Interdisciplinary Summerschool

Network Analysis of European Urban Landscapes

St Petersburg, Russia

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Who am I?

- Study of Social; Theoretical and Empirical Psychology, Heidelberg
- PhD Utrecht University/ICS (1995): Should auld Acquaintances be forgot? – Personal Networks before and after the political turn in the former GDR
- 1996/1997: Chair Empirical Sociology, Aken/Germany
- 1998 -2006: Postdoc/KNAW fellow UU, later associate professor Vidi project
- 2007: Chair: Sociological determinants of pro-social behaviour (UU)

Research interests/ ongoing projects

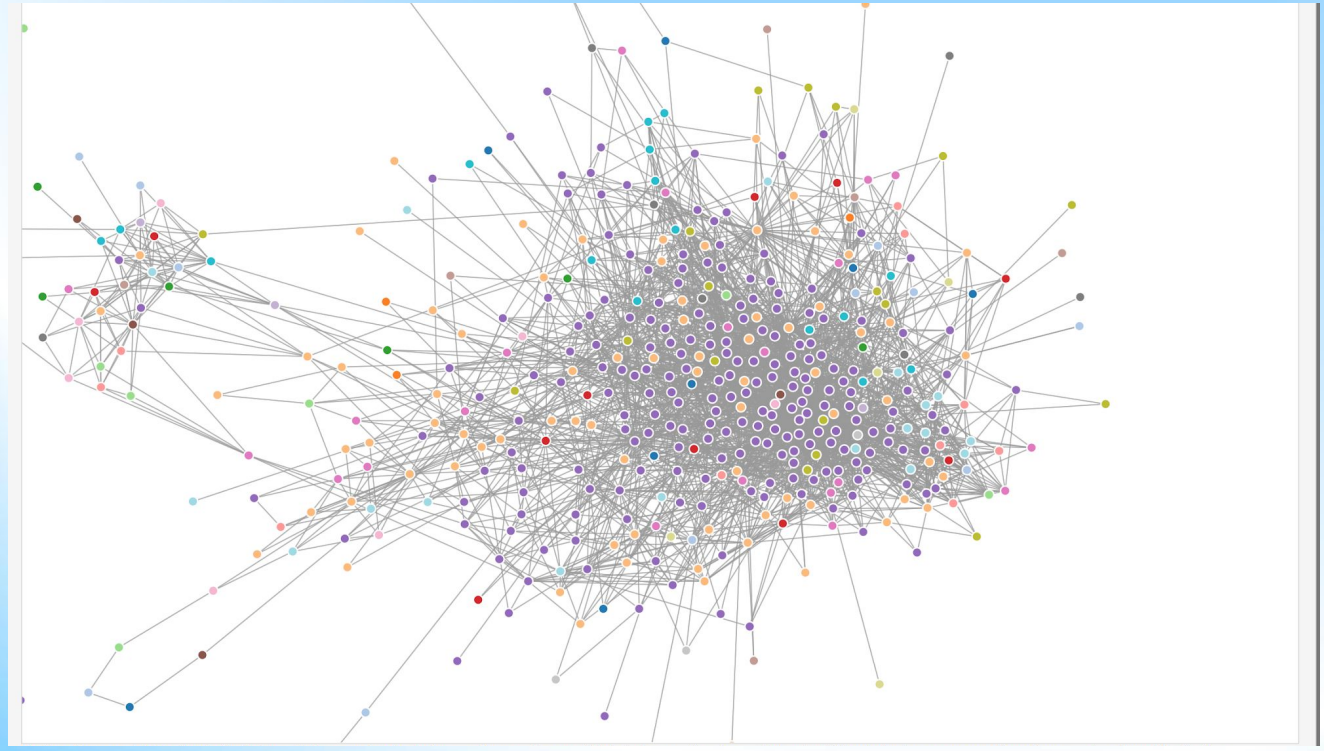
- Influences of contextual (institutional, neighborhood etc) conditions on creation of networks, social capital and community
- Failure of community: social cleavages, limits of functioning
- Consequences of community: health, Peerby

- three papers I work on at this moment:
  - Contextualizing ‘broken windows’
  - Changes of resources and networks through one’s life
  - Peerby: online networks and exchanges in neighhborhods

Two questions:

1) From time to time we discuss personal matters with other people. How many people do you have in your personal network, who are important for this? – With whom did you discuss personal matters during the last 6 months?
2) Estimate the size of your total network. That is, all people who you know and who know you.

Why study friendship & size of networks?



