### Spreading phenomena

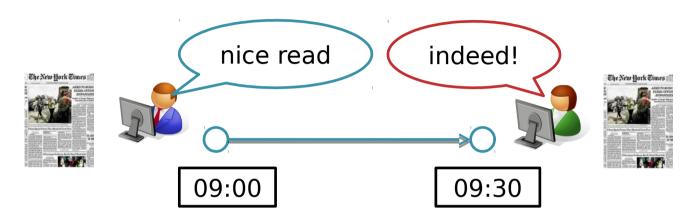
Introduction to Network Science Carlos Castillo Topic 24



#### Sources

- Easley and Kleinberg (2010): Networks, Crowds, and Markets Ch 19
- Carlos Castillo, Wei Chen, Laks V. S.
   Lakshmanan (2012): Information and Influence
   Spread in Social Networks, KDD Tutorial.
- Carlos Castillo (2017): Social influence slides

#### Social influence

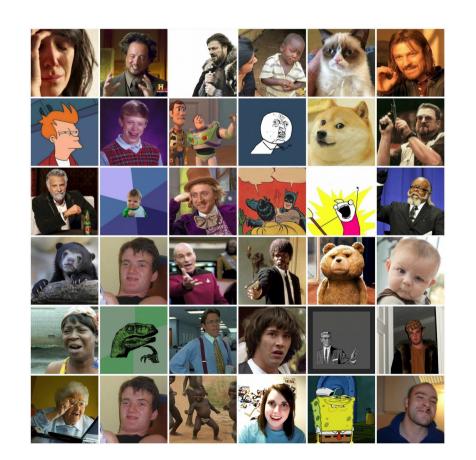


#### People are **connected** and perform **actions**

friends, fans, followers, etc.

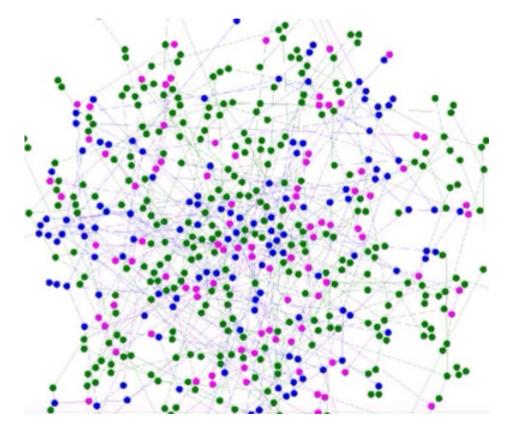
comment, link, rate, like, retweet, post a message, photo, or video, etc.

## "The Selfish Gene" by Richard Dawkins (1976) Chapter 11: "Memes: the new replicators"





#### Contagion in graph



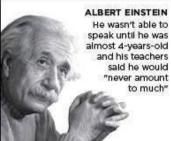
https://www.youtube.com/watch?v=WWTmRIDsydA

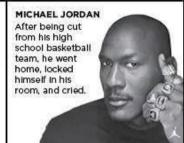
#### Spread of a Meme ("Famous Failures")



https://vimeo.com/50730795

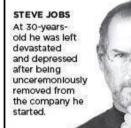
#### **FAMOUS FAILURES**







WALT DISNEY Fired from a newspaper for "lacking imagination" and "having no original ideas."





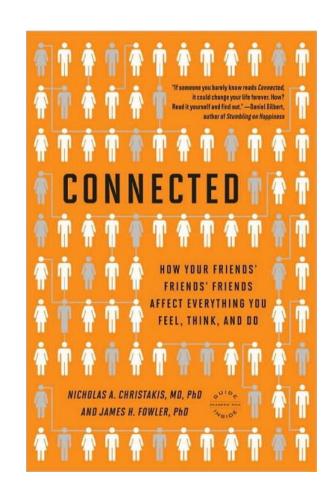


IF YOU'VE NEVER FAILED, YOU'VE NEVER TRIED ANYTHING NEW

television."

