Social Network Data Analyses: Opportunities and Challenges

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Disclosure

- I hold equity and options and receive a salary from MeYou Health, which has a vested interest in the success of everything we are talking about.

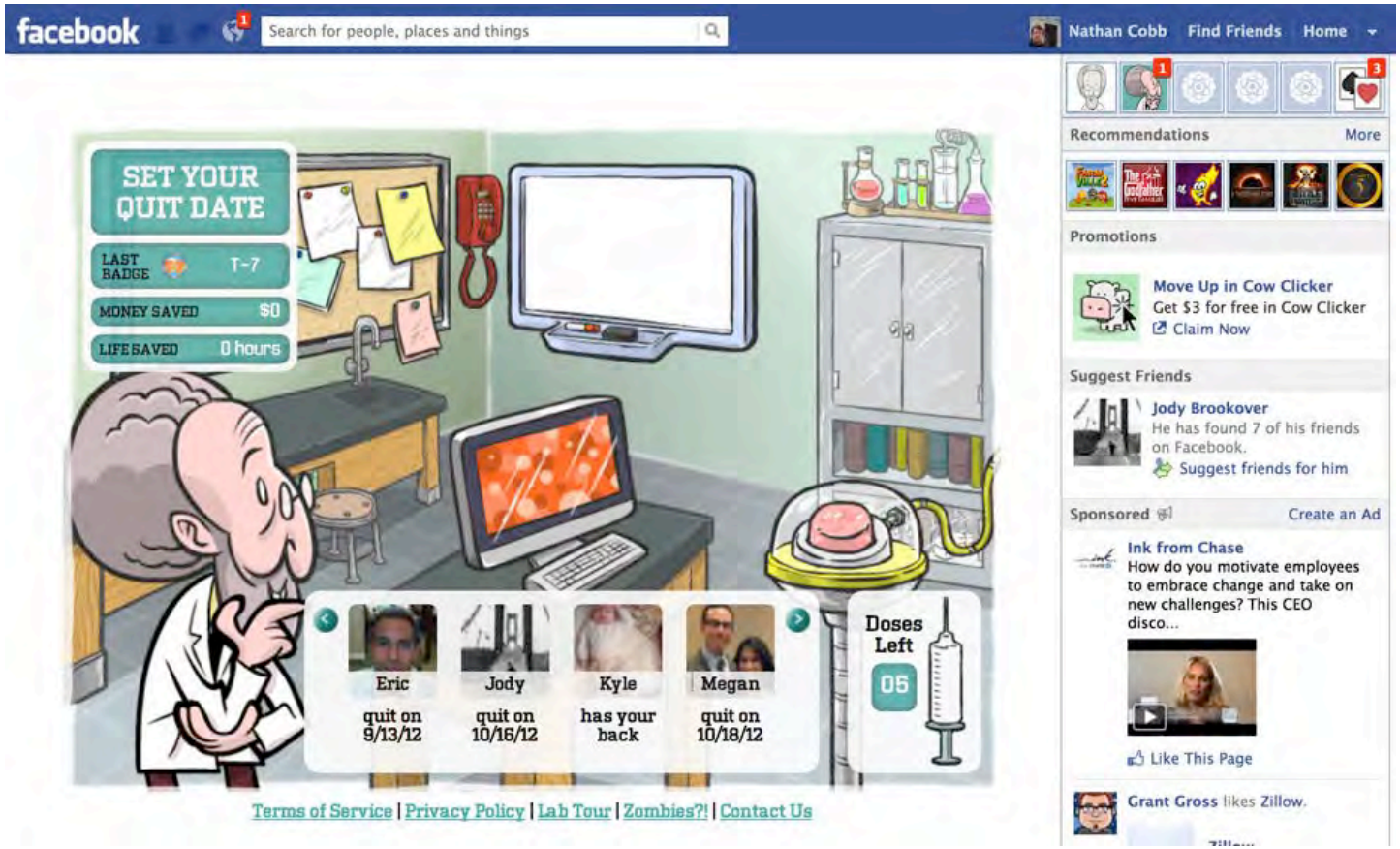
- Why social network analysis?
- 3 Examples
- Major Opportunities
- Major Challenges

Why SNA?