Consequences

* Loneliness/ social isolation
* Well-being
* Social support
* Information
* Social influence

“To speak of social life is to speak of the association between people – their associating in work and in play, in love and in war, to trade or to worship, to help or to hinder. It is in the social relations men establish that their interests find expression and their desires become realized.”

Topics and issues
- morning -

1. How to measure people's network?

2. How large are personal networks?

3. What explains individual variation?

4. Size and connectivity

5. Practical assignment

Topics and issues,
- afternoon -

1. Theories about urban life and community – on the emergence of social and physical disorder:

collective efficacy

broken windows

2. Does the internet change our social relationships?

Topics and issues, morning session

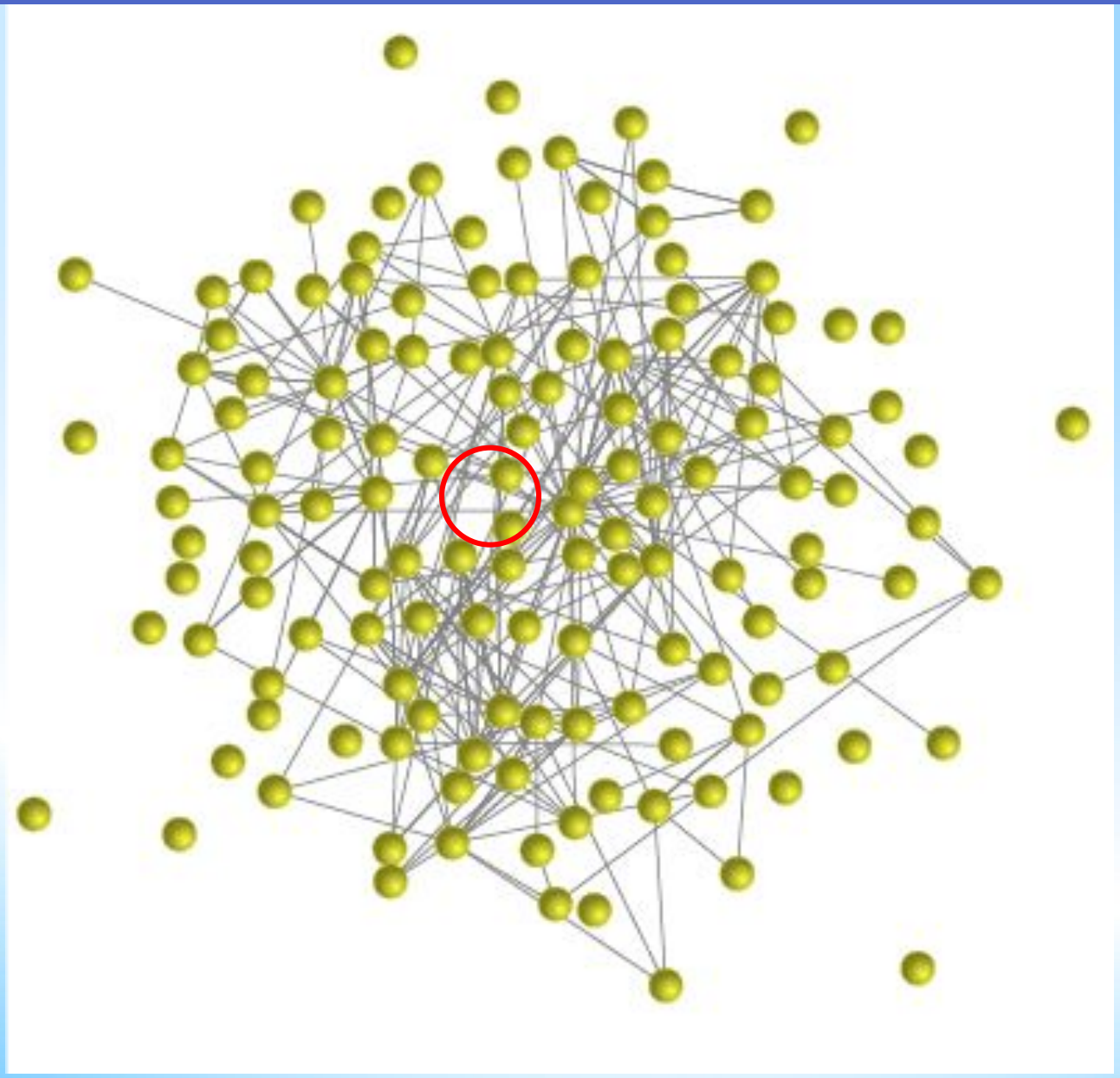
1. **How to measure people's network?**

2. How large are personal networks?

3. What explains individual variation?

4. Practical assignment

Personal networks



Size, degree

Density

Centrality

Resources

Social Network Data Collection: four key dimensions (1)

