

# CS 6474/CS 4803

## Social Computing: Sociological Foundations II

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# Sample Projects

- Inferring emotionality and loneliness of Flickr photos by analyzing visual features
- Identifying linguistic markers of relationship abuse in Reddit communities
- Classification of workplace stress by analyzing corporate email content (Enron)

# Sample Projects (Contd.)

- Understanding the structure and dynamics of pro-eating disorder communities
- Inferring a “health score” of the eating activities of college students by analyzing content of Yelp reviews

# Sample projects (Contd.)

- Classification and exploration of political bias in blogs
- Comparison of public and critics sentiment around movies (Twitter vs. Rotten Tomatoes + IMDB)
- Topic-aware personalized trends on Twitter

# Sample projects (Contd.)

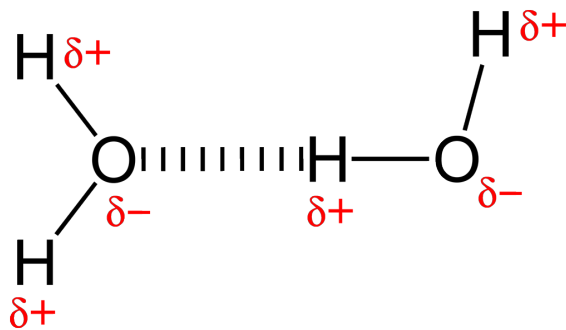
- Content summarization tool to provide positive social support to mental health help seekers on Reddit
- Discovering the grievances, emotional expression, and topics shared in an online community of incarcerated individuals

# The Strength of Weak Ties



# Strength of weak ties: Mark Granovetter:

- "It is the distant acquaintances who are actually to thank for crucial information leading to your new job, rather than your close friends!"



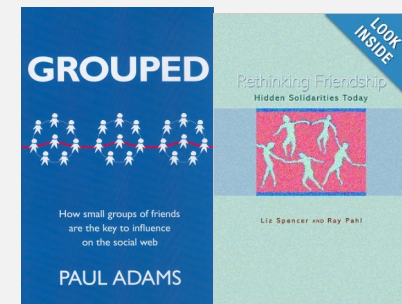
- Mark Granovetter (born October 20, 1943): an American sociologist and professor at Stanford University.
- 1969: submitted his paper to the American Sociological Review—rejected!
- 1972, submitted a shortened version to the American Journal of Sociology—published in 1973 ([Granovetter, 1973](#)).
- According to Current Contents, by 1986, the Weak Ties paper had become a citation classic, being one of the most cited papers in sociology.

# Summary

- The strength of a tie is defined in terms of four dimensions: amount of time, intimacy, intensity and reciprocal services
- Finding: even weak ties can be valuable
  - Weak ties can also act as bridges, and can help information diffuse faster
  - Generally weak ties have role in social cohesion and mobility, e.g., findings a job, geographic move, forming interest communities
- Strong ties are high maintenance; weak ties prevent small highly connected cliques from fragmenting
- Content of ties not considered; theory not validated with data!



# Tie strength in social network



- According to [Rethinking Friendships: Hidden Solidarities Today (Princeton, 2006) by Liz Spencer and Ray Pahl], there are eight different types of relationships:
  - Associates: don't know each other well, and only share a common activity, such as a hobby or a sport.
  - Useful contacts: share information and advice, typically related to our work or career.
  - Fun friends: socialize together primarily for fun without a deep relationship to provide each other with emotional support.
  - Favor friends: help each other out in a functional manner but not in an emotional manner.
  - Helpmates: display characteristics of both favor friends and fun friends; socialize together for fun and also help each other out in a functional manner.
  - **Comforters: similar to helpmates but with a deeper level of emotional support.**
  - **Confidants: disclose personal information to each other, enjoy each other's company, but aren't always in a position to offer practical help.**
  - **Soulmates: display all of these elements and are the people we're closest to.**
- We have a much smaller number of strong ties than weak ties.

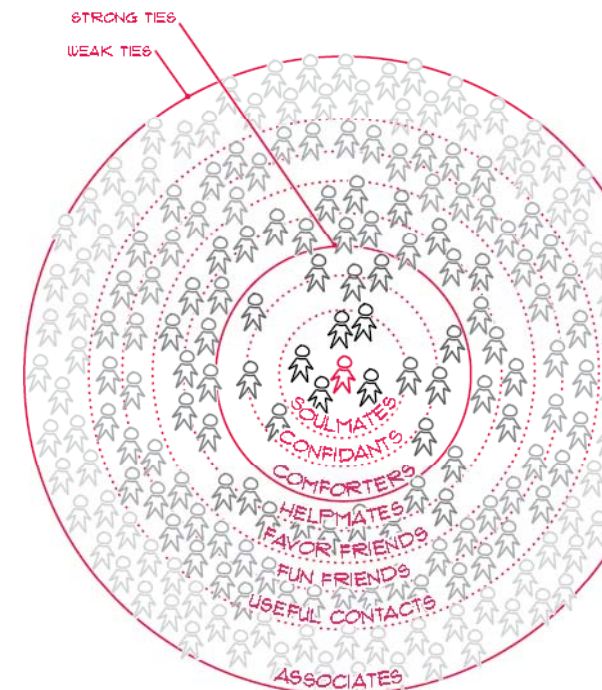
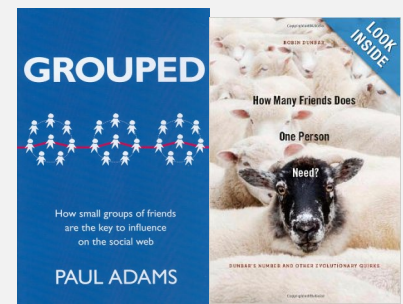