- Social networks drive and enable behavior change, for good and bad.
- Real world networks have shown to effect diffusion of everything from depression to obesity to tobacco use (and cessation.)
- The amount of available data for analysis has exploded – but the impact is unclear.

Example 1/3

Online Social Networks for Dissemination of Smoking Cessation Interventions



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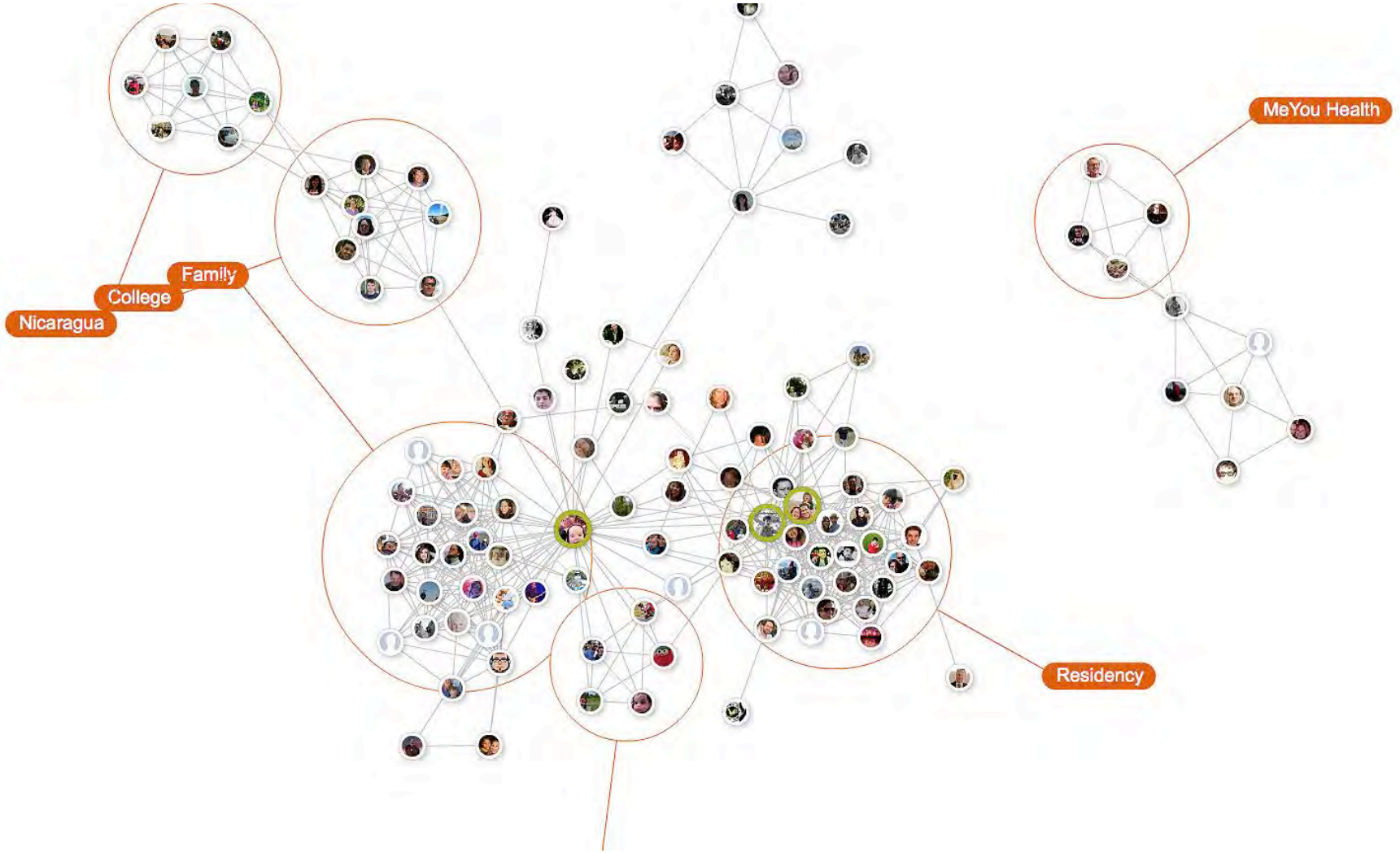
Sample Network