(1) Tie strength

- Emotional closeness
- Contact frequency
- Reciprocity

•Strong ties:

- Spouse
- Friends
- Family members

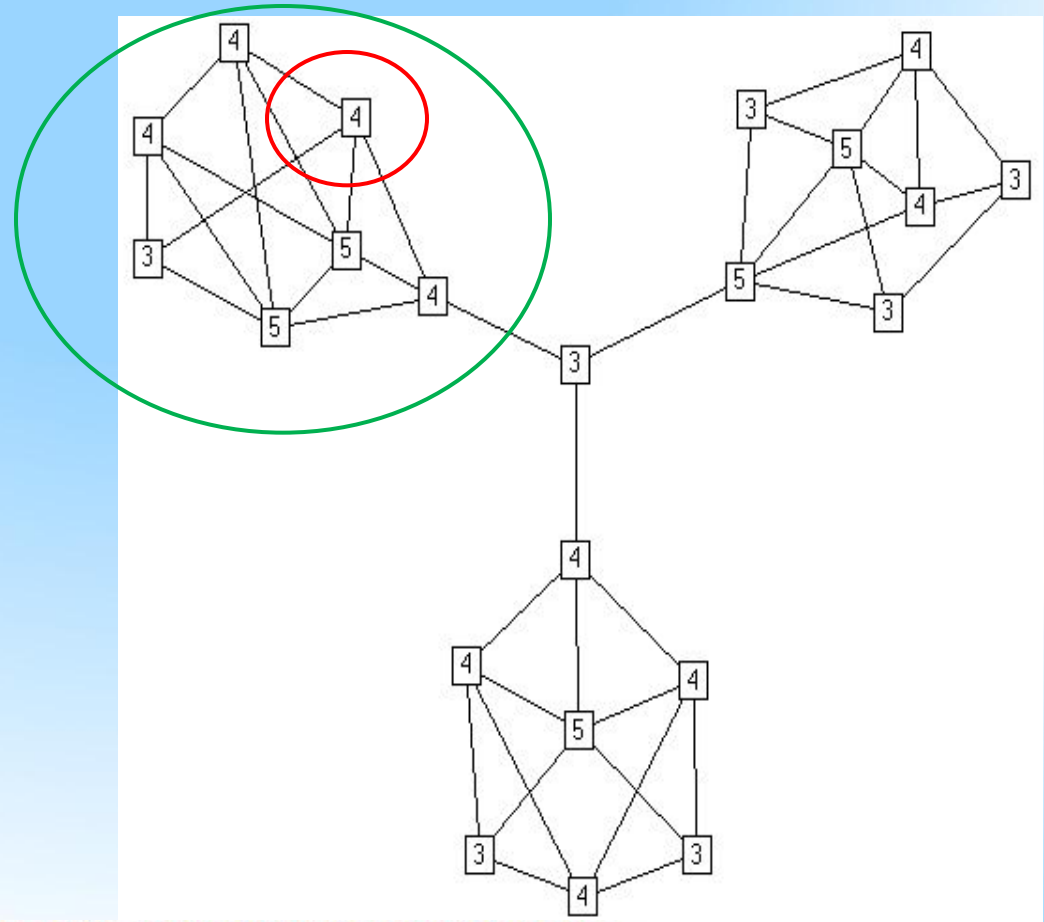
•Weaker ties:

- Acquaintances
- Neighbors, co-workers, family members, etc.

Social Network Data Collection: four key dimensions (2)

(2) Direct or indirect ties? (beyond direct personal network)

- My friends may know people I don't know myself..
- What happens if you exclude the indirect ties?
- Cf. Small world literature (high clustering + short path length, ~ 6 degrees)



Dodds,P.S. et al.,(2003) An Experimental Study of Search in Global Social Networks. *Science*, 301, 827.

Schnettler, S. (2009). A structured overview of 50 years of small-world research. *Social Networks, 31*(3), 165-178.