Figure: Credit: (Adams, 2011)

# Tie strength: the 5-15-50-150-500 rule



- According to [How Many Friends Does One Person Need?: Dunbar's Number and Other Evolutionary Quirks, Robin Dunbar, Harvard University Press (November 1, 2010)]:
  - Most peoples social networks have a common pattern, unchanged for thousands of years.
  - There are clear boundaries based on the number of connections we have; it starts at five and goes up by a factor of three.
    - Inner circle: 5
    - sympathy group: 12-15
    - Semi-regular group: 50
    - stable social group: **150** (the Dunbar number)
    - friends of friends group (weak ties): 500
- Robin Ian MacDonald Dunbar (born 28 June 1947): a British anthropologist and evolutionary psychologist and a specialist in primate behavior at University of Oxford.
- Best known for his Dunbar's number: a measurement of the "cognitive limit to the number of individuals with whom any one person can maintain stable relationships".

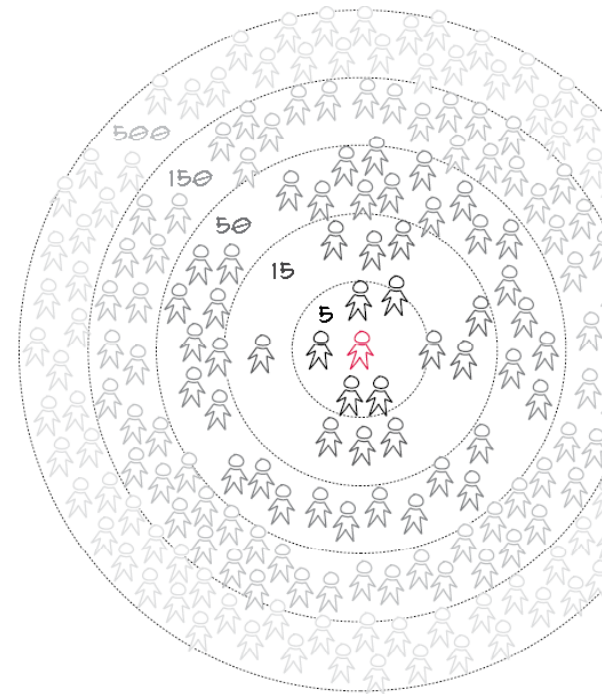



Figure: Credit: (Adams, 2011)

# Predicting Tie Strength With Social Media

# Summary

- First study to quantitatively measure social tie strength.
- Based on Facebook data of 35 participants, they define 74 predictor variables of tie strength
- Seven different categories of the predictor variables:
- 85% predictive accuracy based on an OLS regression model; findings supplemented with interviews
- Findings:
  - Intimacy strongest feature; structural balance i.e., number of overlapping networks least
  - Strong ties provide emotional support, weak ties are great for accessing new kinds of information

facebook John Doe Friends Applications Inbox Home Settings



John Doe
 

Wall Info Photos

How strong is your relationship with this person?  
 barely know them ————— we are very close

How would you feel asking this friend to loan you \$100 or more?  
 would never ask ————— very comfortable

How helpful would this person be if you were looking for a job?  
 no help at all ————— very helpful

How upset would you be if this person unfriended you?  
 not upset at all ————— very upset

If you left Facebook for another social site, how important would it be to bring this friend along?  
 would not matter ————— must bring them!

Write Post Photo Record Video Share Link Give Gift

Send John a Message  
 Poke John

Networks:  
 CUNY Hunter Grad Student '09  
 Ullinois Alum  
 New York, NY

Relationship Status:  
 Married to Jane Doe

Birthday:  
 May 19

Current City:  
 Brooklyn, NY

Mutual Friends

Write something...

How strong is your relationship with this person?

barely know them ————— we are very close

How would you feel asking this friend to loan you \$100 or more?

would never ask ————— very comfortable

How helpful would this person be if you were looking for a job?

no help at all ————— very helpful









How upset would you be if this person unfriended you?

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If you left Facebook for another social site, how important would it be to bring this friend along?

