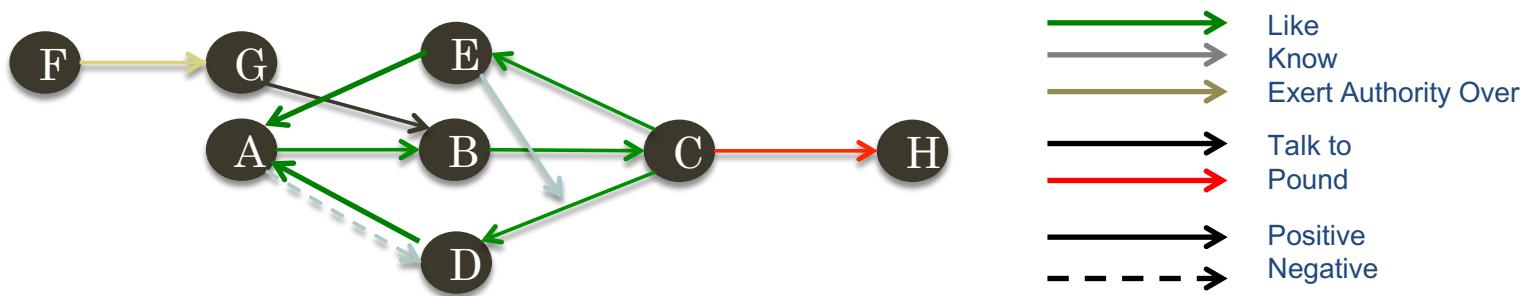


Gathering Social Network Data



(a uni-modal, multiplex, directed, valenced, network)

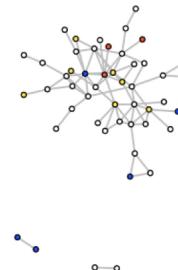
DNAC Workshop on Social Networks & Health:
Gathering Social Network Data

jimi adams
Associate Professor
University of Colorado Denver
Department of Health & Behavioral Sciences

Overview

This session's aims:

1. Network “Sampling”
2. Network Measurement
 - “The Boundary Specification Problem”
3. Platforms for Data Collection (overview)
4. A *brief* aside on Ethics in SNA
5. Some Assessments of SN Data Quality



1997

This visualization is of the literature on PMTCT in AIDS & JAIDS 1988-2008. See more information:

adams, jimi & Ryan Light. 2014. "Mapping Interdisciplinary Fields: Efficiencies, Gaps & Redundancies in HIV/AIDS Research." PLoS One 9(12):e115092

An Aside before we get going...



Field testing a network survey of religious leaders near Rumphi, Malawi (2005).

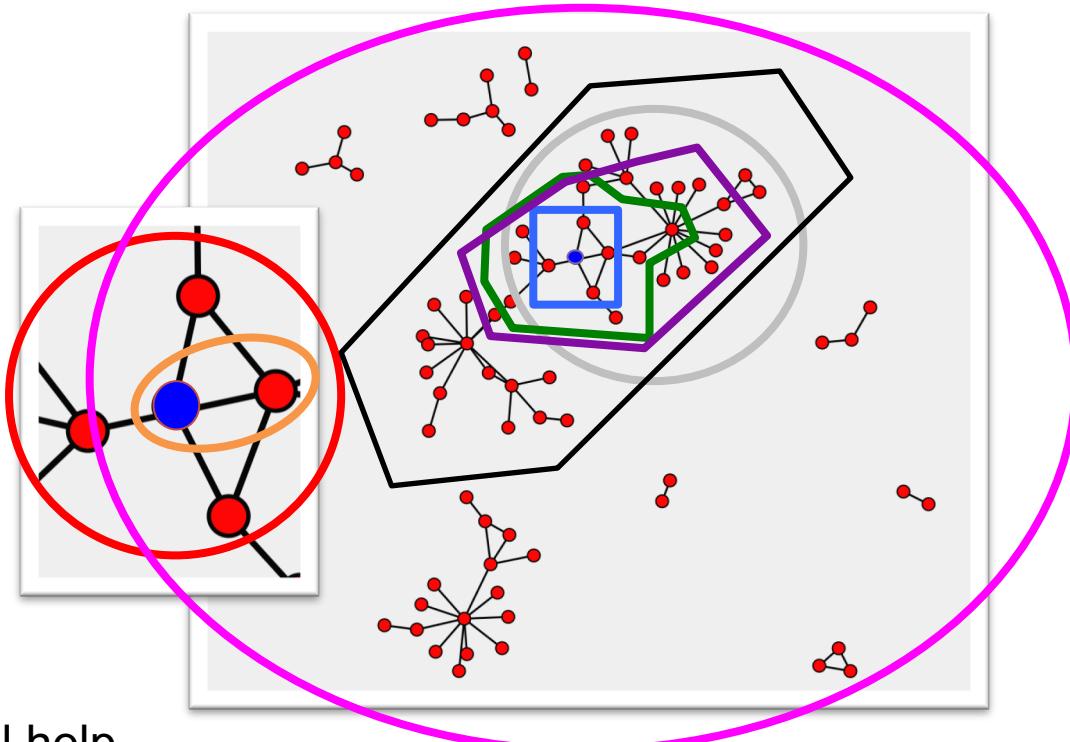
Principles not Recipes

- Apply to range of data collection strategies
 - **NOT** only for surveys
 - Qual & Quant data have most of the same considerations outlined here
 - Passive (e.g., archival, observational, etc.) approaches as well as active
- Many differing opinions on solutions w/in identified domains
 - common rules of thumb, not “best practices”

→ feel free to ask questions e.g., “how would this apply to ___ study?”

- When studying this network, how much of it are we interested in capturing?

- Dyadic
 - directly connected node pairs
- Ego Network
 - focal node and all directly connected alters
- Sub-groups
 - Attribute based groups
- Ego + n-steps
 - “link tracing” 1, 2, 3, n
- “Complete”
 - Node-based boundaries + ALL ties within

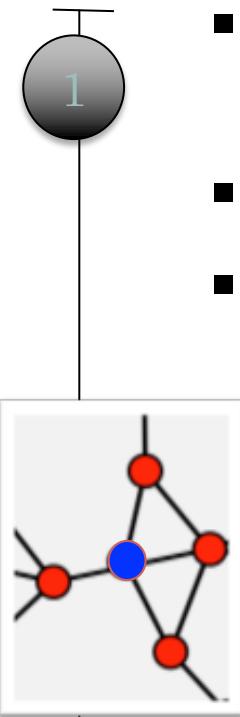


- Which of these aims you’re after will help determine how you gather network data, in terms of:
 - Sampling
 - Measurement

Butts CT, Acton RM, Marcum CS.
“Interorganizational Collaboration in the Hurricane Katrina Response.”
Journal of Social Structure 2012;13(1).

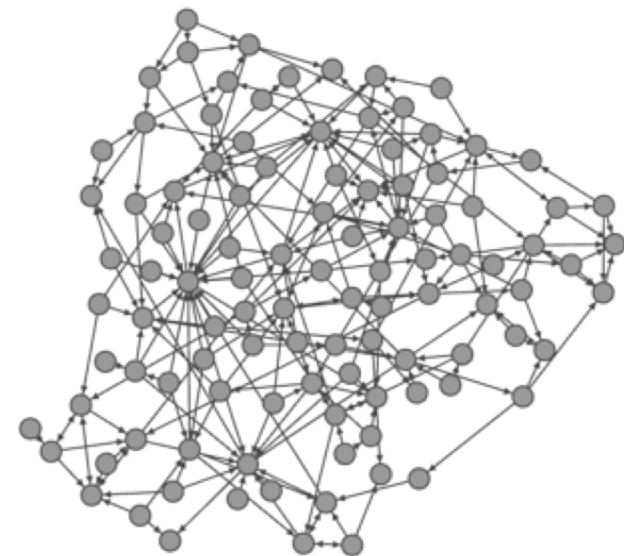
1 - Local / Ego Network Designs

- Data – Respondent (**ego**) & the people they are connected to (**alters**)
- Key aims – # & characteristics of ego's alters
- e.g., GSS “Important Matters” **Name Generator**:
 - “From time to time, most people discuss important matters with other people. Looking back over the last six months -- who are the people with whom you discussed matters important to you? Just tell me their first names or initials.”
- Popular Examples –
 - MDICP (fertility & HIV/AIDS “discussion partners”), NHSLS (sexual partnering & social support), Indianapolis Network Mental Health Study, many many more



2 – “Complete” Network Designs

1. Identify “complete” population boundary
2. Enumerate *all* relationships within
 - How “complete” is *all*?
 - Popular Examples –
 - Add Health, Framingham Heart Study, PROSPER, CKM Physicians, increasing number of others

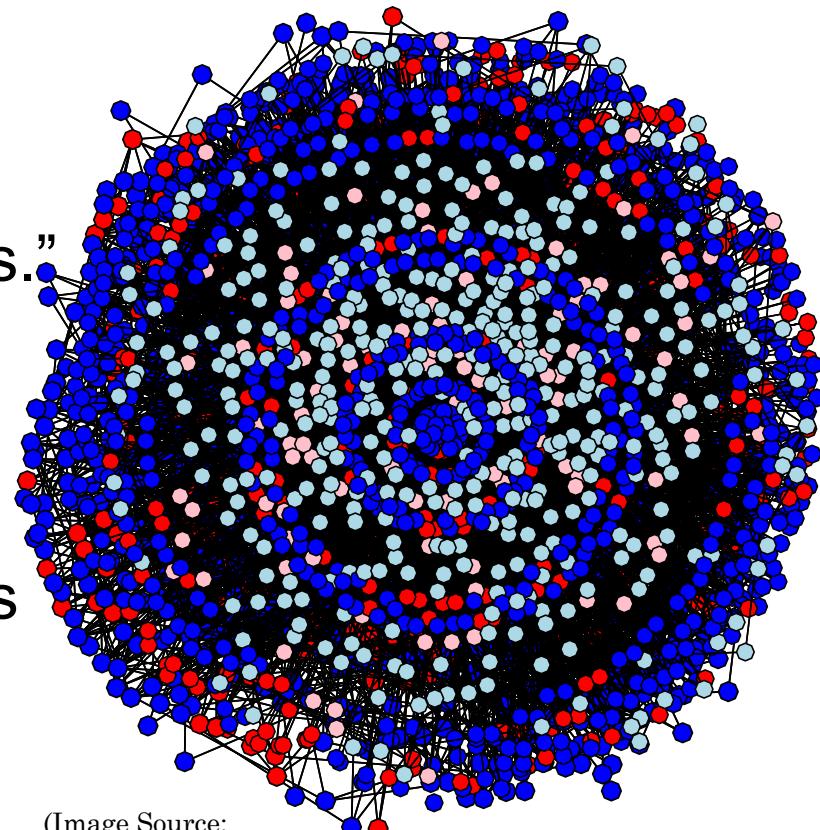


Coleman JS, Katz E, Menzel H. The Diffusion of an Innovation Among Physicians. *Sociometry* 1957;20(4):253.

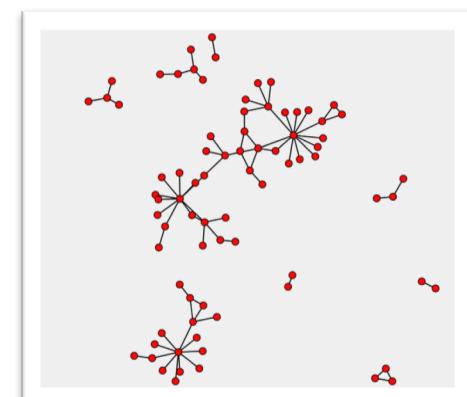
3 – Partial Network Designs

Especially common for hard to identify/find populations.

