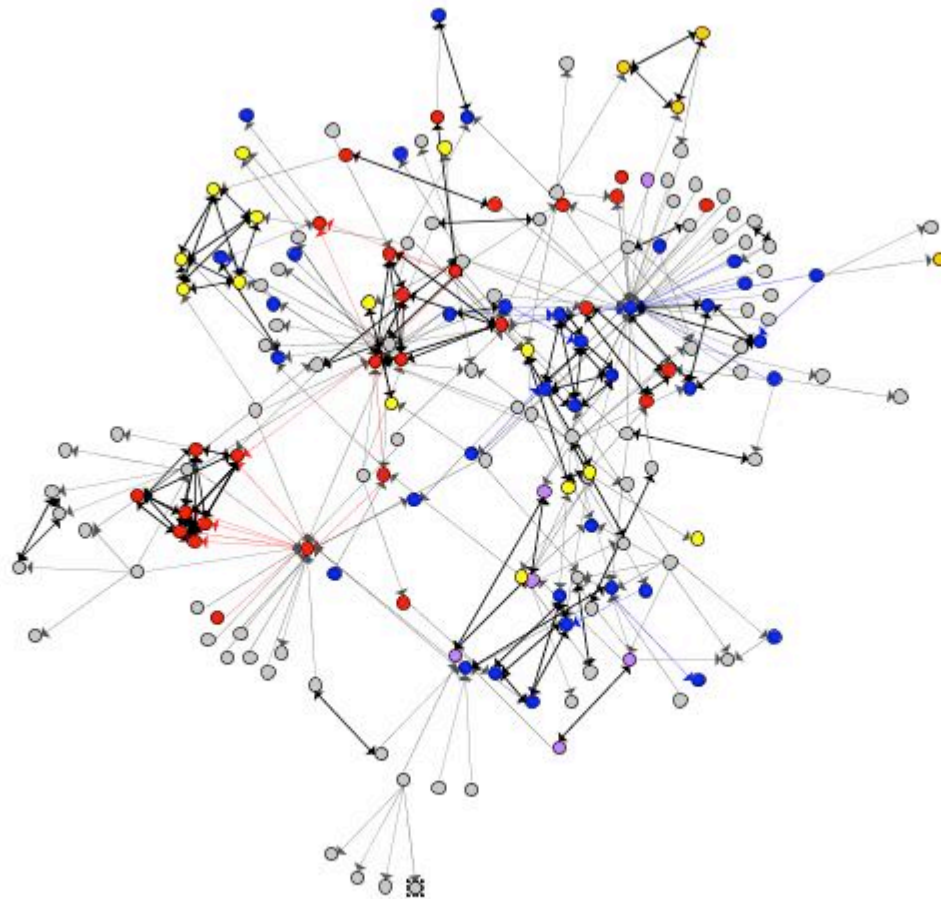
but, bill was passed nevertheless: Senate 74 - 25 , House 302 - 126

How do memes evolve?

02:00 AM Friday Mar. 05, 2004 PST Wired publishes:
"Warning: Blogs Can Be Infectious.”

7:25 AM Friday Mar. 05, 2004 PST Slashdot posts:
"Bloggers' Plagiarism Scientifically Proven"

9:55 AM Friday Mar. 05, 2004 PST Metafilter announces
"A good amount of bloggers are outright thieves."

Before lunch: Eytan writes
FAQ: Do bloggers kill kittens?

After lunch: Several bloggers title posts '**Bloggers kill kittens**!'

Summarizing a new meme

Scoble:
http://scobleizer.wordpress.com/2006/02/13/the-brrreeeport-report/

"Here, let's play a game. Everyone in the world say 'brrreeeport' on your blog and you'll be listed on this Technorati page automatically. Heh. There are also no pages on the Internet linked to for that term on Google, Yahoo, or MSN."

MONDAY, FEBRUARY 13, 2006

Testing Out The Blog Search Engines - Brrreeeport

Scoble is tracking the made up word brrreeeport to see how long it takes the major blog search engines to index it. OK, so I'll play along ;-)

POSTED BY JACK NORK AT PERMALINK 11:22 PM, MONDAY, FEBRUARY 13, 2006

http://www.mason23.com/jack/2006/02/testing-out-blog-search-engines.html

Brrreeeport Mucks My Model

Scoble, Microsoft's resident geek blogger, is doing an experiment. He's asking bloggers to put the word "brrreeeport" in their blogs, and then see how quickly various search engines pick it up. This post is completely outside my normal topical areas and style, but what the heck. Glad to pitch in.

scobleizer.wordpress.com/2006/02/13/the-brrreeeport-report/

Technorati™

Search **Tags** **Blog Finder** **Explore**

| brrreeeport | Search | ▸ **Options** |

422 posts contain:

⊕ **Add to Watchlist**
⊖ **View in Mini**

brrreeeport

Posts in | All Languages ▾ | with ▼ any authority (all results). ❓

▾ Mentions by Day

Posts that contain **Brrreeeport** per day for the last 30 days.