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### Predictive Intensity Variables


Predictive Intensity Variables	Distribution	Max
Wall words exchanged		9549
Participant-initiated wall posts		55
Friend-initiated wall posts		47
Inbox messages exchanged		9
Inbox thread depth		31
Participant's status updates		80
Friend's status updates		200
Friend's photo comments		1352

### Intimacy Variables



Intimacy Variables	Distribution	Max
Participant's number of friends		729
Friend's number of friends		2050
Days since last communication		1115
Wall intimacy words		148
Inbox intimacy words		137
Appearances together in photo		73
Participant's appearances in photo		897
Distance between hometowns (mi)		8182
Friend's relationship status		

6% engaged 32% married  
30% single 30% in relationship




### Duration Variable

Days since first communication		1328
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### Reciprocal Services Variables

Links exchanged by wall post		688
Applications in common		18






### Structural Variables

Number of mutual friends		206
Groups in common		12
Norm. TF-IDF of <i>interests</i> and <i>about</i>		73

### Emotional Support Variables

Wall & inbox positive emotion words		197
Wall & inbox negative emotion words		51

### Social Distance Variables

Age difference (days)		5995
Number of occupations difference		8
Educational difference (degrees)		3
Overlapping words in <i>religion</i>		2
Political difference (scale)		4

Are the gradations “strong”, “weak” and “absent” sufficient for characterizing ties?

# Class Exercise I: What are the implications?

For individuals?

For communities?

Identify five scenarios each where strong ties are more useful and where weak ties are more useful

Why should we care about measuring tie strength on social media? How does it impact our studies of social media? How does it impact design?



Are there situations where both strong and weak ties may be useful in an online context?

# Burke, M., and Kraut, R. 2014. "Using Facebook after Losing a Job: Differential Benefits of Strong and Weak Ties". CSCW 2013.

- Losing a job is associated with increases in stress, while talking with strong ties is generally associated with improvements in stress and social support.
- Weak ties do not provide these benefits.
- Bridging social capital comes from both strong and weak ties.
- Contrary to the "strength of weak ties" hypothesis, communication with strong ties is more predictive of finding employment within three months

“Felt a little better with supporting comments about losing my job. My friends gave me a better outlook on the situation.”

“Been able to share my worries, get help on Cvs, job hunting and general chit chat about whats happening to others.”

“Much better it is way easier to stay connected when looking for employment t see what others found. If someone finds a lead they cannot use they pass it on in case anyone else can use it. We are finding jobs”

“Yes, [I] am able to commiserate with other colleagues on losing our jobs (due to Bank failure) and getting prospects for new opportunities.”

# Class Exercise II

How can you generalize Gilbert and Karahalios' tie strength prediction model beyond Facebook?

Situate strong and weak ties in the context of unidirectional ties like on Twitter.

What does it mean to have “social interaction” in a tie-less system like Yik Yak?

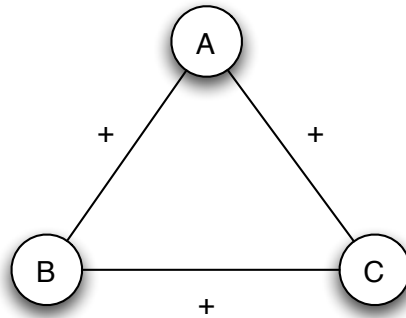
Today we use more and more types of networks, and our contacts are spread across them. What does therefore a strong (or weak) tie on one platform mean for the other?



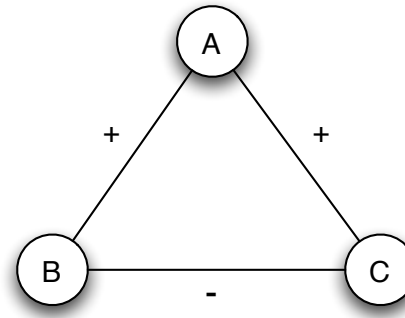
After all, in online context, interface design/ algorithmic manipulation may hugely impact whether a social tie eventually grows to be a strong or a weak tie. What do you think is the impact?

# Signed Ties and Structural Balance

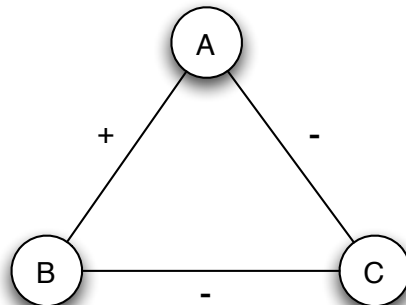
- In many online and offline contexts, ties can be signed.
- Reasons could span from trust/mistrust to voting and positive/negative perceptions of feedback and interaction



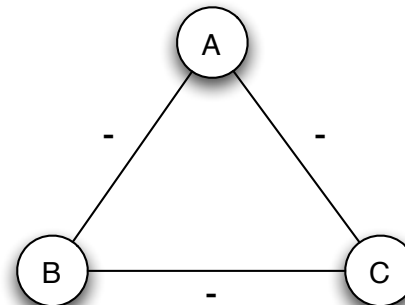
(a) *A, B, and C are mutual friends: balanced.*



(b) *A is friends with B and C, but they don't get along with each other: not balanced.*



(c) *A and B are friends with C as a mutual enemy: balanced.*



(d) *A, B, and C are mutual enemies: not balanced.*