1. Start with a sample of “seeds.”
2. Follow Ego-Network Design for eliciting SN data from some sample of “seeds.”
3. Sample some proportion of nominated alters to recruit as next wave of respondents
 - Random Walks
 - Strong Ties
 - Census, etc...
4. Repeat
 - Popular Examples –
 - “Project 90”, lots of others especially in disease tracing



(Image Source:
<https://www.math.umass.edu/~gile/kgilepurdue2012.pdf>)





1. Local/Ego Network Data (Population-based Sampling)
 - Data – Respondent & people they are connected to
 - Key aims – # & characteristics of respondents' ties
3. Partial Network Data (Network-based Sampling)
 - Data – Some tracing to reach (contacts of) contacts
 - Key aims – Contact Tracing, especially for Hidden/Unknown Population Studies
2. “Complete” Network Data (Census)
 - Data – All actors & ties within a boundary
 - Key aims – Define population, enumerate ties w/in boundary (not |complete|)

The GSS “Personal Networks” Name Generator

127. *From time to time, most people discuss important matters with other people. Looking back over the last six months—who are the people with whom you discussed matters important to you? Just tell me their first names or initials. IF LESS THAN 5 NAMES MENTIONED, PROBE, Anyone else? ONLY RECORD FIRST 5 NAMES.*

NAME1 _____

NAME2 _____

NAME3 _____

NAME4 _____

NAME5 _____

The question was followed by this coding scheme, turned into the GSS variable labeled “Numgiven”:

128. *INTERVIEWER CHECK: HOW MANY NAMES WERE MENTIONED?*

[answer]	[code]
0	0
1	1
2	2
3	3
4	4
5	5
6+	6

Ego Networks in the GSS Subgroup Size Differences

- Age: size drops with age,
- Education: Increases size
- Race/ethnicity: Whites have larger nets
 - Heterogeneity varies by race/ethnicity

“Important Matter”

Ego Networks in the GSS

Estimating Isolation

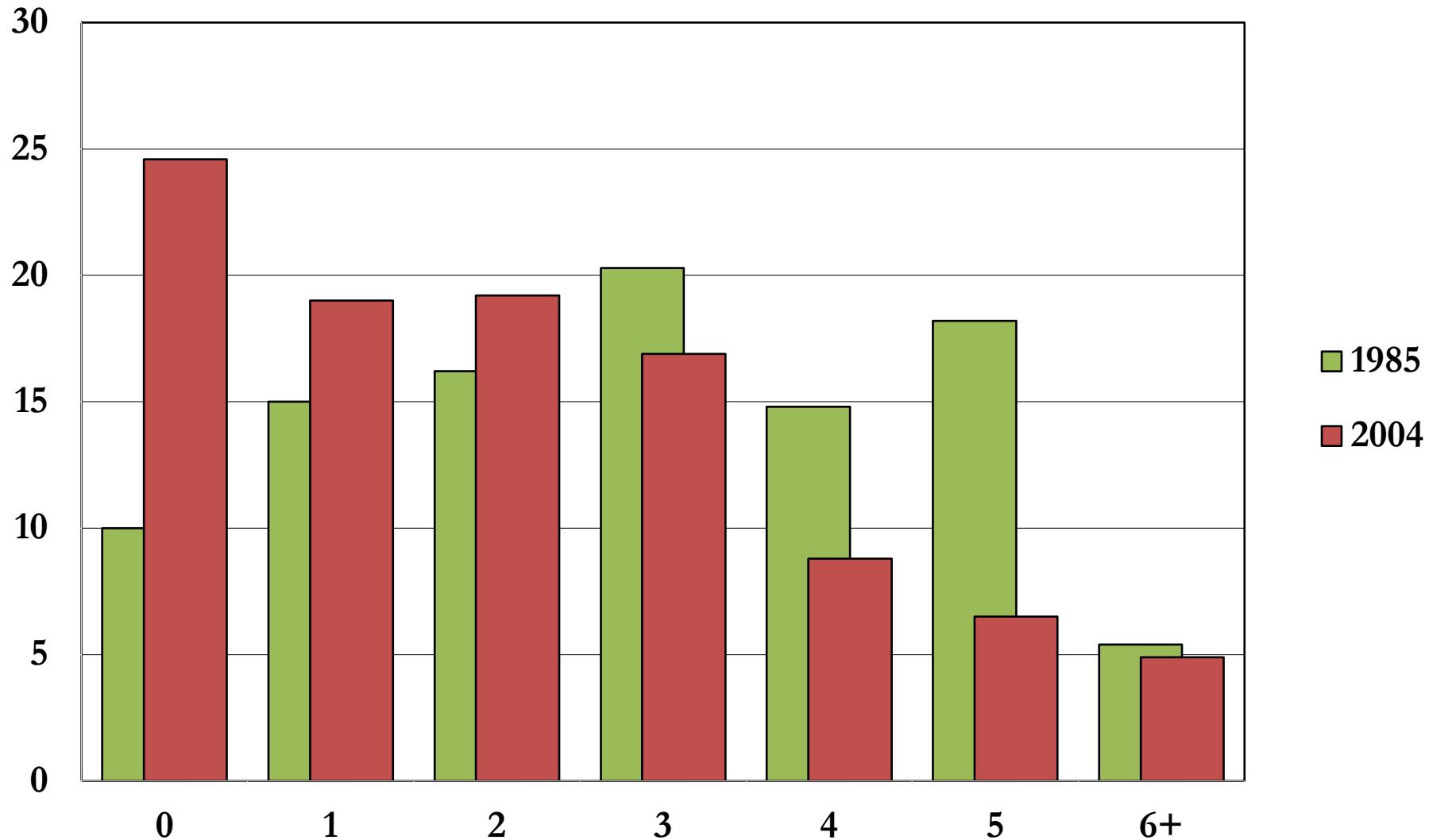
Sampling

Measurement

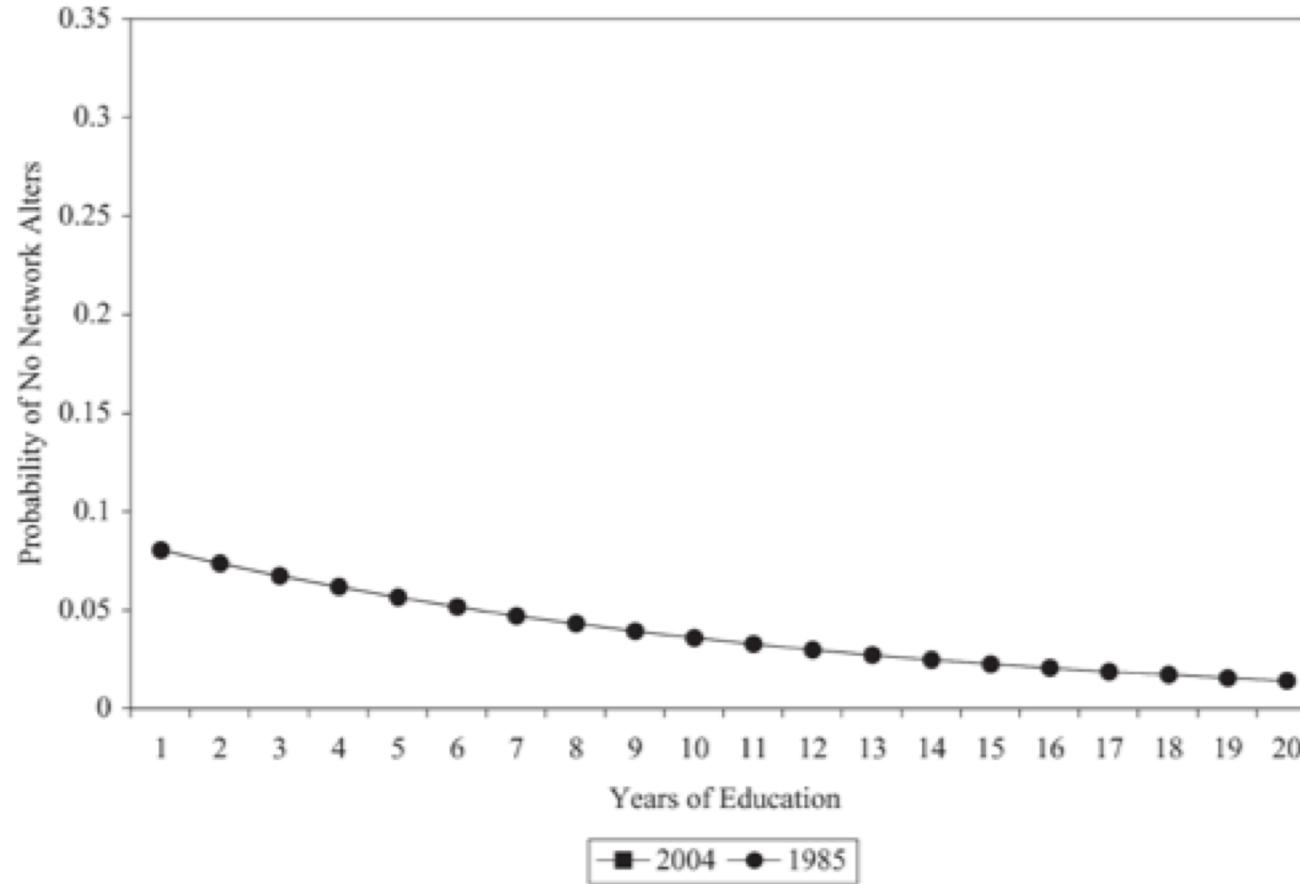
Modes

Ethics

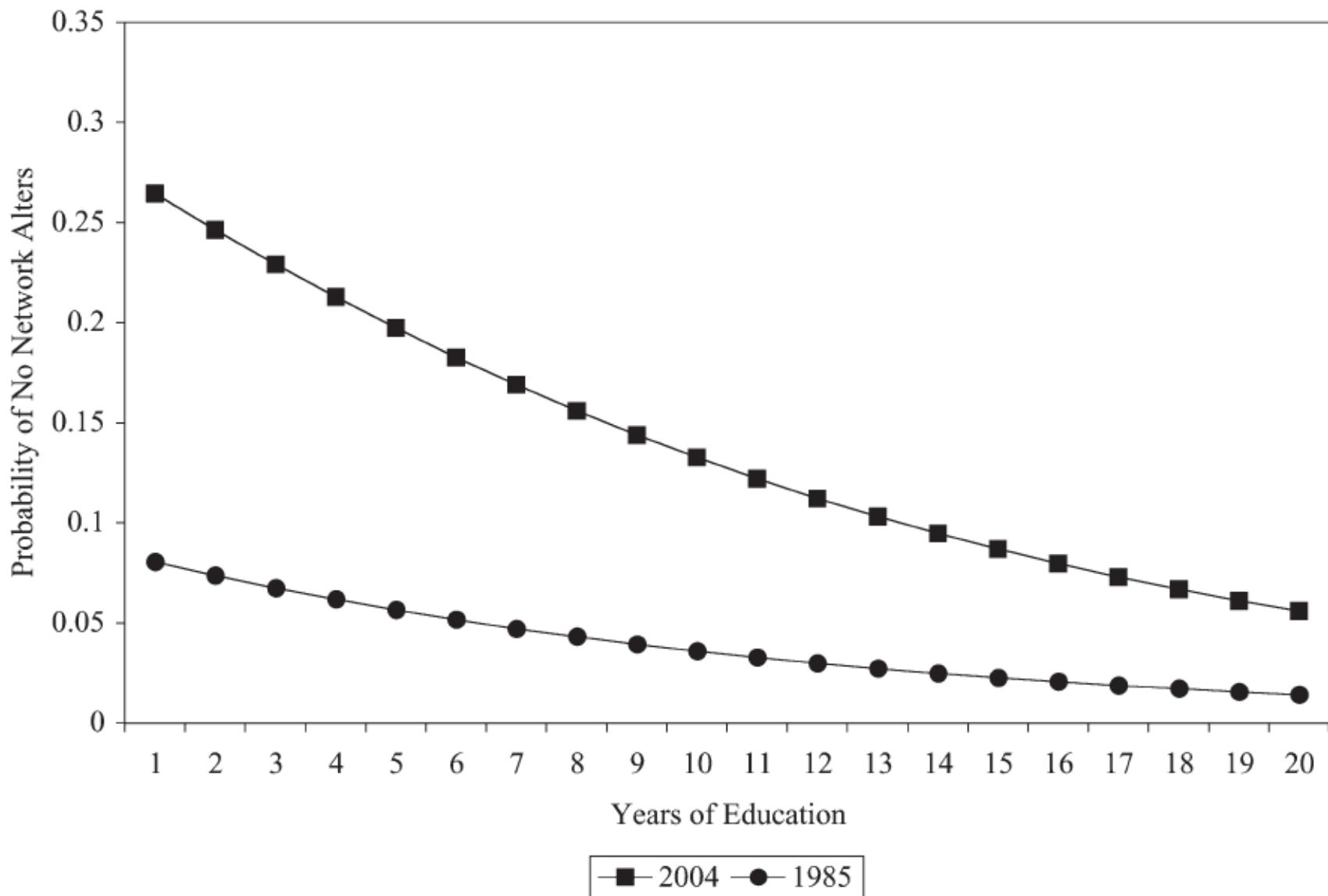
Assessment



Ego Networks in the GSS Isolation



Ego Networks in the GSS Isolation



How large is an “average person’s social network”?

- Pool & Kochen (1967) – Mathematical model
 - 500
- Robin Dunbar (1992) – Model from primate interactions and projecting to humans based on difference in neo-cortex size.
“Replicated” via a study of Christmas cards sent.
 - 150
- Bernard & Killworth (2001) – Empirical inquiry via “Network Scale-up Method”
 - Mean – 291; Median 231
- Facebook “friends” (2015)
 - Mean – 338; median 200

2 – “Complete” Network Designs

- National Longitudinal Study of Adolescent Health (Add Health)
 - 100+ schools, 90k+ students
 - Friendship
 - Full Roster
 - Up to 5 male & female friends
 - Followed up with relationship strength questions
 - Romantic partners - last 18 months
 - Nang Rong Kinship Networks
 - Study of demographic & environmental change in 51 villages
 - Full Population – household kinship rosters & marriage

2

The next questions are about your male friends. First list their names on the line marked "Name". Then, just as you did for other household members, look them up in the Student Directory and write their student numbers in the boxes below their names. Then, darken the ovals that correspond to the student numbers.

Look back at the EXAMPLE on page 6 if you need help with this. If a friend goes to a school for which you don't have a directory, give him the number 7777. (If your friend isn't in school at all, give him the number 7777 also.) If your friend goes to your school and isn't listed in the Student Directory, give him the number 9999; if your friend goes to the other school and isn't listed, give him the number 8888.

Remember: If a male friend goes to your school but is not listed in the directory, write 9999.

If a male friend goes to the other school but is not listed in the directory, write 8888

If a male friend does not go to your school or the other school, write 7777

After you have listed your male friends and their numbers, answer the five questions about each of them.

YOUR MALE FRIEND

List your closest male friends. List your best male friend first, then your next best friend, and so on. Girls may include boys who are friends and boyfriends.

