

# Small Worlds with a Difference

New Gatekeepers and the Filtering of Political  
Information on Twitter



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# Political Tweets

*(German general election 2009)*

“Ihr werdet euch noch wünschen wir wären Politikverdrossen [sic!].” – Max Winde (@343max)

*rough translation:*

“Soon you’ll be wishing we were through with politics”

# A Political Question

*Assuming that ...*

the web is a considerable source for political information

each user only perceives a selection of this information

facts and opinions have the potential to influence recipients and journalists

*Q: what forces influence the visibility of information?*

# Old Answer

Journalists as gatekeepers

vs

Recipients as selective readers  
("Uses & Gratifications")

# New Environment

*Networked Information*

**Relevant** – social networking sites see immense growth in adoption

**New paradigms** – real-time, recommended many-to-many communication

*Perceived information **varies**, selection is **distributed***

*Old answers neglect network effects in the process*

# What We Know

Social networks tend to exhibit **small world properties** (so do networks of political communication on twitter)

Information flows **fast** and networks are relatively resistant to (random) **disruptions**

*Information should be able to move unencumbered*

# The Problems

Contagion model of information spread

Links can be substituted

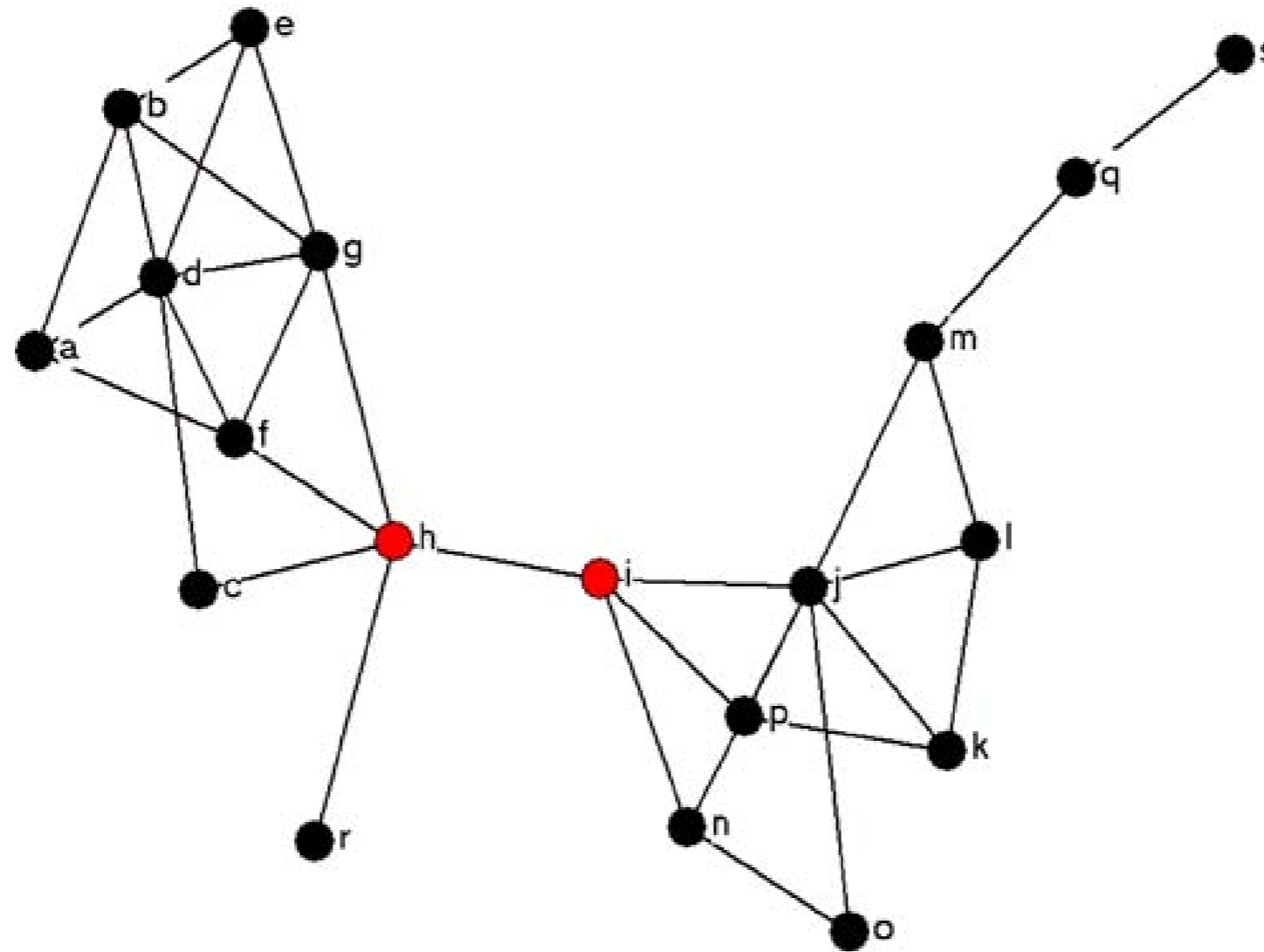
But: Almost everyone has almost no friends (power law), key players have dominant role