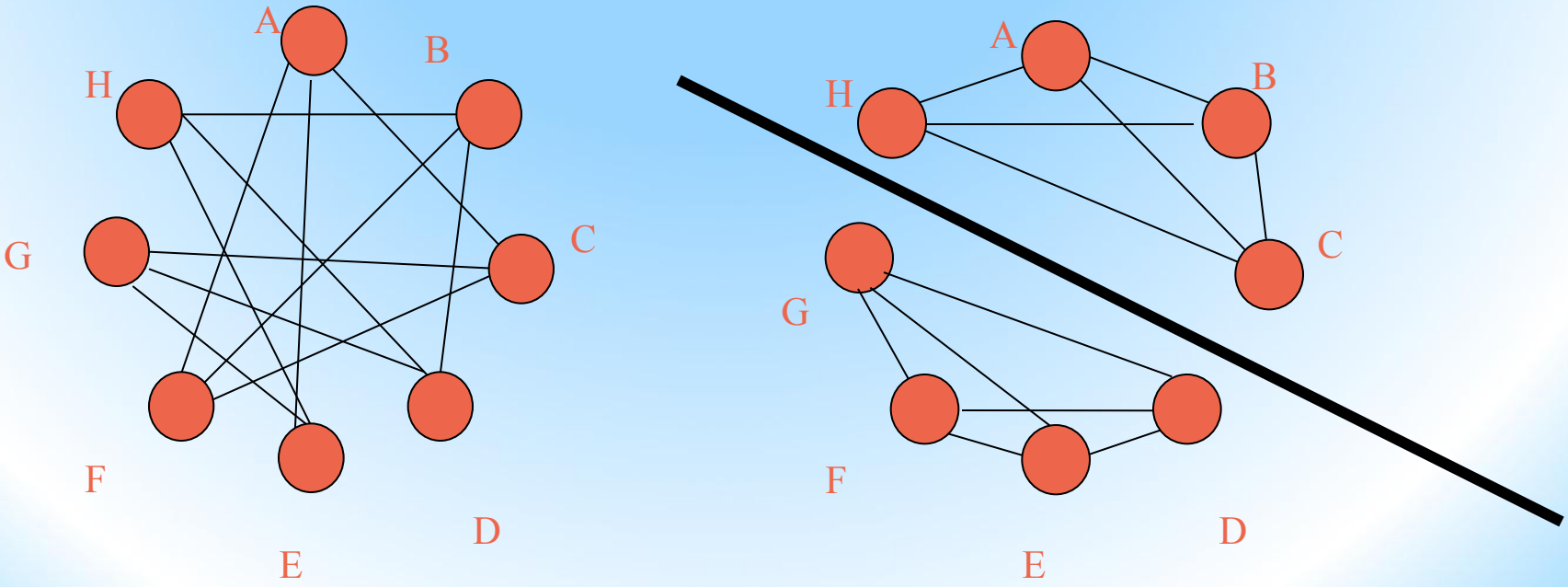
Intermezzo

Small world experiment

The ‘Small World Problem’ (1)

(S.Milgram, 1967, *Psychology Today* 1:61-67;

J. Travers and S.Milgram, 1969)



The Small World Problem (2)

* What is the likelihood for two random people in a given population to know each other?

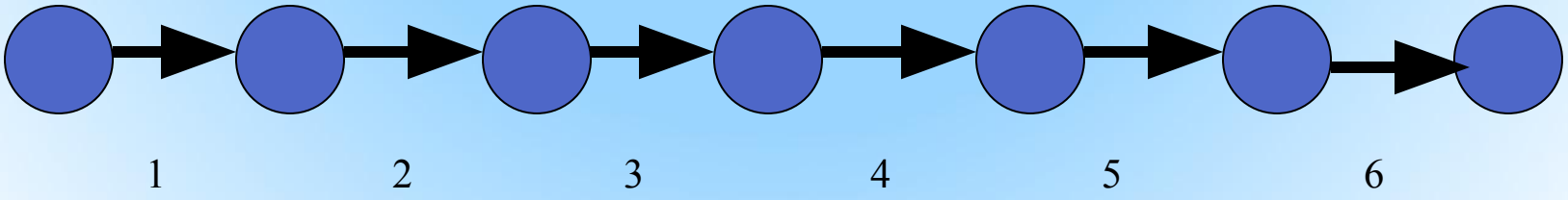
* What is the likelihood that these people have a common acquaintance?

* What is the likelihood that these two people are linked via 0,1,2,….k intermediaries?