Best Male Friend 1	Male Friend 2	Male Friend 3	Male Friend 4	Male Friend 5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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1 - Local / Ego Network Designs

2 - Follow Name Generators w/ (set of) Name Interpreters

1

	Name 1	Name 2	Name 3	Name 4	Name 5
a. How do you know _____?	1. Family 2. Friend 3. Neighbor 4. School mate 5. Other				
b. Does _____ live within 5 miles of your home?	No Yes				
b. Is _____ male or female?	Male Female				
c. How long have you known _____?	___ mos ___ yrs.				
d. How often do you see _____?	1. Daily 2. 1x/week 3. 1x/month 4. once				
e. Does _____ smoke?	No Yes				
f. What do you usually discuss with _____?	1. Family 2. Politics 3. Neighborhood 4. Work 5. Other				

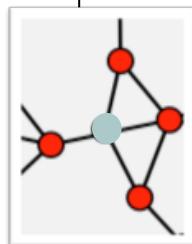
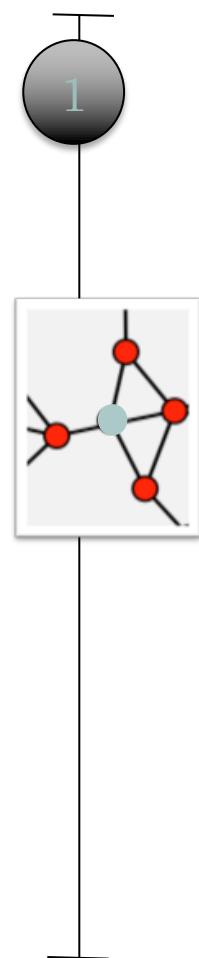


Image Source: Tom Valente

Ego Networks in the GSS

Alter Subgroup Differences

- Age: size drops with age,
 - kin/nonkin varies by age
- Education: Increases size (& nonkin)
- Race/ethnicity: Whites have larger nets
 - Heterogeneity varies by race/ethnicity (IQV=Whites .03, Blacks .13, Hispanics .22)
- Sex: Women have more kin
- Size of Place: Urbanites cite more non-kin



1 - Local / Ego Network Designs

3 – Ego Estimates Relationships Among Alters

NOW RETURN TO A24a AND ASK THE QUESTIONS ABOUT THE NEXT CONVERSATION PARTNER UNTIL YOU FINISH ALL PARTNERS LISTED IN A23b.

If the respondent mentioned less than four conversation partners, probe: "Is there anyone else you have talked to about AIDS that you did not mention before?"

If YES, go back to A23b, write the person's name, and ask the questions about that person from A24a to A38d

INTERVIEWER:

1. Copy the names of the AIDS conversation partners from A23b to the table below
2. Ask: "Finally, I would like briefly to ask you how well all the people you told me you have chatted with about AIDS know each other. For each pair that I mention, please tell me whether they are confidants, just friends, acquaintances, or they do not know each other." RECORD the response in the appropriate cell. Do not write in the shaded area."

1. NAME (from A23)	2. How much does [NAME] know...	NWP #1	NWP #2	NWP #3	NWP #4
NWP#1: _____	code relationship to...				
NWP#2: _____	code relationship to...				
NWP#3: _____	code relationship to...				
NWP#4: _____		DO NOT WRITE IN SHADED AREA			

Relationship CODE:

- 1 = confidants
- 2 = just friends

3 = acquaintances

4 = don't know each other

5 = don't know between the persons

1 - Local / Ego Network Designs

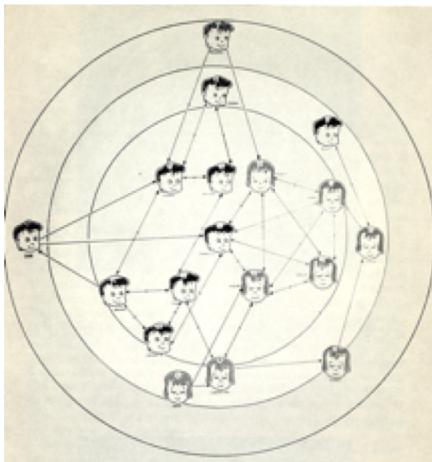
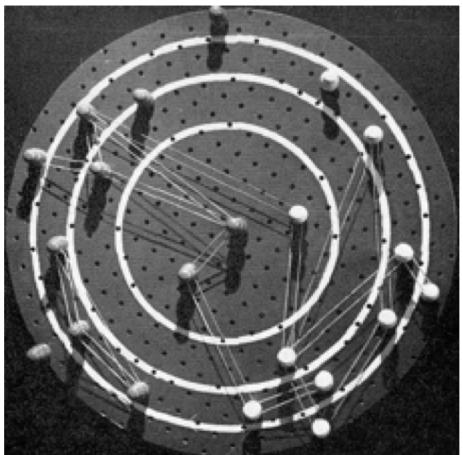
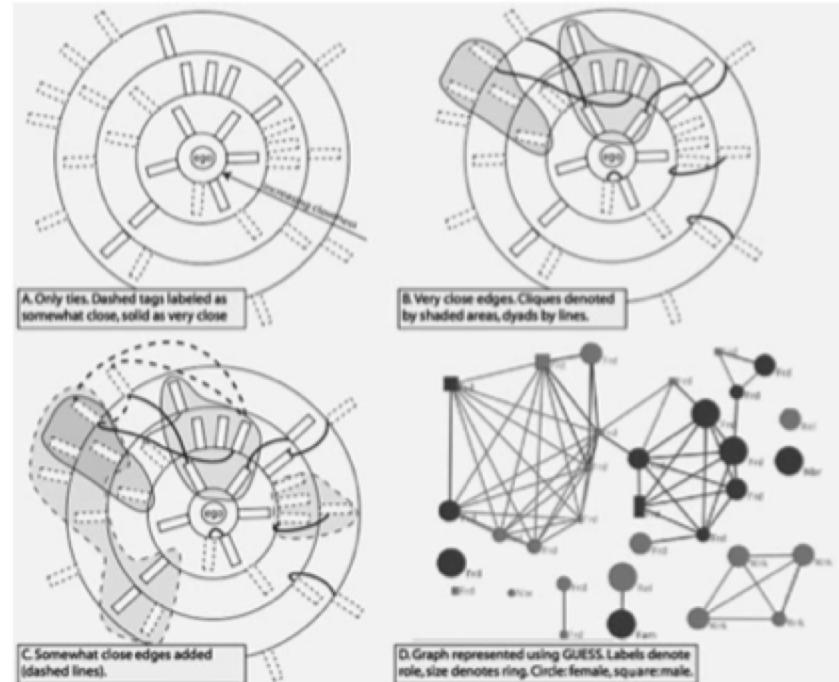


FIGURE 2
An Example Social Network in Four Stages of Detail



Freeman LC. Visualizing Social Networks. *Journal of Social Structure* 2000;1(1).

- Arrangement of alters.
- Drawing of strong ties—cliques first, followed by edges.
- Drawing of somewhat close ties—cliques first, followed by edges.
- Graph as coded and represented using the GUESS Network Visualization software (Adar 006).

Hogan B, Carrrasco JA, Wellman B. Visualizing Personal Networks: Working with Participant-Aided Sociograms. *Field Methods* 2007;19(2):116-144.

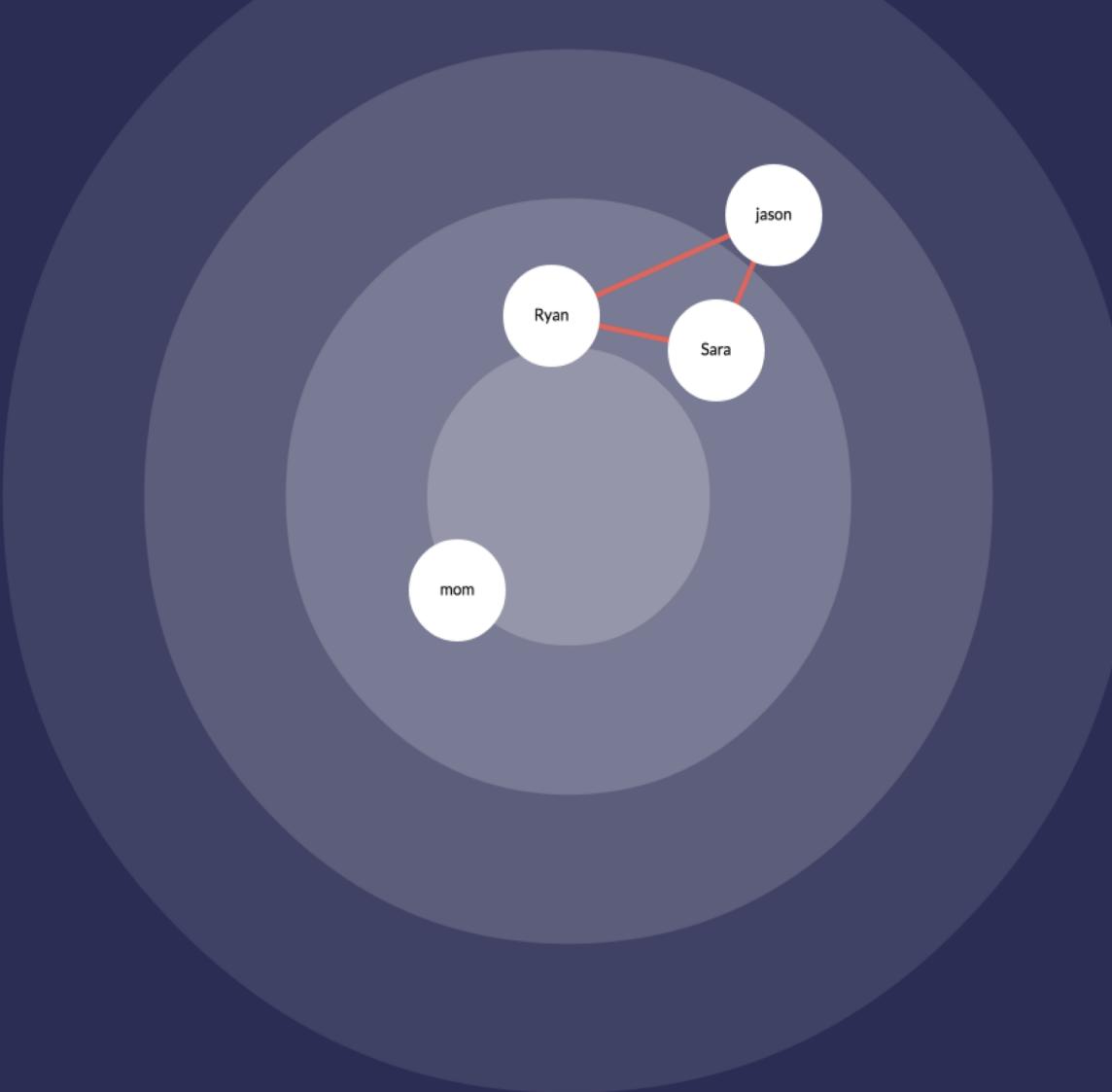


Network Canvas



Please draw a line
between people who
work together or
interact professionally

Tap a person to select
them, and then tap
another person to create
a line.

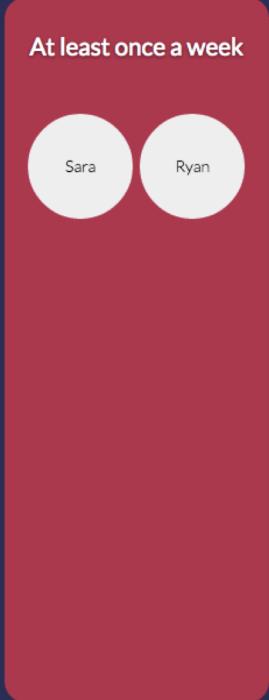


1 - Local / Ego Network Designs

2 - Follow Name Generators w/ (set of) Name Interpreters

 On average, how often do you usually talk to each of these people?



<  Almost every day  At least once a week  At least once a month  Less than once a month  Not Applicable >

Sara Ryan
jason mom

How many name generators to use / relations to gather?

Similarities			Social Relations				Interactions	Flows
Location	Membership	Attribute	Kinship	Other role	Affective	Cognitive	e.g.,	e.g.,
e.g., Same spatial and temporal space	e.g., Same clubs Same events etc.	e.g., Same gender Same attitude etc.	e.g., Mother of Sibling of	e.g., Friend of Boss of Student of Competitor of	e.g., Likes Hates etc.	e.g., Knows Knows about Sees as happy etc.	e.g., Sex with Talked to Advice to Helped Harmed etc.	e.g., Information Beliefs Personnel Resources etc.

Borgatti SP, Mehra A, Brass DJ, Labianca G. Network Analysis in the Social Sciences. *Science* 2009;323:892-895.

Table 3 - Ego-Alter Relationships: Bivariate Correlations of Individual Generators and the MGRI to a Multiple Name Generator.