Example 1/3

- 9,000 randomized, data on a total of 27,000
- 9 million ties between them and friends
- 5 million additional ties including familial ties, significant others and photo co-occurrence.

- 164 million ties between their friends

- This is not big data anymore.

Example 2/3

LETTER

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A 61-million-person experiment in social influence and political mobilization

Robert M. Bond[1], Christopher J. Fariss[1], Jason J. Jones[2], Adam D. I. Kramer[3], Cameron Marlow[3], Jaime E. Settle[1] & James H. Fowler[1,4]

Human behaviour is thought to spread through face-to-face social networks, but it is difficult to identify social influence effects in observational studies[9–13], and it is unknown whether online social networks operate in the same way[14–19]. Here we report results from a randomized controlled trial of political mobilization messages delivered to 61 million Facebook users during the 2010 US congressional elections. The results show that the messages directly influenced political self-expression, information seeking and real-world voting behaviour of millions of people. Furthermore, the messages not only influenced the users who received them but also the users' friends, and friends of friends. The effect of social transmission on real-world voting was greater than the direct effect of the messages themselves, and nearly all the transmission occurred between 'close friends' who were more likely to have a face-to-face relationship. These results suggest that strong ties are instrumental for spreading both online and real-world behaviour in human

Example 3/3

NATIONAL SECURITY AGENCY
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DEPARTMENT OF DEFENSE

JOURNAL OF MEDICAL INTERNET RESEARCH Cobb et al

Original Paper

Online Social Networks and Smoking Cessation: A Scientific Research Agenda

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Abstract

Background: Smoking remains one of the most pressing public health problems in the United States and internationally. The concurrent evolution of the Internet, social network science, and online communities offers a potential target for high-yield interventions capable of shifting population-level smoking rates and substantially improving public health.

Objective: Our objective was to convene leading practitioners in relevant disciplines to develop the core of a strategic research agenda on online social networks and their use for smoking cessation, with implications for other health behaviors.

Methods: We conducted a 100-person, 2-day, multidisciplinary workshop in Washington, DC, USA. Participants worked in small groups to formulate research questions that could move the field forward. Discussions and resulting questions were synthesized by the workshop planning committee.

Results: We considered 34 questions in four categories (*advancing theory*, *understanding fundamental mechanisms*, *intervention approaches*, and *evaluation*) to be the most pressing.

Conclusions: Online social networks might facilitate smoking cessation in several ways. Identifying new theories, translating these into functional interventions, and evaluating the results will require a concerted transdisciplinary effort. This report presents a series of research questions to assist researchers, developers, and funders in the process of efficiently moving this field forward.

(J Med Internet Res 2011;13(4):e119) doi:10.2196/jmir.1911

KEYWORDS

Smoking cessation; social support; social networks; addiction; treatment; tobacco

Opportunities

- Advancing theory of how networks impact behavior change
  - How well do our small scale network theories translate to massive, longitudinal data sets?
- Understanding mechanisms of social diffusion
  - Could we harness rather than just observe the diffusion of information or behavior?
- Impact on social norms and modeling
  - Can we rewire networks to change how norms are displayed?
- Behavioral intervention targeting
  - Can we identify targets for behavior change to jump start large scale change?

Challenges

- Research design
  - How do you run an ethical trial on individuals when it impacts their network?
- Defining outcomes for network interventions
  - Are externalities a valid endpoint? Can we measure them?
- Developing predictive models
  - Can we construct models that predict with any certainty the evolution of networks? Of the spread of behavior? Of *anything*?