Experiment and Results

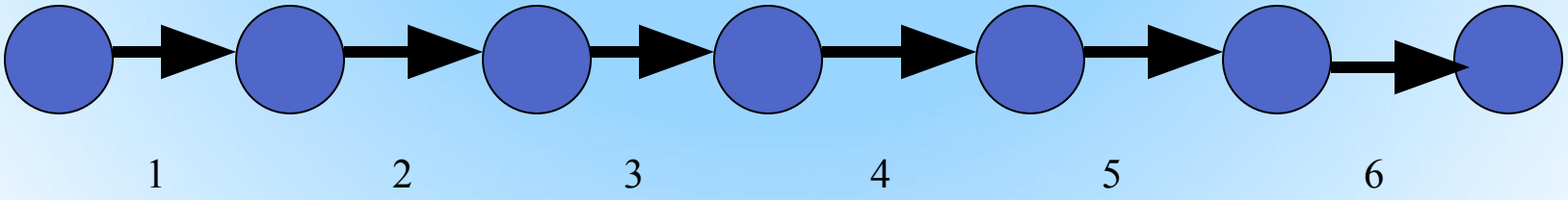
* Transfer a message via informal networks to a target person living hundreds of miles away
* Random sample plus target person
* Result: 22% complete chains with an average length of 5-6 links
* Longest chain: 11 steps
* Broken chains were usually shorter, between 2 and 3 links

“Six degrees of separation”



We often do not know with whom our network members are connected!

What is intriguing in this experiment?



THERE EXIST PATHS BETWEEN RANDOM INDIVIDUALS

STRANGERS ARE CONNECTED THROUGH TIES AT DISTANCE 2 + X

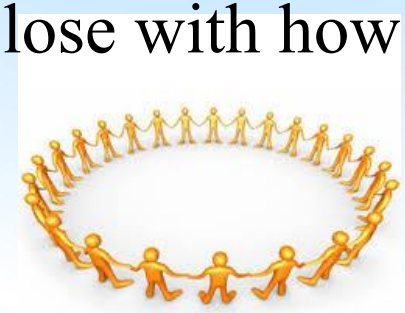
Many replications…

- See Schnettler 2009 for an overview
- Famous replication: Dodds e.a. (2003) small world study by email and between continents. Results are similar like Milgram!
- Potential: study inequality and cohesion. Who is better connected? And why?

2 crucial dimensions of social networks:

Connectivity and Size

How close with how many?



Social Network Data Collection: four key dimensions (3+4)

(3) Type of interaction

- Personal network = face-to-face (old view)
- What is a tie? What is contact frequency and social interaction nowadays?
- Multiple channels
  - Face-to-face
  - Phone, SMS, Email, etc.

Eagle, N., Pentland, A. S., & Lazer, D. (2009). Inferring friendship network structure by using mobile phone data. *Proceedings of the National Academy of Sciences, 106*(36), 15274-15278. (P2)

Wang and Wellman (2010). From 2002 to 2007 Social Connectivity in America: Changes in Adult Friendship Network Size. *American Behavioral Scientist,* 53: 1148

(4) Specific setting or not?

- Just friends anywhere… or friends in class?
- Boundary Specification: key is what constitutes the "edge" of the network
- Ego versus complete