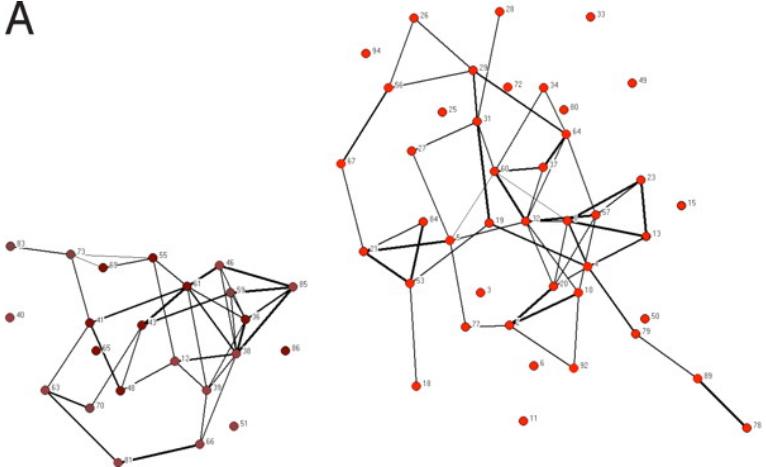
	Discuss ¹	Helped	Money	Social	Sugar	MMG	MGRI
Mean Closeness	.529(292)	.489(160)	.298(244)	.694(290)	.656(261)	0.766(295)	.898(299)
Mean Yrs. Known	.767(293)	.407(161)	.514(244)	.816(291)	.697(267)	0.884(296)	.904(299)
Mean Distance by Category	.794(292)	.426(159)	.520(244)	.785(291)	.285(260)	0.873 (296)	.877(299)
Mean Distance in Miles	.793(292)	.427(157)	.639(244)	.773(291)	.222(260)	0.880 (296)	.880(300)
Mean Ln(Distance in Miles)	.698(292)	.432(157)	.492(244)	.679(291)	.354(260)	0.815 (296)	.849(300)
Mean No. of Relationships	.738(299)	.603(171)	.573(251)	.750(296)	.592(273)	0.899 (301)	.896(305)
Mean	0.720	0.464	0.506	0.750	0.468	0.853	0.884

¹ Numbers in parentheses are N for each correlation.

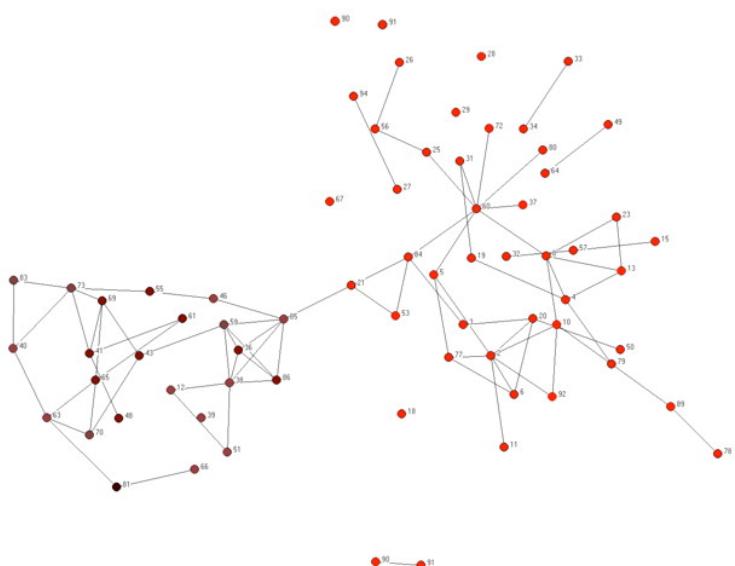
Marin A, Hampton KN Simplifying the Personal Network Name Generator: Alternatives to Traditional Multiple and Single Name Generators." *Field Methods* 2007; 19(2):163-193.

What do you want to capture?

A



B



Eagle N, et al. Inferring Friendship Network Structure by Using Mobile Phone Data. PNAS 2009; 106(36):15274-15278.

Table 1. Assorted graph-level measures for networks A and B from Eagle et al. (1), and their union ($A \cup B$) and intersection ($A \cap B$)

	A (inferred)	B (reported)	$A \cup B$	$A \cap B$
<i>N</i> isolates	17	5	0	25
<i>N</i> components	2	7	1	6
<i>N</i> components >10	2	1	1	2
Size largest component	31	51	65	17
Max geodesic distance	7	14	11	9
Density*	0.041	0.037	0.058	0.020
Transitivity ratio†	0.28	0.29	0.26	0.33
Reachability†	0.14	0.17	0.30	0.06

Isolates are nodes with no ties. Components are all node sets (≥ 2) for which a noninfinite path-length exists. Geodesic distance is the shortest path between two connected nodes; for a fully connected graph (e.g., u), this is its diameter. Density computes the number of ties present as a proportion of all possible ties among the full node set [$\Delta = 2L/[g(g - 1)]$]. The transitivity ratio captures the proportion of $i-k$ ties that are observed when both $i-j$ and $j-k$ ties are present. Reachability computes the inverse of the normed-weighted distance between all pairs of nodes (higher values represent a more well-connected graph).

*Densities of networks A and B are not statistically different, which was calculated using a bootstrap paired sample t test with ref. 5.

†Similarly, the presented values for A and B are not statistically different on their transitivity ratio or reachability, as calculated using density-conditioned permutation tests with ref. 3.

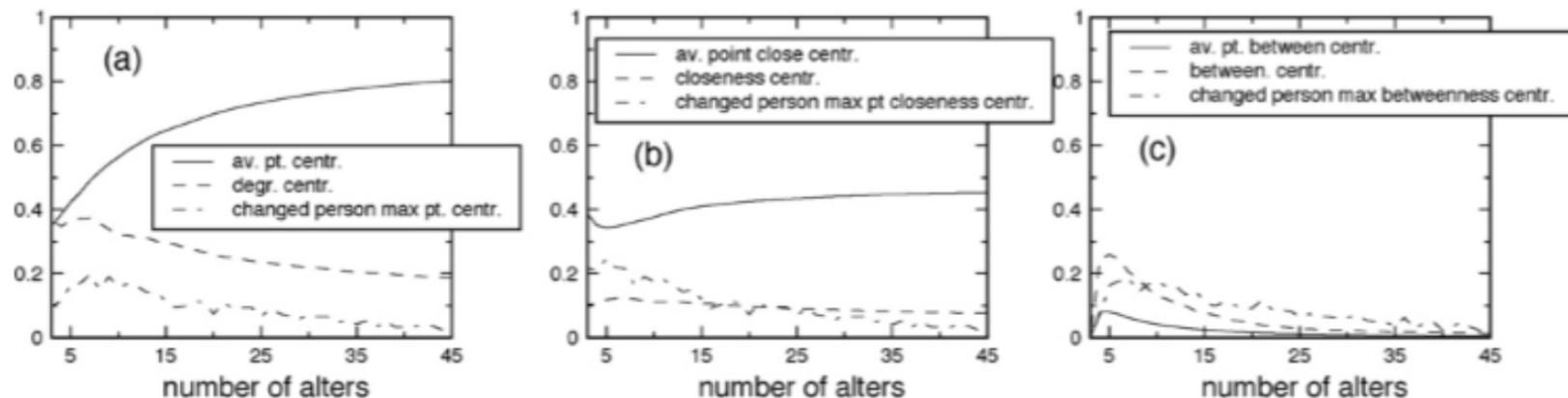
adams, j. Distant Friends, Close Strangers? Inferring Friendships from Behavior. PNAS 2010; 107(9):e29-30.

To Cap or Not to Cap # of Alters?

- Common practice to elicit top N ties (e.g., N = 3-6), differing practice on whether caps are implicit/explicit
 - can introduce ceiling and/or floor effects
 - can alter individual & network statistics:

C. McCarty et al. / Social Networks 29 (2007) 300–315

307

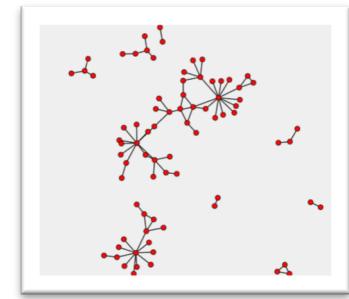


- introduced biases can be differentially associated with network attributes (e.g., those w/ higher degree)

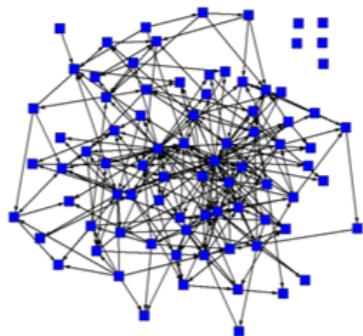
- Specificity vs. General relationship estimates – timing, denominators (e.g., MDICP's "AIDS discussion partners")
Bell DC. Partner Naming and Forgetting: Recall of Network Members. Social Networks 2007; 29(2):279-299.
- Free recall vs. Roster-based – cognitive difficulty/ease, rosters can inflate nominations, requirements for instrument prep
Eagle DE, Proeschold-Bell RJ. Methodological Considerations in the Use of Name Generators and Interpreters. Social Networks 2015; 40:75-83.
- Binary vs. Valued vs. Nested (adapted from Steve Borgatti)
 - Who have you seen regularly in the past six months?
 - How often do you see named alters? a – once a year; b – once a month; c – once a week, d – daily
 - Who do you see at least once a year? Of those,...once a month? Of those...once a week? Of those...daily?
- In longitudinal studies, priming from previous responses – under-/over-estimate stability?
Brewer DD. Forgetting in the Recall-Based Elicitation of Person and Social Networks. Social Networks 2000; 22:29-43.
- Breadth vs. Depth tradeoff – structure vs. content of ties, timing limitations impact network data collection more than other types
Paik A, Sanchagrin K. Social Isolation in America: An Artifact. American Sociological Review 2013; 78(3):339-360.
- Pre-test, Pre-test, Pre-test

The “Boundary Specification” Problem

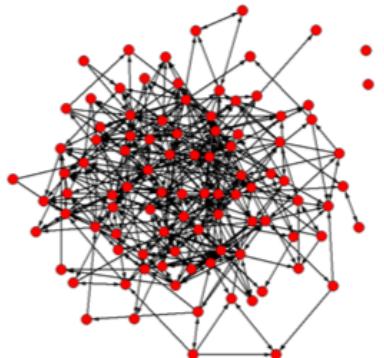
- “[S]ystem specification is probably a more serious issue for network analysis than for much survey analysis.” (Laumann et al 1992: 63)
 - Simultaneously about node & tie level inclusion.
- Approaches to BSP:
 - **Realist** – defined by the (mutual) subjective perceptions of actors.
 - **Nominalist** – exogenously identified conceptual population boundary.
- BSP is salient for ***all*** network sampling designs (not just a question for complete network studies, not just surveys, etc.).



BSP – Why “Complete” vs. Complete



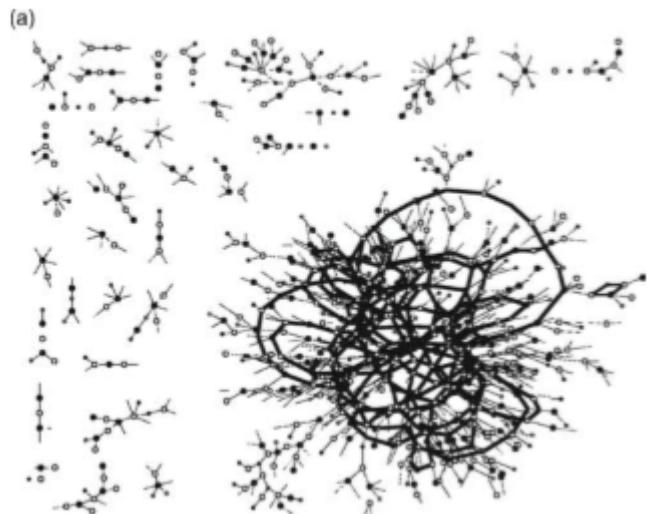
Laboratory collaboration network (A)



Researcher advice network (B)

Lazega E, et al. Effects of Competition on Collective Learning in Advice Networks. *Social Networks* 2016; 47:1-14.

AIDS 2007, Vol 21 No 17

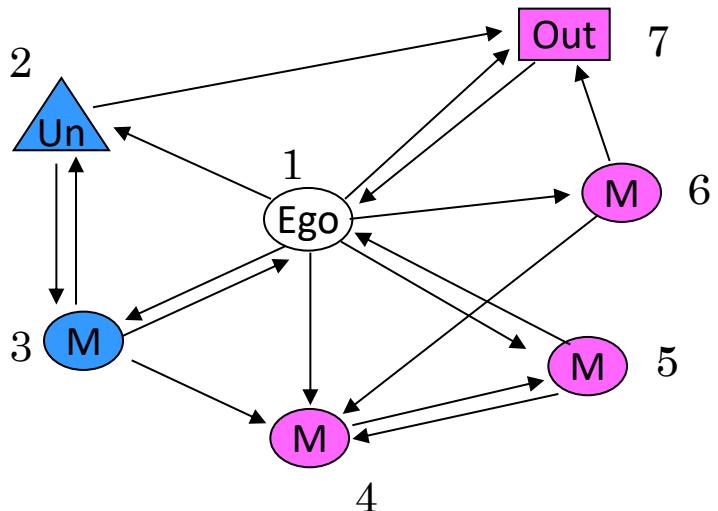


Limitations in the BSP

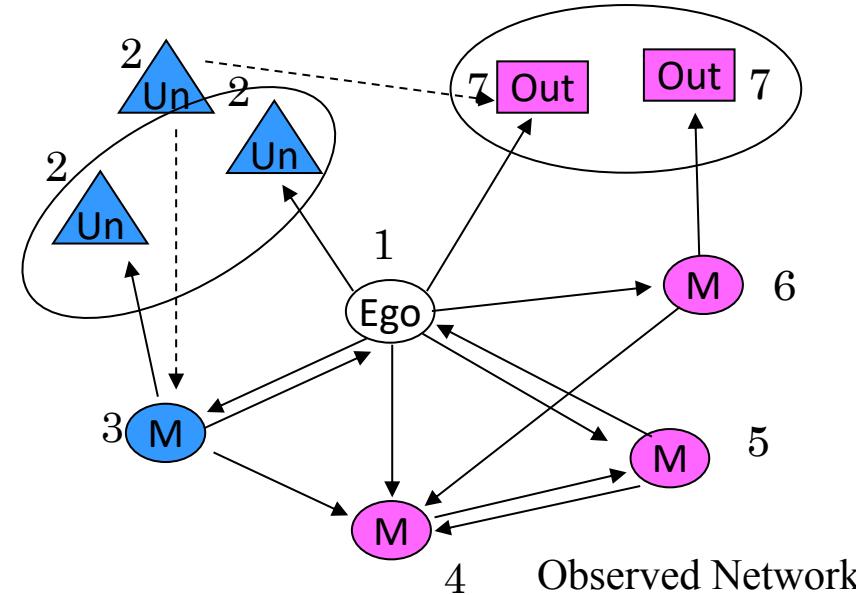
- Porous boundaries
 - Collaborations outside the lab, advice outside the organization (Lazega)
 - Sexual partners off the island (Helleringer)
 - Add Health, some schools more bounded than others (e.g., Sunshine vs. Jefferson)
- “Off Roster”
 - Respondents – cannot (easily) be linked to their received nominations
 - Nominations – may not be matched across multiple namings
 - Can artificially
 - Inflate number of nodes in the network
 - Reduce observed local network characteristics (e.g., reciprocity)
 - Alter network-level statistics

2 – “Complete” Network Designs

Why is “complete” in quotes?

