Emotion, Tie Persistence, and Network Structure on Twitter

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social media information lab?
social media research:
1. what are people doing (and why)?
social media research:

2. understanding social systems at scale
social media research:
3. creating new experiences
Social media awareness streams networks
today’s big story

generate a better understanding of the social dynamics

validate theories from social sciences in these new and important settings
today's more specific story

Twitter and networks:

Part 1. social sharing of emotion and networks on Twitter

Part 2. unfollowing on Twitter
study 1
emotion & social networks

Kivran-Swaine & Naaman. Network Properties and Social Sharing of Emotions in Social Awareness Streams. (CSCW 2011)
main question
How does users' social sharing of emotion in SAS relate to the properties of their social networks?
research questions

RQ1

What is the association between people’s tendency to express emotion (joy, sadness, other) in their posts (updates or interactions) and their number of followers?
research questions

RQ2

What is the association between people’s tendency to express emotion (joy, sadness, other) in their posts (updates or interactions) and their network characteristics like density and reciprocity rate?
1.5 step ego-centric network
theory background

expression of emotion $\Leftrightarrow$ number of followers

( - ) people who mostly post about themselves have significantly lower number of followers*

( + ) emotional broadcaster theory

* Naaman, Boase, Lai (CSCW 2010)
theory background

expression of emotion $\Leftrightarrow$ network density
expression of emotion $\Leftrightarrow$ reciprocity rate

(+) intimacy
(-) curbing
data

content dataset from Naaman, Boase, Lai (2010)
social network dataset from Kwak et al. (2010)

105,599 messages from 628 users who:

had no more than 5,000 followers or followees
posted at least one Twitter update in July 2009 in English
still had public profile in April 2010
pilot study

joy

on average 23% of a user’s updates

“Fireworks at the Cumming fairgrounds were awesome. Sophia had a blast. Lucy said, “ooooh,” over and over. Good times with my family.!”

sadness

on average 10% of a user’s updates

“RIP Kathy. Live life for today. You never know how long you have.”
study details

automated analysis of the users’ tweets based on LIWC

“expression of emotion” => “existence of emotive words”
some gender differences

- joy
- sadness
- other emotions
analysis

independent variables:
- joy (interactions-updates),
- sadness (interactions-updates),
- emo (interactions-updates)

3 linear regression models for dependent variables:
- number of followers
- network density
- reciprocity rate
results

... explaining number of followers ($R^2 = .22$)

@follower ... joy-interactions .35 **

@follower ... sadness-interactions .20 **

** p < .01
results

... explaining network density ($R^2 = .33$)

- yay!
- joy-updates $-0.10^{**}$
- @follower ...
- sadness-interactions $-0.18^{**}$
- number of followers $-0.50^{**}$

** $p < .01$
limitations & future work

better emotion classifier
improve sampling, increase dataset
culture dependent
dyad-level analysis
today's more specific story

Twitter and networks:

Part 1. social sharing of emotion and networks on Twitter

Part 2. unfollowing on Twitter
study 2

unfollowing on Twitter

main question:

what structural properties of the social network of nodes and dyads predict the breaking of ties (unfollows) on Twitter?
theory background

tie strength
embeddedness within networks
power & status
content dataset from Naaman, Boase, Lai (2010)
social network dataset from Kwak et al. (2010)
Twitter API – connections still exist 9 months later?

715 seed nodes
245,586 “following” connections to seed nodes
30.6% dropped between 07/2009 & 04/2010
analysis

* independent variables (computed for our 245K dyads)

seed properties
follower-count, follower-to-followee ratio, network density, reciprocity rate, follow-back rate

follower properties
follower-count, follower-to-followee ratio

dyad properties
reciprocity, common neighbors, common followers, common friends, right transitivity, left transitivity, mutual transitivity, prestige ratio
<disclaimer>

the following figures are NOT scientific evidence and are shown here for illustration purposes

no control for intra-seed effects; no inter-variable effects

no R installation was harmed in the making of the following figures
effect of number of followers (none):
effect of reciprocity (large):
effect of follow-back rate
effect of common neighbors
back to scientific results (made R break sweat)
sparing you the details, though
in-depth analysis

the details you do not want to hear (now)

multi-level logistic regression (dyads/edges nested within seed nodes)

three models: full one includes seed, follower, and dyadic/edge variables

complete details: in the paper
some results

effect of tie strength on breaking of ties

*** dyadic reciprocity (−)
*** network density (−)

*** highly statistically significant
some results

effect of power & status on breaking of ties

*** prestige ratio (+)
*** follow-back rate (-)
*** f’s follower-to followee ratio (-)
*** dyadic reciprocity (-)

*** highly statistically significant
some results

effect of embeddedness on breaking of ties

*** common neighbors (-)

*** highly statistically significant
limitations & future work

only two snapshots: add more
additional (non-structural) variables (e.g., frequency of posting!)
emotion and tie breaks
...and even broader

what can we learn from social dynamics on Twitter (and Facebook) about:

our relationships?
our language?
our society and culture?
our interests and activities?
for more details

http://bit.ly/MorInfoSeminar
thank you

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