Personal Network Size

Common Measures

1. Stronger ties:
   - Role relations: partner, good friends
   - Affective method
   - Name generator/exchange method

2. Strong and weak ties:
   - Scale up-methods
   - Summation method

3. Resource or position generator method: social capital

Personal Network Size

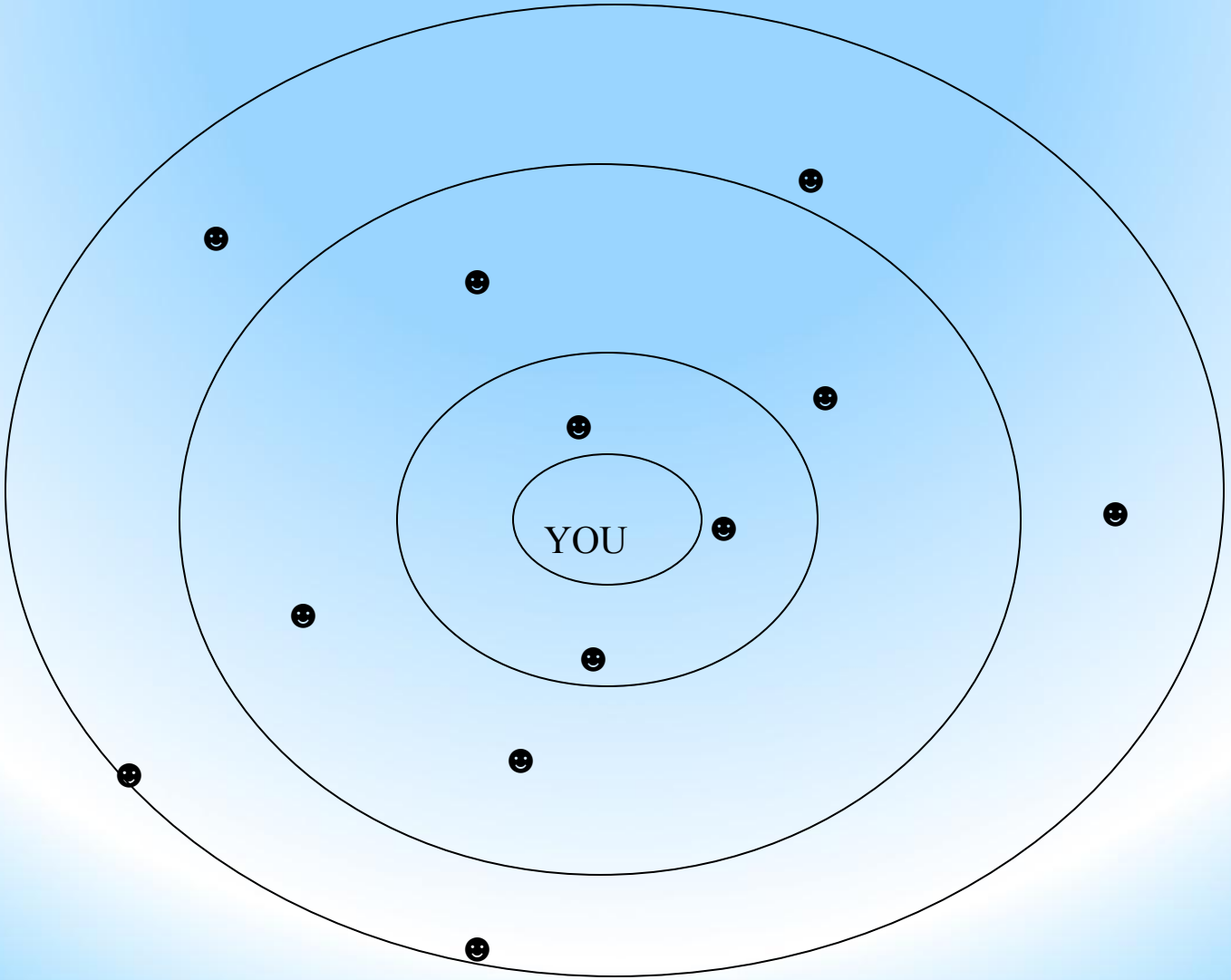
Common Measures

1. **Stronger ties:**
   - **Role relations: partner, good friends**
   - **Affective method**
   - **Name generator/exchange method**

Role relation

* Who is your neighbor, brother, friend?
* Advantage: warranty that information is collected from roles that are important for the research
* Disadvantage: rather fixed and inflexible, neglects acquaintances, casual contacts etc.

Affective method



Affective method

* Advantage:
* Easy to understand
* Disadvantage:
  * Focus on just one dimension of relationships, i.e. closeness
  * People cannot differentiate between many circles of closeness, so the focus comes to lie on strong relationships

Name Generator method

* two steps: 1. identifying alters and 2. interpreting the names provided (see e.g. Fischer, 1982, Marsden, 1986, Burt, 1984)
* elicits data on alters, the relationship between ego and alter as well between alters
* also referred to as '**exchange method'**
* note: association between network size and number of different name generators

Exchange method/name generators

- Delineation not on the basis of one tie characteristic but on joint activities or exchange of commodities between ego and alter. Inquiry of tie characteristics belongs to a second step
- Advantage: rather flexible and can be adapted to any research problem; allows inquiry into weaker ties
- Disadvantage:
- flexibility leads to large variation in applications, it is difficult to compare results among surveys

Ego Network: Procedure Name Generator GSS

Example Name Generator (GSS):

"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."

Why this question?

- Only time for one question
- Normative pressure and influence likely travels through strong ties
- Similar to 'best friend' or other strong tie generators but not confounded by culture and individual characteristics

Ego Network: Procedure Name Generator

Who are you connected to?

% Complete

In this section, we are interested in your relationships with others through email.

Think again of people you exchange email with for personal matters (such as exchanging jokes, letters, discussing family issues, personal problems and so forth), who are the people you exchange email with most frequently?

Please list their first names (or initials) in the boxes below. We will use these names in questions that follow.

- If you have two people with the same first name, use their initials or some other marker that helps you distinguish them.
- If you have more than 8 people you exchange email with for personal matters, please choose the 8 you email most often.
- If you email multiple people at a single email address, please list each name separately (for example, instead of "Mom & Dad", list "Mom" and "Dad" on separate lines).
- Please take care to avoid including quotation marks with the name.