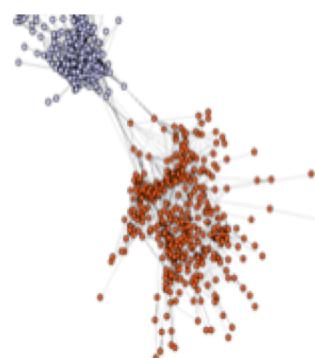


True Network



Observed Network

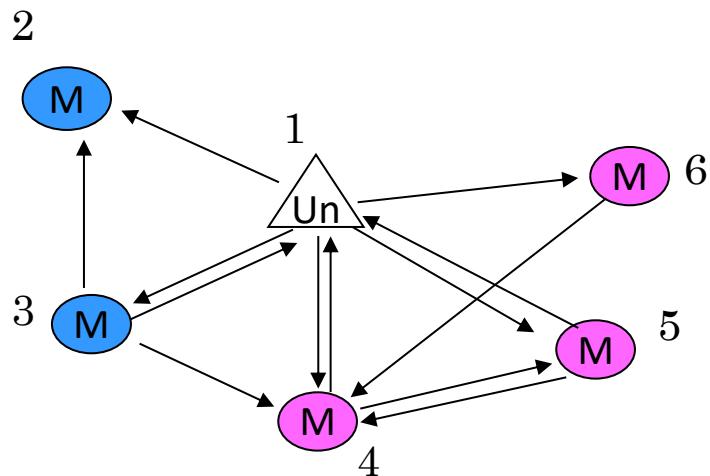
	1	1	1	1	1	1
0		1	0	0	0	1
1	1		1	0	0	N
0	N	1		1	0	N
1	N	0	1		0	N
0	N	0	1	0		1
N	N	N	N	N	N	



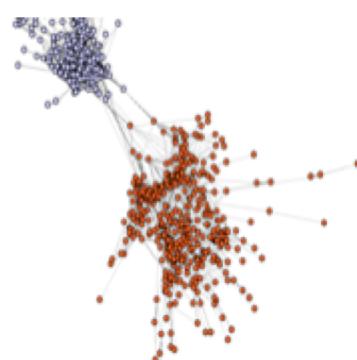
(Image Source: James Moody)

2 – “Complete” Network Designs

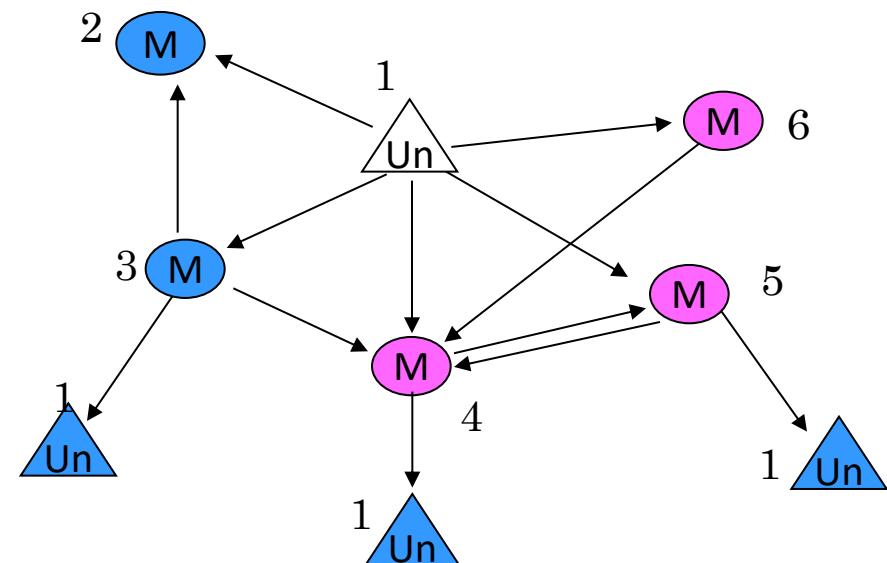
Why is “complete” in quotes?



True Network



(Image Source: James Moody)



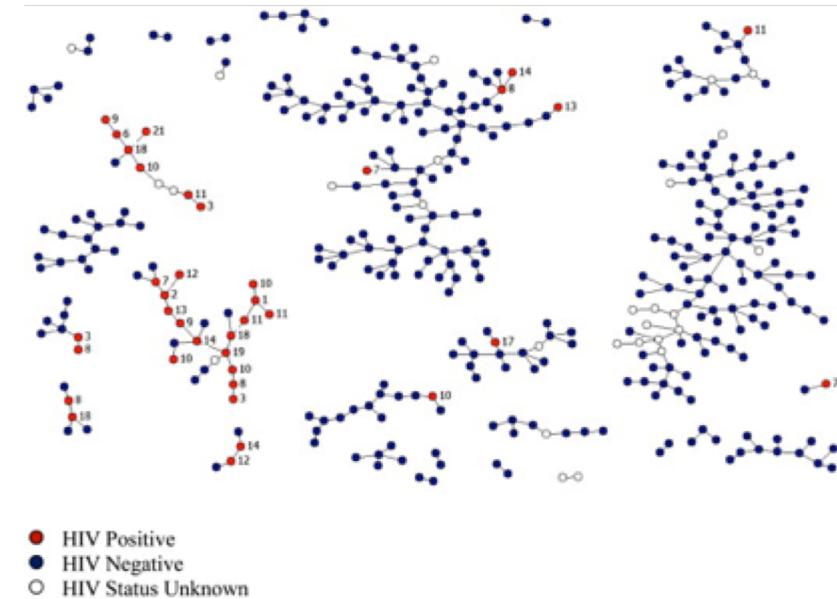
Observed Network

	1	1	1	1	1
N		0	0	0	0
1	1		1	0	0
1	0	0		1	0
1	0	0	1		0
N	0	0	0	0	

An Aside about RDS

aka – Why aren't we talking more about it?

- Respondent Driven Sampling - A combination of snowball sample and mathematical model weighting to account for non-random sampling designs to allow for the estimation of *population* level estimation for hidden/hard-to-reach populations (Heckathorn 1997)
 - Sampling over networks
 - Not sampling of networks
 - Rarely allows for SNA
 - Gile & Handcock 2011
 - Dombrowski et al. 2011
 - Also – see updates
 - Goel & Salganik 2010

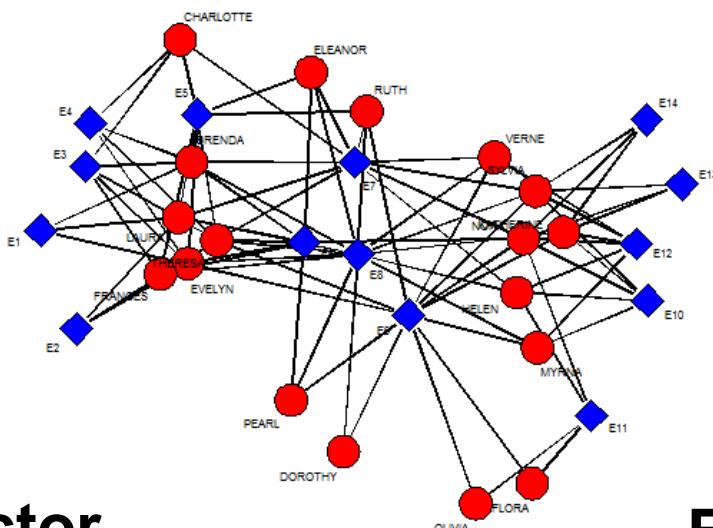


Rudolph AE, Crawford ND, Latkin C, Fowler JH, Fuller CM. 2013. "Individual and Neighborhood Correlates of Membership in Drug Using Networks with Higher Prevalence of HIV in New York City." *Annals of Epidemiology* 23(5):267-274.

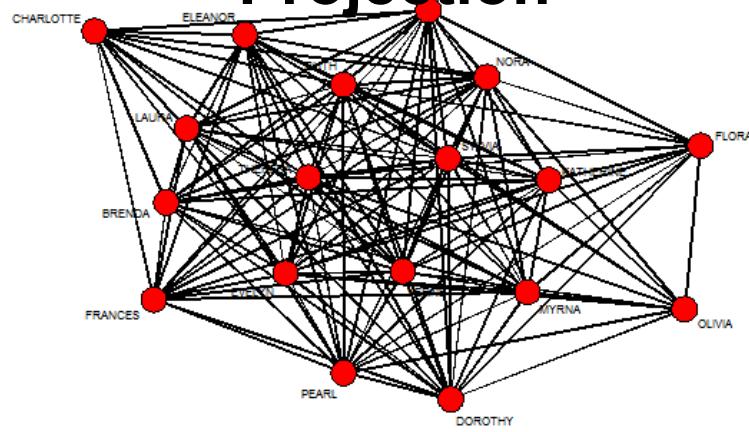


	Ego	Partial	Complete
Relative Difficulty of Process	Low	High (hard to gauge success without prior knowledge of data aims)	Medium (response rate, biases)
Inference	Given assumptions hold, same as for independent samples	Harder, often bootstrap based	Alternative modeling accounting for dependencies
Respondent Burden	High	Medium	Medium-Low
Ease of Node Matching	NA	Built in?	Depends on prep, approach & prior knowledge
Researcher Control	High-Moderate	Low	Moderate

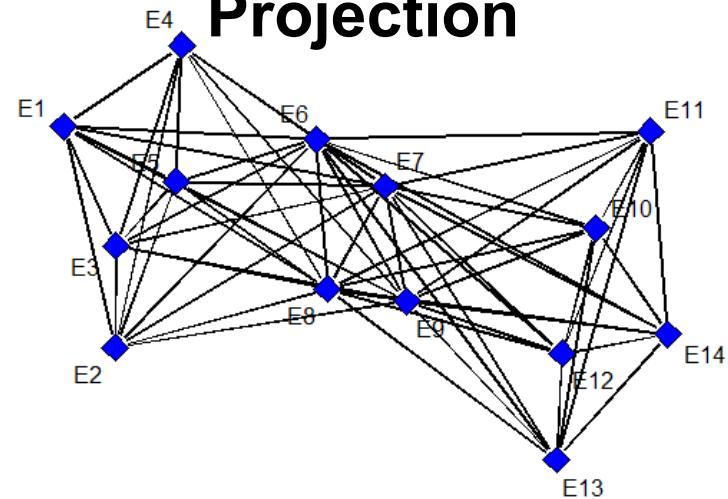
Original DGG Network



**Actor x Actor
Projection**



**Event x Event
Projection**



David Krackhardt (1987) recognized the salience of people within a studied network having perceptions of the network's structure

- For some questions those perceptions are as (more) salient for understanding group dynamics
- Reorientation of numerous network “informant accuracy” studies
- *Expensive!*
- Can be adapted for “external observers” (Cairns & Cairns)

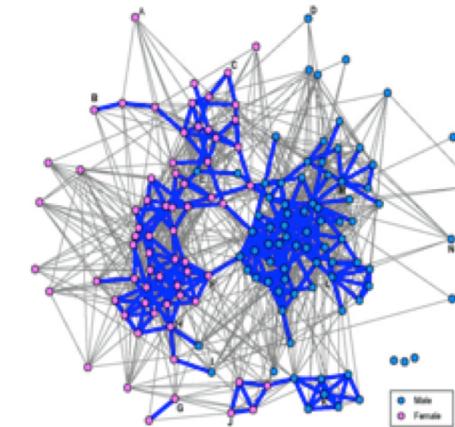
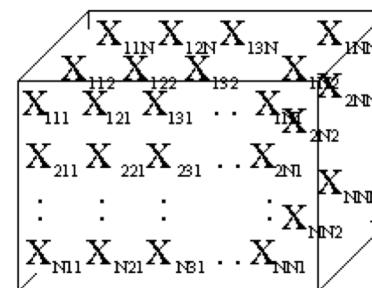
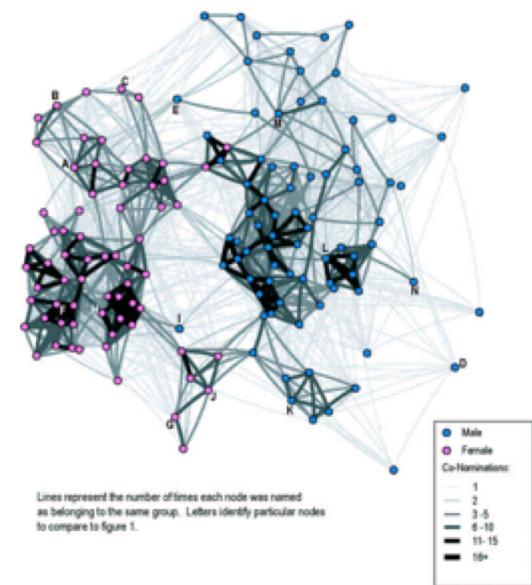


Figure 1: Multiple-Informant Co-Nomination Network



Lines represent the number of times each node was named as belonging to the same group. Letters identify particular nodes to compare to figure 1.