300
200
100
0
Jan 16   Feb 14

More »

Charts sponsored by
PERFORMANCING

▾ Who's Blogging about **Brrreeeport**

NEW **Explore Recent Posts on Brrreeeport blogs!**

Blog a Cow
Updated 1 hour ago.

TagMan
Updated 3 hours ago.

A Deeper Look
Updated 5 hours ago.

Truston Identity Theft Blog
Updated 7 hours ago.

I waited forever for this and I was never...
🔍 💬 In Hyrina's Brain 28 minutes ago
brrreeeport MindMap

Blogs Like Mine
🔍 💬 In The Jade Pages 47 minutes ago
Jumping into a Technorati game, I'd like to say **brrreeeport**. No, I have no idea what that means, it's an exercise to play with someone's blogging codes. For somewhat of an explanation, visit

BRRREEEPORT
🔍 💬 In The Technocrat Soapbox 1 hour ago
Technorati Tag: **brrreeeport** O.K. Here goes...**brrreeeport**. **BRRREEEPORT** What the heck is **brrreeeport**?

Day Of Ridiculosity
🔍 💬 By fauxpop in FauxPop 1 hour ago
It's a Wednesday, and the sun was especially warm today. It was nice. It was a fairly nice day today, Dick Cheney talked about his mindless lapse (story) and **brrreeeport** is making waves in the blogging world (story). Abu Ghraib's making a comeback, maybe an ill-fated time for Australian TV network SBS (story) to break the news in light

The 'brrreeeport' effect
🔍 💬 In theSpoke.net 1 hour ago
brrreeeport Would my 'brrreeeport' be ranked higher if I bold or italic it? Related links: Playing with "the man"– Cyberspace People Watcher The **brrreeeport** report – Robert Scoble

Brrreeeport

everyone say 'brrreeeport'...

Click here to listen to the **brrreeeport track** (requires winamp), the voice is my handy speech synth.
alternatively (for example, if you dont use winamp), click **here** to download it first

What started it all was the following text on 14 February 2006 from Scobleizer's blog:

*"Here, let's play a game. Everyone in the world say 'brrreeeport' on your blog and you'll be listed on this Technorati page automatically.
Heh. There are also no pages on the Internet linked to for that term on Google, Yahoo, or MSN."*

Some things have changed since, for example Google has indexed thousands of references to brrreeeport

A suggested definition from redcouch is:
Brrreeeport! (noun). The weather news from Antartica, the North Pole or any other frigid zone.

For more information look at the Technorati tag linking to oodles of sites mentioning it.

Hit counter: 16766
comments...

---

kokey:
Visitors can now leave comments. What other useful bits of information about brrreeeport can I include on this page?
http://www.brrreeeport.org

TagMan:
FYI, as of 5:45 pm ET on Sunday 2/19/06, I'm no longer seeing brrreeeport on the tags page on Technorati.
http://apogee-web-consulting.com/tagman/

---

feedscott:
going going going going going...
http://www.feedscott.com/

---

kokey:

Done

Home · Popular · Discover · Favorites · Watchlists   Sign up · Sign in · Help

Technorati

Search for brrreeeport   in blog posts ▼   Search   **Advanced search**

Home / Search / Results for brrreeeport

2,556 results from all blogs ▼ **with** any authority ▼ ? **in** all languages ▼   View results in Mini · Subscribe

Refine results: + Blogging   + Technorati   + Krugle   + Scoble   + Internet   + Blog   + Humor   + Satire   + Web 2.0   + Brrreeeport Pic

Take Blogging to a Whole New Level
Create a meaningful, organized and beautiful record of your thoughts. www.ourstory.com

Start Your Blogging Now
Are you serious about creating your own blog? Go pro, for free. www.problogs.com

Tammy NYP
Tammy NYP · 7 hours ago · No blogs link here
Still an other video of style of Tammy NYP is emerged from ours this time the cables comes
presumed from Ang the Mo Kio that what is being disturbed ... really that new time says someone
was **Brrreeeport** square has had to return hardly one and to send