Contact 1: Lisa
Contact 2: Randy
Contact 3: Dan
Contact 4:
Contact 5:
Contact 6:
Contact 7:
Contact 8:

Continue

Ego Network: Procedure Name Generator

The second part usually asks a series of questions about each person

GSS Example:

"Is (NAME) Asian, Black, Hispanic, White or something else?"

ESWP example:

Will generate N x (number of attributes) questions to the survey

Examples of name generating questions

- With whom did you discuss personal matters during the last six months
- Who helped you to get your current job?
- With whom do you spend your leisure time (e.g. going out occasionally?)

Ego networks:

What people do with their relationships

	Job	Advice (a)	Coop	House	Repairs	Keys	Visiting	Core
Partner	9.6	5.0	2.3	8.0	13.5	2.1	1.3	16.1
Family	15.6	2.3	1.6	29.3	34.1	50.3	29.5	27.2
Friend	6.7	5.3	3.2	16.8	21.8	13.3	43.8	39.6
Work	53.4	86.1	92.3	6.6	3.6	5.2	2.6	6.4
Neighbor	2.3	0.2	0.2	11.4	23.4	26.6	8.2	3.1
Club	3.0	0.5	0.2	1.3	0.4	0.1	0.9	0.7
Acqua.	9.6	0.4	0.2	25.7	3.2	2.4	3.4	1.9

Source: SSND,2000. Note that these are not all of the 13 name generating questions. Reading example: of all the network members important for getting the current/last job are 9.6% partners and 53.6% work mates (boss, colleagues and subordinates are asked for separately).

Where does our network come from? Social settings and the recruitment of network members

	Partner	Friend	Acquaintances
Education	9.1	**18.3**	3.0
Club/Association	10.9	**17.5**	11.4
Work	**12.9**	13.6	**23.9**
Family	5.1	3.3	8.0
Other friends	9.1	**15.1**	8.9
Neighborhood	4.8	12.7	**19.9**
Public going-out place	**30.7**	7.7	4.4

Step 2: Characteristics of alters and the relationship ego-alter

- Characteristics of alter:
  - Sex, age, education, occupation, having a paid job, family situation , religion,
  - role relation with ego

- Characteristics of the relationship ego- alter:
  - Degree of intensity, trust and liking
  - Duration of relationship
  - Frequency of contact
  - Geographical distance

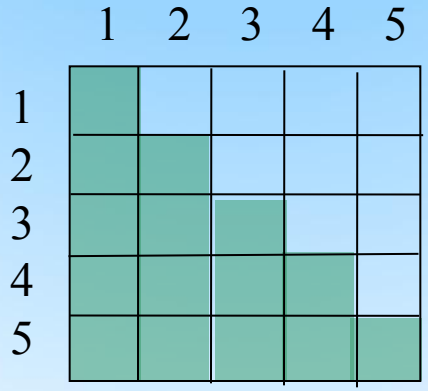
		NAME GENERATOR NG NR													CHARACTERISTICS OF LATER AND THE RELATIONSHIPS BETWEN ALTER AND EGO:															
	NAME NETWORKMEMBER	1	2a	2b	3	4	5	6	7	8	9	10	11	12	SEX	AGE	ROL	R	R	GELO	GETR	KIN	FREQ	DUUR	M1	M2	GEODIS	MOGEN	VERTR	TOEKOMST
1																														
2																														
3																														
4																														
5																														

up to 30 network members possible to mention…

DENSITY IN Ego Networks: Procedure Name Generator

Local Network data:

The third part usually asks about relations among the alters. Do this by looping over all possible combinations. If you are asking about a symmetric relation, then you can limit your questions to the n(n-1)/2 cells of one triangle of the adjacency matrix:



GSS: Please think about the relations between the people you just mentioned. Some of them may be total strangers in the sense that they wouldn't recognize each other if they bumped into each other on the street. Others may be especially close, as close or closer to each other as they are to you. First, think about NAME 1 and NAME 2. A. Are NAME 1 and NAME 2 total strangers? B. ARe they especially close? PROBE: As close or closer to each other as they are to you?

Obstacle: Name generators are demanding!

- Interviews at the French CNRS/Claire Bidart took more than 2 days per respondent! (in the 1990s)

- Van der Poel (1993) identified subsets of name generators that predicted size and composition of networks elicited when using a ten generator instrument

- See also Bernard et al. 1990 (and later) who also identified particular groups of name generators

- Burt 1997: a minimal module should consist of the core tie generator, socializing and job (change) discussion

Ego Network: Existing Surveys With Name Generator

There are lots of network data archived. Check INSNA for a listing.

Ego Network data:

- Fairly common, because it is easy to collect from sample surveys.