Non-Survey Methods

Observational

Sampling

Measurement

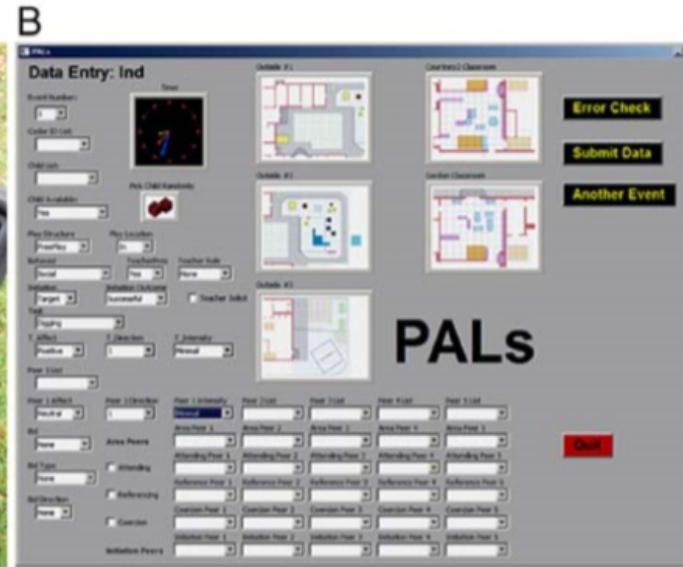
Modes

Ethics

Assessment

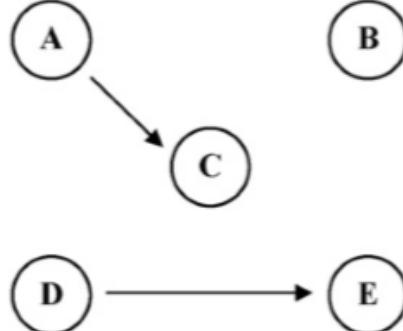


B



PALS

Torrens PM, Griffin WA. Exploring the Micro-Social Geography of Children's Interactions in Pre-School: A Long-Term Observational Study and Analysis Using Geographic Information Technologies. *Environment & Behavior* 2012; 45(5):584-614.

Time	Network Structure	Possible Processes
1		<p><u>Reciprocity</u> $C \rightarrow A, E \rightarrow D$</p> <p><u>Popularity</u> Indegrees: C, E=1; A,B,D=0 (low indegree inequality)</p> <p><u>Triadic Closure</u> <i>Impossible</i></p>

Schaefer DR, et al. Fundamental Principles of Network Formation among Preschool Children. *Social Networks* 2010; 32:61-71.



Prison Inmate Networks Study (PINS)

This study examines the social networks of prison inmates in a state correctional institution.

Project Team

- Principal Investigator: Derek Kreager, Ph.D., Department of Sociology & Criminology (dkreager@psu.edu)
- Co-Principal Investigator: Gary Zajac
- Co-Investigators: Martin Bouchard (SFU), Dana Haynie (OSU), David Schaefer (ASU), Michaela Soyer (Hunter), Jacob Young (ASU), Sara Wakefield (Rutgers)

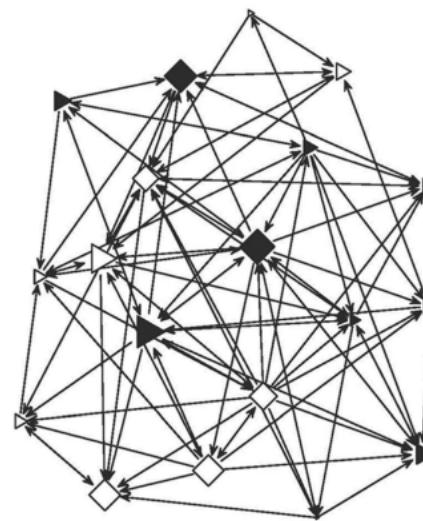


Figure 2. Friendship Network in a Prison Work Unit
(Node color reflects inmate race [white=non-Hispanic white, black=other race/ethnicity].
Node size represents time served and diamond shape indicates life sentence.)

		Clergy Health Phone Survey	1998 US GSS
Mean	6.1	2.9	
Median	5.0	3.0	
SD	3.7	2.0	
N	652	999	

Eagle DE, Proeschold-Bell RJ. Methodological Considerations in the Use of Name Generators and Interpreters. *Social Networks* 2015; 40:75-83.

Source: Clergy Health Initiative Panel Survey, 2008
Representative data is from the 1998 United States General Social Survey

Table 3: Clergy Kin and Non-Kin Discussion Networks by Survey Type, 2008

Number of Names Given	<u>Kin Network</u>			<u>Non-Kin Network</u>		
	Phone(%)	Mail(%)	Web(%)	Phone(%)	Mail(%)	Web(%)
Mean ^a	1.71	1.31	1.7	4.67	4.47	4.02
Median	1	1	1	4	4	4
SD ^b	1.2	0.87	1.26	3.34	3.05	2.66
N	650	71	974	652	75	999

Non-Survey Methods

Archival Sources

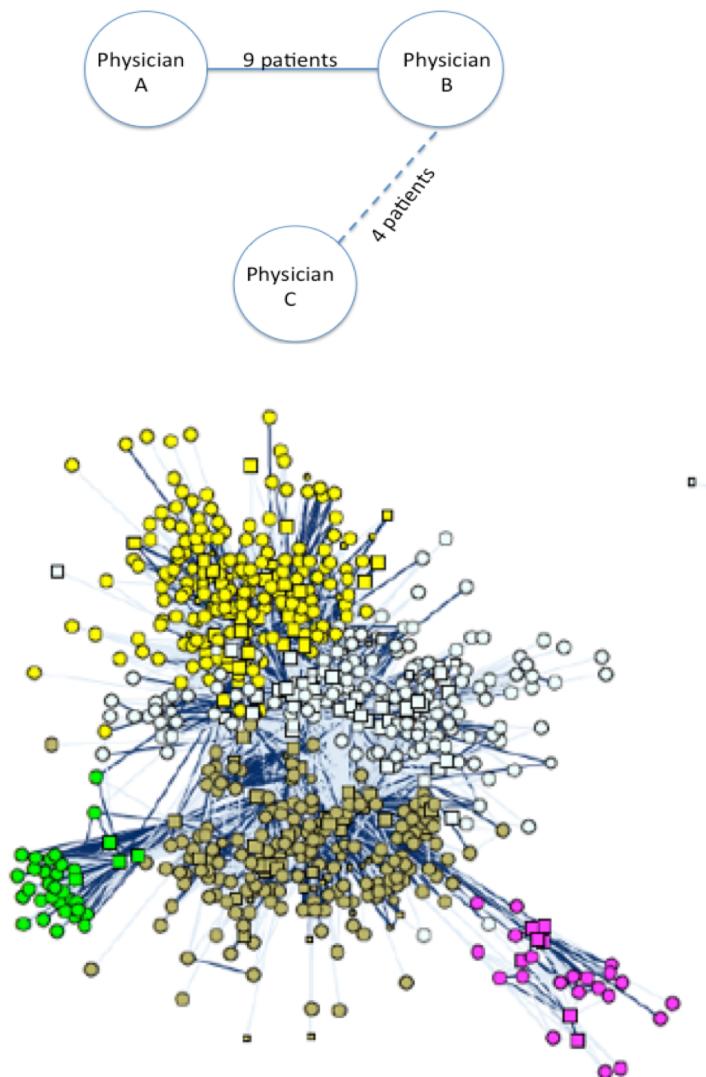
Sampling

Measurement

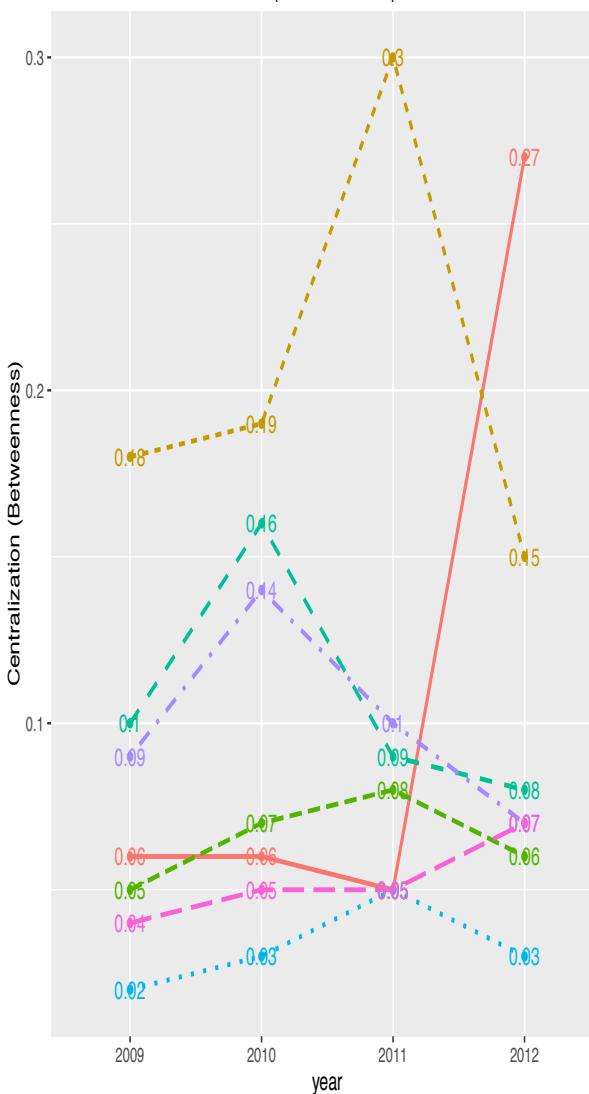
Modes

Ethics

Assessment



Centralization (Betweenness): 2009–2012



Loresto FL. Exploring the Use of Social Network Analysis on Physician Networks Created from Medicare Data through Studying the Use of Minimally Invasive Breast Biopsy Among Physicians: Descriptions, Regressions, and Network Models. Dissertation – Clinical Science, UTMB. 2018

SNA Data Repositories

- Lin Freeman's collection of “classic” datasets
 - <http://moreno.ss.uci.edu/data.html>
- Katya Ognyanova's collection of collections
 - <http://kateto.net/2016/05/network-datasets/>
- Mark Newman's mish-mash collection
 - <http://www-personal.umich.edu/~mejn/netdata/>
- Stanford Large Network Dataset Collection
 - <https://snap.stanford.edu/data/>
- ICPSR (not network specific, but a good general resource)
 - <http://www.icpsr.umich.edu/icpsrweb/ICPSR/index.jsp>

Searching for Saddam

A five-part series on how the U.S. military used social networking to capture the Iraqi dictator.

By *Chris Wilson*



A horizontal row of six thumbnails, each with a caption below it. From left to right: 1. A large building with palm trees, captioned "PART I: THE FIVE FAMILIES OF TIKRIT". 2. A collage of several people, captioned "PART II: SADDAM FAMILY PHOTOS". 3. An open blue book, captioned "PART II BONUS: A SLIDE SHOW OF SADDAM". 4. Two men in suits, captioned "PART III: THE BROTHERS MUSSLIT". 5. A man in a suit, captioned "PART IV: THE FAT MAN". 6. A network graph with four nodes and connecting lines, captioned "PART V: NETWORK STATE OF MIND".