Ask Me!
Pranav ... Blogging · 15 days ago · No blogs link here
Ask Me! Tags .NET Articles Ask Me ASP/Scripting Automation BillG Blog **brrreeeport** C#
C/C++/ATL Code samples CS CSS Developer Support Excel extensibility GTSC Hot - n - New
Humor India InfoPath

Ask Me!
Pranav ... Blogging by **pranavwagh** · 15 days ago · **18 blogs link here**
Ask Me! Tags .NET Articles Ask Me ASP/Scripting Automation BillG Blog **brrreeeport** C#
C/C++/ATL Code samples CS CSS Developer Support Excel extensibility GTSC Hot - n - New
Humor India InfoPath

IN 24 HOURS

Advertise on Technorati

Who's Blogging About

Blogs about **brrreeeport** in order of recency.

Liberal Common Sense
by **psyche777** 10 hours ago

**neebone's desperate measures - News,
Videos, Games, Humour, Images**
14 hours ago

The Right Perspective Podcast Blog
by **NewsGuy** 1 day ago

More blogs about brrreeeport »

Mentions by Day

aiting for www.mukom.netfirms.com...   Adbloc
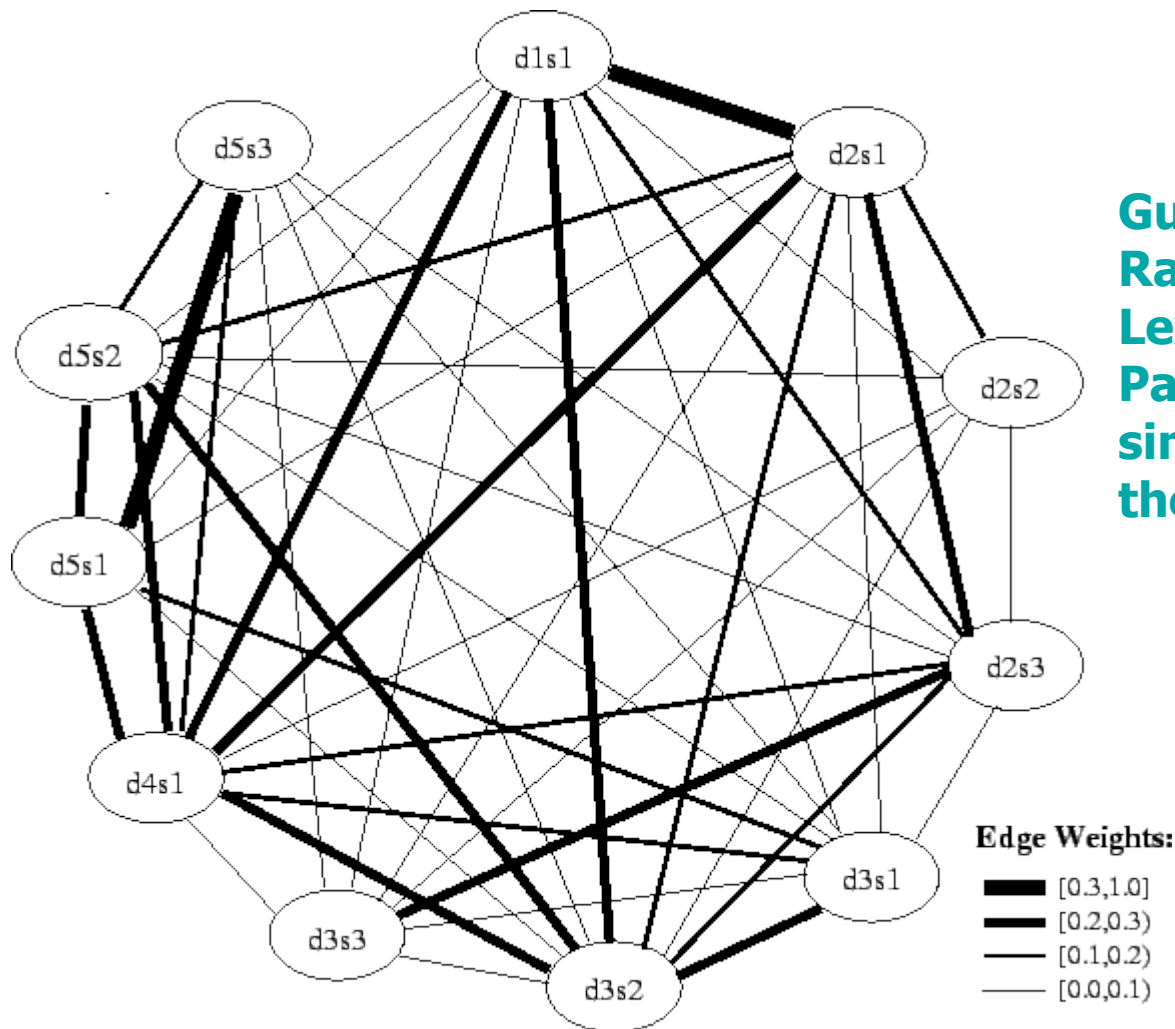
Gunes Erkan & Drago Radev:
LexRank: applying PageRank to a textual similarity matrix selects the best summary

blog posts that are good summaries tend to occur early on

Edge Weights:

▬▬▬ [0.3,1.0]
▬▬ [0.2,0.3)
— [0.1,0.2)
— [0.0,0.1)
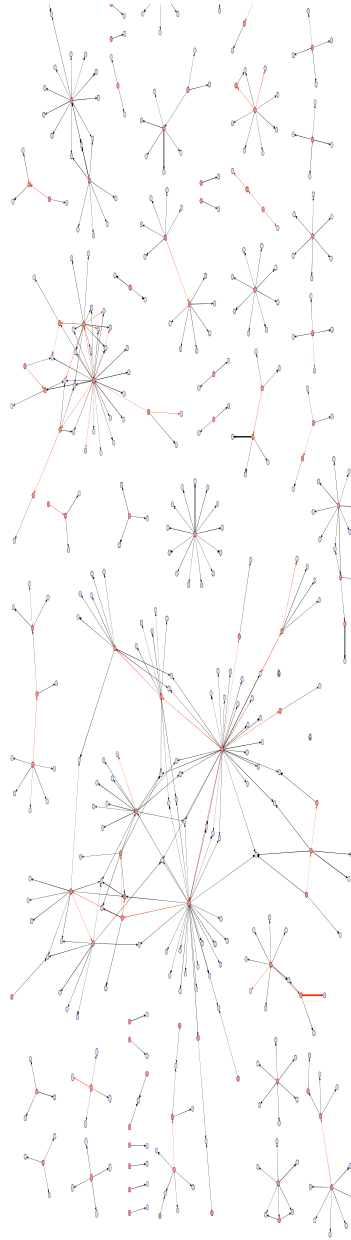
Networks and viral marketing
diffusion with costs

• Some people recommend much more enthusiastically than others

• Recommendation cascades power-law distributed

• Hubs' influence is limited

• Peer pressure is limited

• Links may weaken from overuse

product recommendation network

recommendation network

for a single anime DVD

- 🔴 purchase following a recommendation

- 🔵 customer recommending a product

- • customer not buying a recommended product

incentives can change the shape of a network

recommendation success by book category

- consider successful recommendations in terms of
  - av. # senders of recommendations per book category
  - av. # of recommendations accepted
- books overall have a 3% success rate
  - (2% with discount, 1% without)
- lower than average success rate (significant at p=0.01 level)
  - fiction
    - romance (1.78), horror (1.81)
    - teen (1.94), children's books (2.06)
    - comics (2.30), sci-fi (2.34), mystery and thrillers (2.40)
  - nonfiction
    - sports (2.26)
    - home & garden (2.26)
    - travel (2.39)
- higher than average success rate (statistically significant)
  - professional & technical
    - medicine (5.68)
    - professional & technical (4.54)
    - engineering (4.10), science (3.90), computers & internet (3.61)
    - law (3.66), business & investing (3.62)

professional and organized contexts

- Some organized contexts other than professional also have higher success rate, e.g. religion
  - overall success rate 3.13%
  - Christian themed books
    - Christian living and theology (4.7%)
    - Bibles (4.8%)
  - not-as-organized religion
    - new age (2.5%)
    - occult spirituality (2.2%)
- Well organized hobbies
  - books on orchids recommended successfully twice as often as books on tomato growing

regressing on product characteristics

Variable	transformation	Coefficient
const		-0.940 ***
# recommendations	$\ln(r)$	0.426 ***
# senders	$\ln(n_s)$	-0.782 ***
# recipients	$\ln(n_r)$	-1.307 ***
product price	$\ln(p)$	0.128 ***
# reviews	$\ln(v)$	-0.011 ***
avg. rating	$\ln(t)$	-0.027 *
R^2		**0.74**

significance at the 0.01 (***), 0.05 (**) and 0.1 (*) levels

→ small tightly knit communities purchasing expensive products

conclusions

- **information diffuses on networks**
  - path is influenced by structure
  - measured network is influenced by diffusion

- **different interests/products bring people together**
- **incentives can modify social network structure**
  - positively (new connections)
  - negatively (weakening existing connections)