Information relay via key players

**Non-Random** removal!

Problem moves from **contagion** to **disruption**  
(Borgatti's KPP-Neg problem)

# Impact of Key Player Removal



Borgatti (2010) p.39



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Network of 8,609 german Twitter users who used political hashtags during the general election campaign 2009 (June 18 to September 30, 2009)

Edges are directed messages (RT and @) which contain political hashtags

# Finding Key Players

Need general measure for a node's impact on network's capability to transfer information

» Ortiz-Arroyo (2010):  
Centrality Entropy metric ( $H_{ce}$ )

$$H_{ce}(G) = - \sum_{i=1}^n \gamma(v_i) \times \log_2 \gamma(v_i)$$

$$\gamma(v) = \frac{spaths(v_i)}{spaths(v_1, v_2, \dots, v_M)}, \quad spaths(v_1, v_2, \dots, v_M) > 0$$

# Centrality Entropy

Calculates the entropy of a network = capacity for information transfer (~ease of transfer)

Iteratively remove nodes and re-calculate to determine largest impact = key players\*  
(KPP-NEG)

Complexity is  $O(n^3)$

\*note: no optimal solution for KPP-Neg

# Results

Network centrality entropy: 12.1596

The most influential node reduces entropy by  $\sim .1$  when removed (N= 8,609)

Highest entropy impact of a node in Borgatti's example networks:  $\sim .1$  (N=19)

Entropy impact declines rapidly (power law?)

» A small number of users can have a disproportionately large disruptive impact

# Political Tweets II

During the election campaign, users explicitly coded party affiliations:

#party+ = positive (e.g. cdu+, spd+)

#party- = negative (e.g. cdu-, spd-)

This allows for the creation of party affiliation profiles

# User Bias

We calculated the distribution of party evaluations for **outgoing** and **incoming\*** directed messages

A simple  $\chi^2$  test was used to test for difference of those distributions

\*messages from network neighbors

# Results

A majority of users with testable volume of messages displayed a significant ( $p < 0.001$ ) bias

All testable gatekeepers (top 100) displayed bias

	sig. bias	no sig. bias
negative party evaluations	2,866	201
positive party evaluations	3,835	34
Users with significantly differing distributions of incoming and outgoing party evaluations. N = 8,609		



# Example User

**Table 2. Political bias of the Twitter account @volker\_beck by the German politician Volker Beck (Bündnis 90/Die Grünen)**

	Outgoing <sup>2</sup>	Incoming <sup>3</sup>
CDU (conservatives)	0	511
CSU (conservatives)	0	58
SPD (social democrats)	0	876
FDP (liberals)	0	1,269
Grüne (green party)	19	630
Linke (socialists)	0	267
Piraten (pirate party)	10	4,944

# Takeaways

The network of political conversations during the general election campaign 2009 was dominated by a small number of key users which functioned as critical relays within the network

# Takeaways

In their tweets, these key users did not mirror their network environment but instead exhibited an individual political bias

# Takeaways

The visibility of political information on twitter is critically dependent on the network structure

# Thank you for your (early morning) attention!

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