No blanket Approach; aspects to consider:

- Informed Consent & Deductive Disclosure
- Anonymity v. Confidentiality
- Who benefits? Who bears burdens?
 - Tradeoffs
- Descriptive vs. Predictive Utility
- Aggregate vs. Individual level predictions
 - E.g., describing structural (in-)efficiencies in an organization vs. who to hire/fire/promote within it

Ethics, 2-mode data and recent events

A (mostly) tongue-in-cheek analysis

Sampling

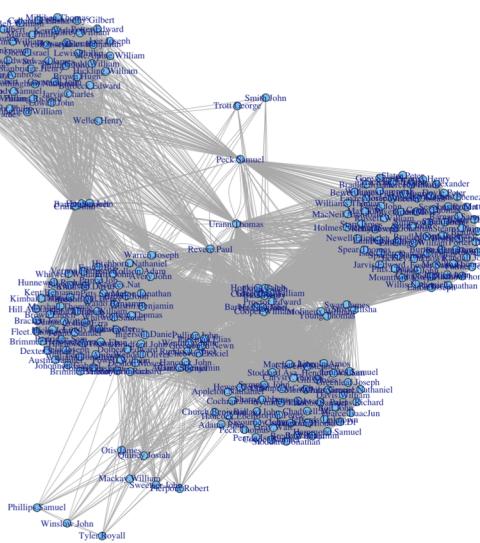
Measurement

Modes

Ethics

Assessment

	St AndrewsLodge	LoyalNine	NorthCaucus	LongRoomClub	TeaParty	Bostoncommittee	LondonEnemies	
1	Adams.John	0	0	1	1	0	0	0
2	Adams.Samuel	0	0	1	1	0	1	1
3	Allen.dr	0	0	1	0	0	0	0
4	Appleton.Nathaniel	0	0	1	0	0	1	0
5	Ash.Gilbert	1	0	0	0	0	0	0
6	Austin.Benjamin	0	0	0	0	0	0	1
7	Austin.Samuel	0	0	0	0	0	0	1
8	Avery.John	0	1	0	0	0	0	1
9	Baldwin.cyrus	0	0	0	0	0	0	1
10	Ballard.john	0	0	1	0	0	0	0
11								
12								



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Using Metadata to Find Paul Revere

"Social Network Analysis," a small encroachment on freedom, identifies terrorists in the Colonies.

By Kieran Healy | Posted Monday, June 10, 2013, at 4:22 PM



Portrait of Paul Revere by John Singleton Copley, 1768
Courtesy of Museum of Fine Arts Boston/Wikipedia

Evaluating Social Network Data

MOMMA By Mell Lazarus



“Important Matter” Isolation – Ego Networks in the GSS

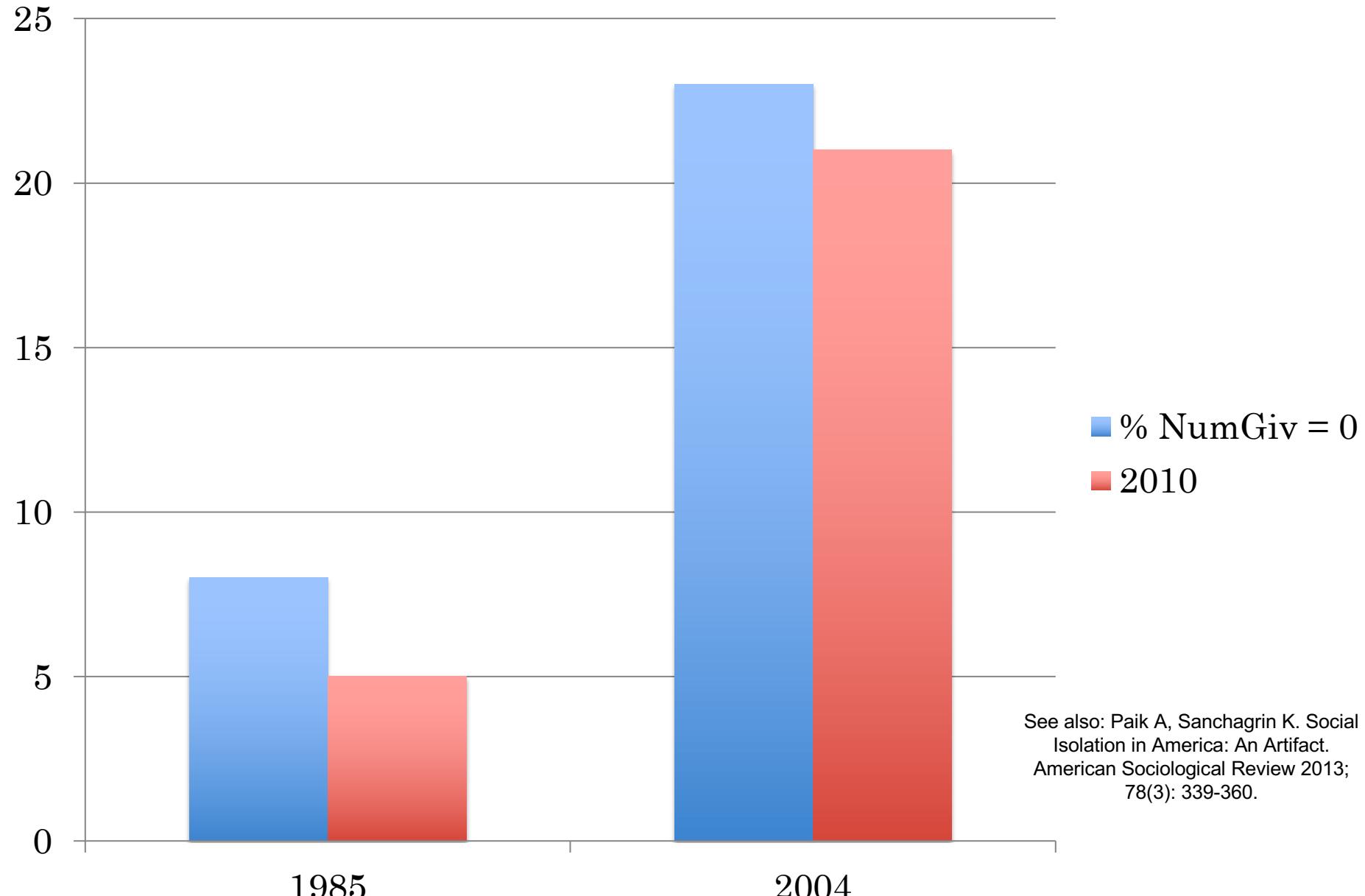
Sampling

Measurement

Modes

Ethics

Assessment



See also: Paik A, Sanchagrin K. Social
Isolation in America: An Artifact.
American Sociological Review 2013;
78(3): 339-360.

What do the Data Represent?

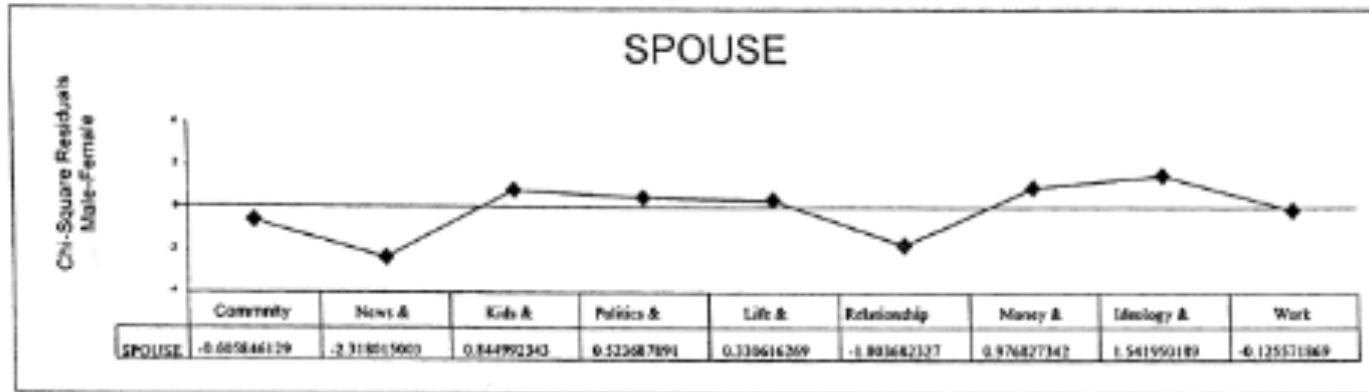
- GSS “Important Matters” ego networks – Isolation ~20%
 - About half are “true isolates”
 - Other half are “uninteresteds” (have contacts, nothing important to talk about)
- What are “important matters”? (via ~cognitive interviewing)
 - Broad domains – Community Issues, News & Economy, Kids & Education, Politics & Elections, Life & Health, Relationships, Money & House, Ideology & Religion, Work
 - “Trivial” (?) topics - where to get a haircut, “cloning headless frogs”
 - Does social capital value hinge on this determination?
 - Hard to determine objectively (see next slide)

What do the Data Represent?

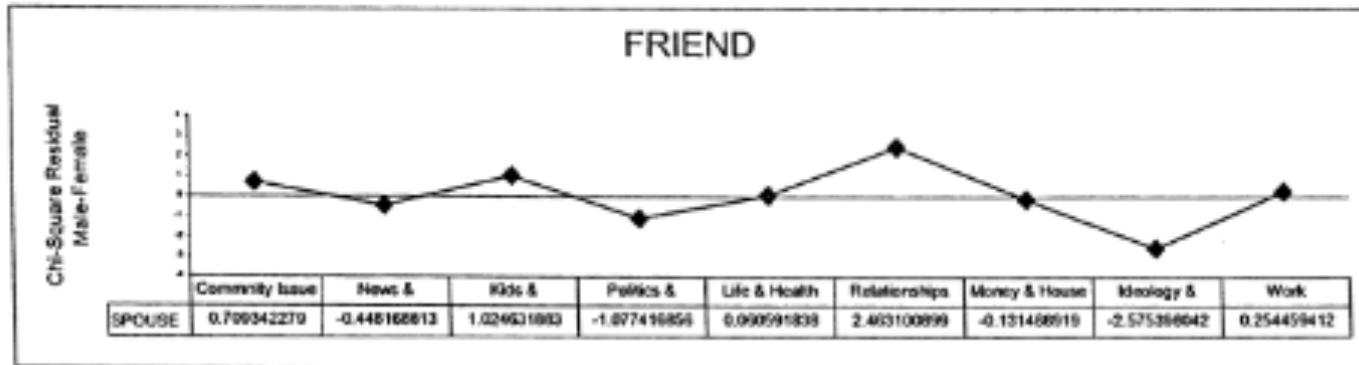
Who talks about what, *with whom*?

FIGURE 1: Conversation Asymmetries

Panel a: Conversation Asymmetries for Talking with Spouse



Panel b: Conversation Asymmetries for Talking with Friend



What do the Data Represent?

Who talks about what, *with whom?*

TABLE 6: Role-Topic Domain Dependency by Gender

	Spouse vs. Friend	Spouse + Friend vs. Other Relative	Spouse + Friend + Other Relative vs. Acquaintance	Total
Males	$G^2 = 12.50$ (p = .13)	$G^2 = 1.53$ (p = .992)	$G^2 = 12.03$ (p = .15)	$G^2 = 26.56$ (p = .35)
Females	$G^2 = 16.42$ (p = .037)*	$G^2 = 5.28$ (p = .728)	$G^2 = 11.02$ (p = .201)	$G^2 = 32.71$ (p = .11)



“Trivial” Topics and Rich Ties: The Relationship Between Discussion Topic, Alter Role, and Resource Availability Using the “Important Matters” Name Generator

Matthew E. Brashears

Cornell University

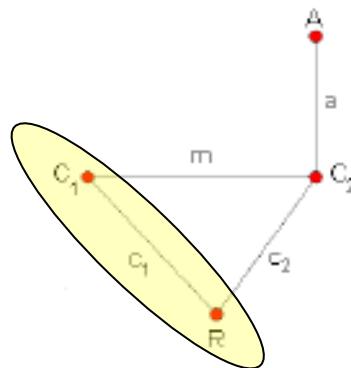
Abstract: This paper uses a nationally representative dataset of discussion relationships to determine what Americans consider to be an important matter, whether some topics are predominantly discussed with certain types of associates, and if the topic of discussion or the role of the discussant predicts the availability of social support. Results indicate that some topics are pursued or avoided with particular types of alters, and that the role of the discussant, but not the topic of discussion, predicts the availability of support from our discussion partners. This implies that some differences in measured network structure may be due to variations in topics discussed, but that topic says little about the supportiveness of the tie once we are dealing with important matters discussants.

Keywords: ego networks; social support; discussion topics; important matters; roles; social networks

Table 1
Concordance frequencies for contact tie reports

	Sex tie	Drug tie	Needle tie ^a	Social tie
Pooled				
Match	174	203	36	274
Mismatch	32	81	53	75
Proportion matching	0.845	0.715	0.405	0.785
Timed^c				
Match	184	198	61	286
Mismatch	13	43	26	37
Proportion matching	0.934	0.822	0.701	0.885

Figure 1. Hypothetical Four Person Sub-Network



Reliability

Table 3

Contact corroborations of matrix and associate tie reports

	Sex tie	Drug tie	Social tie
Match	126	573	709
Mismatch	30	116	351
Proportion matching	0.808	0.832	0.669

R says tie exists, do C/A agree?

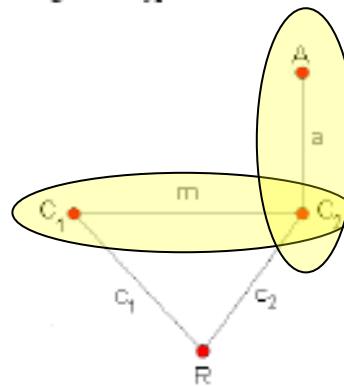
Table 4

Matrix and associate corroborations of contact tie reports

	Sex tie	Drug tie	Social tie
Match	117	536	726
Mismatch	91	182	111
Proportion matching	0.563	0.747	0.867

C/A says tie exists, does R agree?