#### Non-trivial examples

- Back pain: spread from West to East in Germany after fall of Berlin Wall
- Suicide: well known to spread throughout communities on occasion
- Sexual "scripts": expected sequences of behaviors during intimate situations
- Politics: the denser your connections, the more intense your convictions

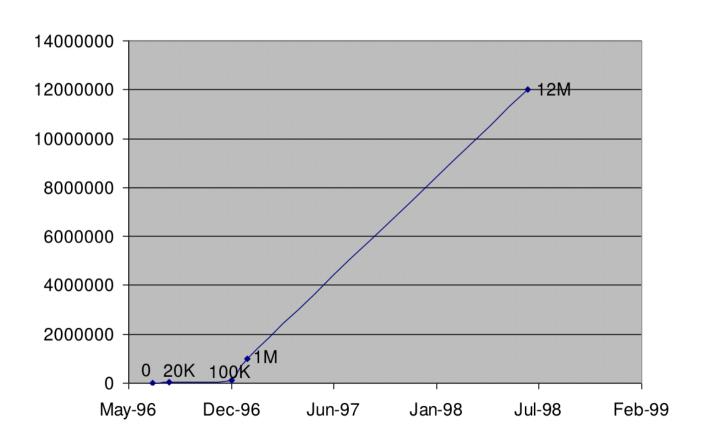


#### Viral marketing

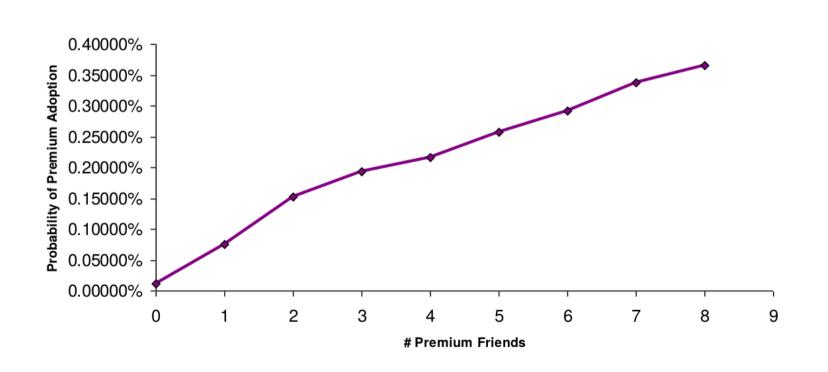
#### Viral Marketing Online

- Early example: Hotmail
  - Jul 1996: Hotmail.com started service
  - Aug 1996: 20K subscribers
  - Dec 1996: 100K
  - Jan 1997: 1 million
  - Jul 1998: 12 million
- Bought by Microsoft for \$400 million
- At the end of each email sent there was a message to subscribe to Hotmail.com: "Get your free email at Hotmail"

#### Hotmail users



# Peer pressure (pay "premium" subscription)



#### Influencers and Viral Marketing

#### The promise of "influencers"

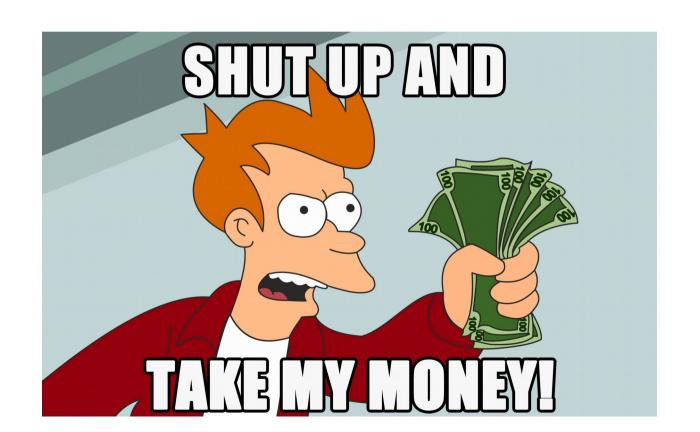
Influencers increase brand awareness. product conversions through Word-of-Mouth Marketing (WoMM)

Influencers advocate a brand

Influencers influence purchasing actions



# Viral marketing went through a stage of ...



### Can social influence really drive viral cascades?

- Watts et al. challenge the traditional notions and intuitions about SI causing viral spread
- Social epidemics are not always responsible for dramatic, possibly sudden social change
- Influence is hard to prove
- Do not dismiss influence altogether

#### How useful is viral marketing?

- Hard to predict which campaign will succeed virally
- Lack of predictability makes VM hard to implement;
- The magic might not be in a small number of influentials
- "Big seed" marketing is a predictable, practical alternative

#### Example: Huffington Post

- Ad agency buys all of the ad slots for a week
- Displays attractive videos with options for easy sharing
- Gets 7x more views due to social referrals, but ...
- None of the videos "goes viral" (grows exponentially in views) at any time





### Summary

#### Things to remember

Influence phenomena exist,
 but they are hard to create/engineer