Figure 1. Hypothetical Four Person Sub-Network



Reliability

Concordance is often found to be relatively low (BKS)

- Recency & timing specificity/anchoring improve reliability
 - Ongoing > dissolved
- Marital > nonmarital
- Single partner > multiple partners
- Long term > short term
- Gender differences

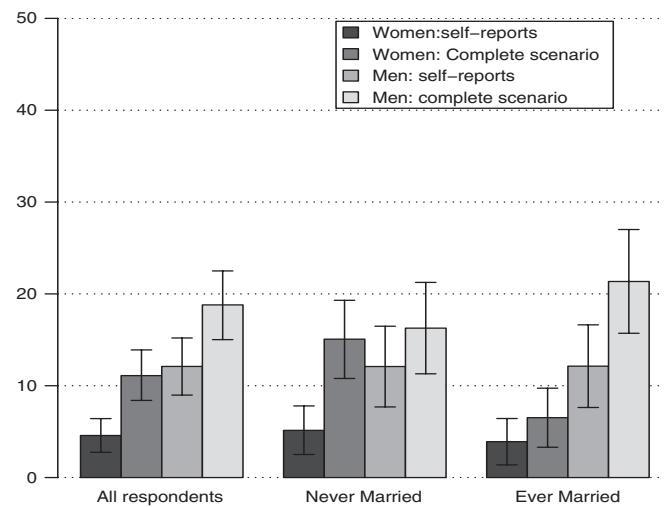
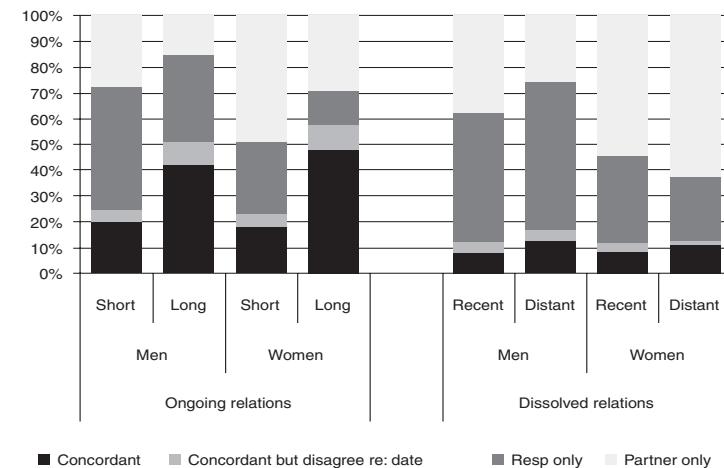
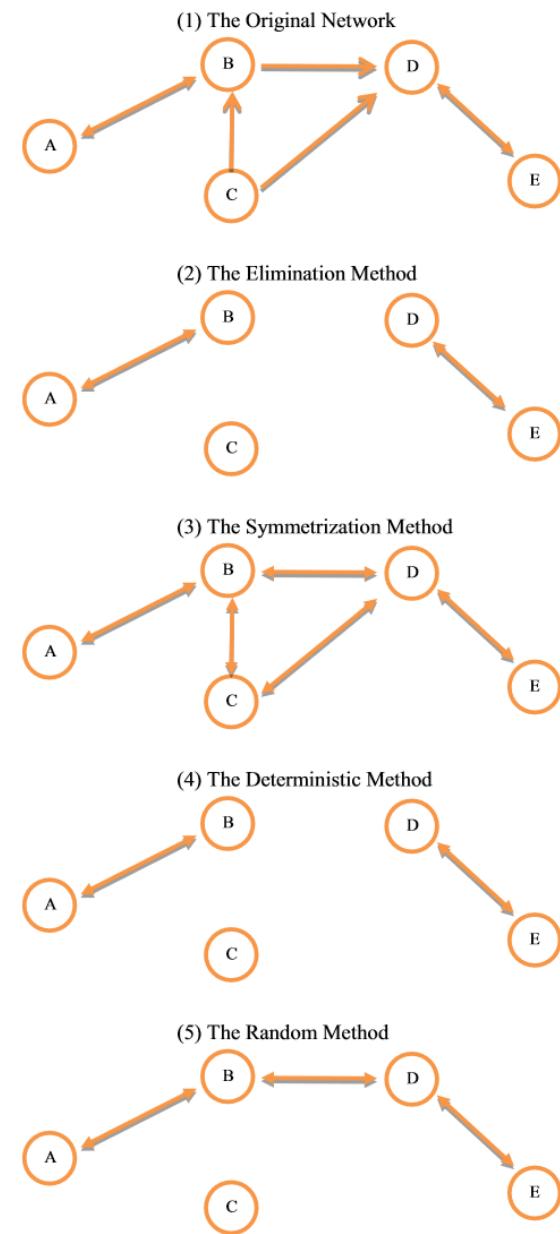
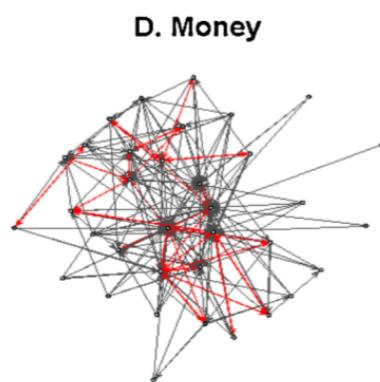
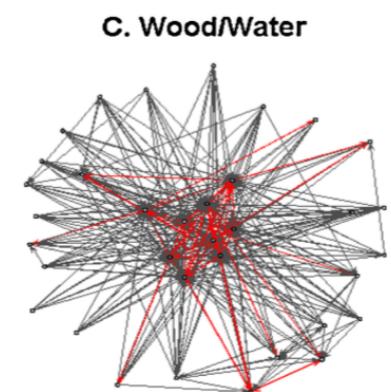
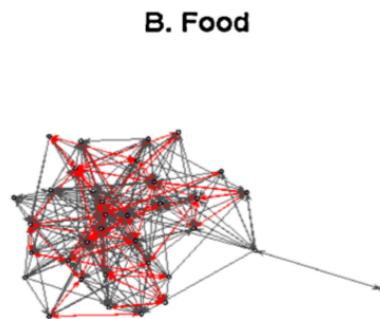


Fig. 3. Prevalence of partnership concurrency at the time of

**Table 1**

Dyadic ties and credibility scores in a binary exchange network.

Actor	Eind	Eout	Ex	Cind	Cout	Con	P1	P2
A	1	1	2	0	0	0	1.00	1.00
B	2	2	4	1	1	2	0.67	0.50
C	0	2	2	0	2	2	0.67	0.00
D	3	1	4	2	0	2	0.67	0.33
E	1	1	2	0	0	0	1.00	1.00

Notes: Eind: number of incoming exchange ties; Eout: number of outgoing exchange ties; Ex: number of exchange ties; Cout: number of contested outgoing exchange ties; Con: number of contested ties.

Fig. 1. The original and revised binary exchange networks.

Reliability

- **reducible:** contained triadic closure (Figure 1a)
- **irreducible:** contained no closed triads (Figure 1b)
- **strong:** if relations were described using kin labels (e.g., parent/child, brother/sister)
- **weak:** if relations were described using non-kin recreational labels (e.g., friend, group member)

Model Type	OLS Full Performance	OLS Full Accuracy	OLS Full Coverage
Fitting Stage			
DV			
Reducible	0.128 ± 0.042 ($p < 0.002$)	0.144 ± 0.035 ($p < .001$)	0.126 ± 0.034 ($p < 0.001$)
Strong	-0.087 ± 0.042 ($p < 0.039$)	-0.073 ± 0.035 ($p < 0.038$)	-0.067 ± 0.034 ($p < 0.051$)
Reducible* Strong	0.171 ± 0.060 ($p < 0.005$)	0.113 ± 0.05 ($p < 0.026$)	0.129 ± 0.049 ($p < 0.009$)

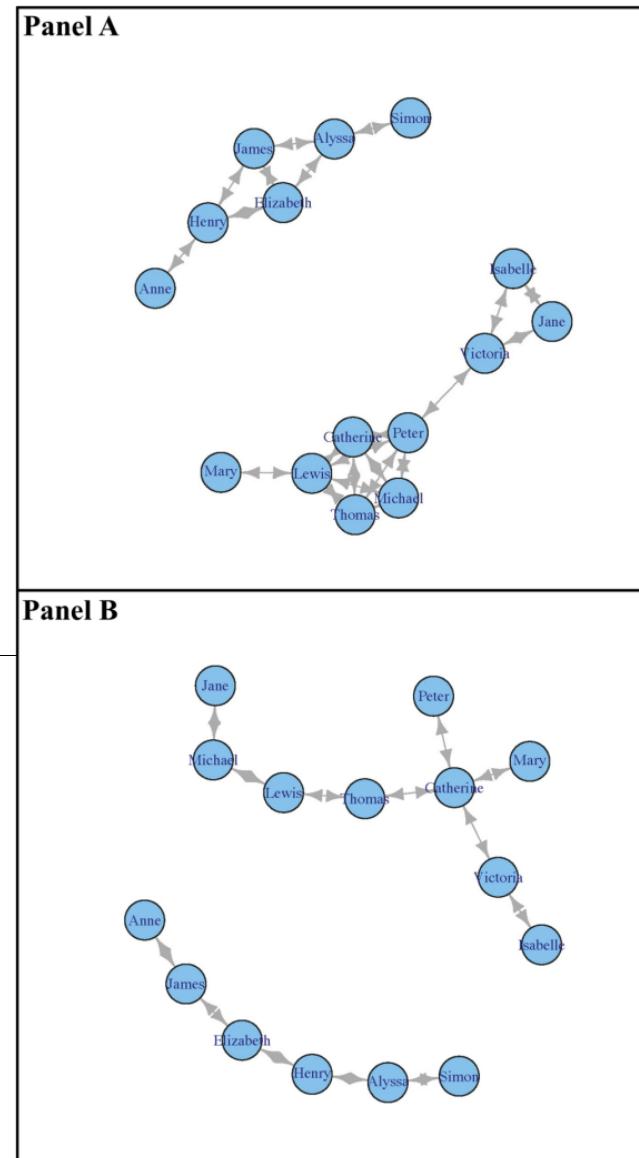


Figure 1 | Network structure depicted in the reducible (Panel A) and irreducible (Panel B) conditions.

■ How commonly is network data likely to be missing?

Grippa F, Gloor PA. You are Who Remembers You: Detecting Leadership through Accuracy of Recall. *Social Networks* 2009; 31(4): 255-261.

Wang DJ, Shi X, McFarland DA, Leskovec J. Measurement Error in Network Data: A Re-Classification. *Social Networks* 2012; 34(4):396-409.

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■ Diagnosing the biases due to missing network data:

Borgatti SP, Carley KM, Krackhardt D. On the Robustness of Centrality Measures under Conditions of Imperfect Data. *Social Networks* 2006; 28:124-136.

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■ Strategies for dealing with missing data:

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Koskinen JH, et al. Bayesian Analysis for Partially Observed Network Data, Missing Ties, Attributes, and Actors. *Social Networks* 2013; 35:514-527.

Neal JW. "Kracking" the Missing Data Problem: Applying Krackhardt's Cognitive Social Structures to School-Based Social Networks. *Sociology of Education* 2008; 81: 140-162.

■ Punchline – it's a bear, and yet to achieve consensus on what to do about it.



Social Science & Medicine 59 (2004) 299–310

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Secretive females or swaggering males? An assessment of the quality of sexual partnership reporting in rural Tanzania

Soori Nnko^{a,b}, J Ties Boerma^c, Mark Urassa^{a,b}, Gabriel Mwaluko^a, Basia Zaba^{d,*}

Prostitution and the sex discrepancy in reported number of sexual partners

Devon D. Brewer^{*†}, John J. Potterat[‡], Sharon B. Garrett^{*}, Stephen Q. Muth[‡], John M. Roberts, Jr.[§], Danuta Kasprzyk[¶], Daniel E. Montano[¶], and William W. Darrow[¶]

^{*}Alcohol and Drug Abuse Institute, University of Washington, 3937 15th Avenue NE, Seattle, WA 98105; [†]El Paso County Department of Health and Environment, 301 South Union Boulevard, Colorado Springs, CO 80910; [‡]Department of Sociology, University of New Mexico, Albuquerque, NM 87131; [¶]Centers for Public Health Research and Evaluation, Battelle Memorial Institute, 4000 NE 41st Street, P.O. Box 5395, Seattle, WA 98105-5395; [§]Department of Public Health, Florida International University, 3000 NE 145th Street, ACI-394F, North Miami, FL 33181

Communicated by A. Kimball Romney, University of California, Irvine, CA, August 16, 2000 (received for review June 21, 2000)

One of the most reliable and perplexing findings from surveys of sexual behavior is that men report substantially more sexual partners than women do. We use data from national sex surveys and studies of prostitutes and their clients in the United States to examine sampling bias as an explanation for this disparity. We find that prostitute women are underrepresented in the national surveys. Once their undersampling and very high numbers of sexual partners are factored in, the discrepancy disappears. Prostitution's role in the discrepancy is not readily apparent because men are reluctant to acknowledge that their reported partners include prostitutes.

Our analyses of the GSS are based on data from 1988 to 1991 combined. Overall sample sizes are 5,907 for the GSS and 3,159 for the NHISLS.

Analysis and Results. Because of slight differences in the numbers of men and women in the population at large and differences in the proportions of men and women who are heterosexual, estimates must be obtained at the United States population level rather than simply by relying on the surveys' sample means for men's and women's numbers of partners. (Detailed calculations for all analyses are presented in the *Appendix*, which is published

PNAS 2000; 97(22): 12385-12388.

Questions?

Also, be on the lookout for a QASS book on this topic, hopefully, early next year.



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