- US: GSS, NHSL, Urban Inequality Surveys, etc.
- NL: SSND, TRAILS
- Cross-national: CILS4EU, SCIP

- Pay attention to the question asked
- Key features are (a) number of people named, (b) attributes, (c) relations among alters.

Complete Network: Existing Surveys

Complete network data:

- Significantly less common and never perfect.
- Start by defining a *theoretically relevant boundary*
- Then identify all relations among nodes within that boundary

Key example: Friendships within strongly bounded settings (schools)

- US: Add Health
- NL: studies of Baerveldt,
- NL: recently, TRAILS (Groningen)
- Cross-national: CILS4EU/Youth in Europe Survey (YES!) (Netherlands, Germany, Sweden, England)

Other data (archives):

- Citation or Acknowledgements in Science Networks
- Co-membership in boards of directors
- Email or Cell-phone Logs

Complete vs. Ego-Networks?

Delineation	All relations in a specific context	Sample of relations in different contexts or domains
Respondent	Not much background information	focus on ego
Focus	structure	Content
Data	case studies	survey research
Popular parameters	Centrality, density betweenness, structural equivalence	*For networks:* size, composition *for relations:* multiplexity, intensity, +other relational characteristics
Popular statistical Packages	UCINET, STRUCTURE, GRADAP, SIENA	SPSS, STATA, sometimes Ucinet

Personal Network Size

Common Measures

1. Strong ties:
   - Role relations: partner, good friends
   - Affective method
   - Name generator/exchange method

2. **Strong and weak ties:**
   - **Scale up-methods**
   - **Summation method**

3. Resource or position generator method

Ego Network: Scale Up Methodology

Scale up methodology

- See also: Marsden (2005)
- Killworth & Bernard (1978), Killworth et al. (2006); Zheng et al. (2006) and later;
- Hard to count populations

The original network scale-up model was a four-part equation:

1 the event population (called e);

2 the total population (called t) within which e is embedded;

3 the probability, p, that anyone in t knows someone in e; and

4 the number of people whom people know, c.

Some history: Bernard was in Mexico City, soon after the earthquake there in the fall of 1985. No one knew how many people had died in that earthquake, but one person told Bernard that “there must be thousands dead, because everyone knows someone who died.” We did a random, representative street-intercept survey and found the percentage of people who reported knowing someone who

Ego Network: Summation method

Method

1. Ask people how many people they know in a certain role relation
2. Take the sum of that

Problem:

1. Count people multiple times

Immediate family
Other birth family
Family of spouse or significant other
Coworkers
People at work but don't work with directly
Best friends/confidantes
People known through hobbies/recreation
People from religious organization
People from other organization
School relations
Neighbors
Just friends
People known through others
Childhood relations
People who provide a service
Other

Personal Network Size

Common Measures

1. Strong ties:
   - Role relations: partner, good friends
   - Affective method
   - Name generator/exchange method

2. Strong and weak ties: entire ego network
   - Scale up-methods
   - Summation method

3. **Resource or position generator method**

Position generator

- Asks respondents whether they have relationships with specified set of persons – usually family, friends or acquaintances – in a set of social positions
- Allows for constructing range, size and composition, e.g. with regard to prestige
- No reflection of other characteristics
- Extensions possible but limited
- No identification of alters; problem for longitudinal research questions

Occupation/function	Family	Friend	Acqua	No
Physician	(1)	(2)	(3)	(0)
Cook	(1)	(2)	(3)	(0)
Manager	(1)	(2)	(3)	(0)
Real estate agent	(1)	(2)	(3)	(0)
Lawyer	(1)	(2)	(3)	(0)
Mechanic/technician	(1)	(2)	(3)	(0)
Scientist	(1)	(2)	(3)	(0)
Policy maker	(1)	(2)	(3)	(0)
Musician/artist/writer	(1)	(2)	(3)	(0)
Police agent	(1)	(2)	(3)	(0)
Secretary	(1)	(2)	(3)	(0)
Farmer	(1)	(2)	(3)	(0)
Truck driver	(1)	(2)	(3)	(0)
Postman	(1)	(2)	(3)	(0)
Machine worker	(1)	(2)	(3)	(0)
Unskilled worker	(1)	(2)	(3)	(0)
Cleaner	(1)	(2)	(3)	(0)
Barber	(1)	(2)	(3)	(0)

I here have a list of some of the different occupations or functions that people can have. Does someone of your family, your friends, or acquaintances have one of these occupations?

Example list from SSND1

Extension of position generator: resource generator

* Van der Gaag 2004
* Instrument for measuring individual social capital
* Focuses on whether alters have specific possessions or capacities

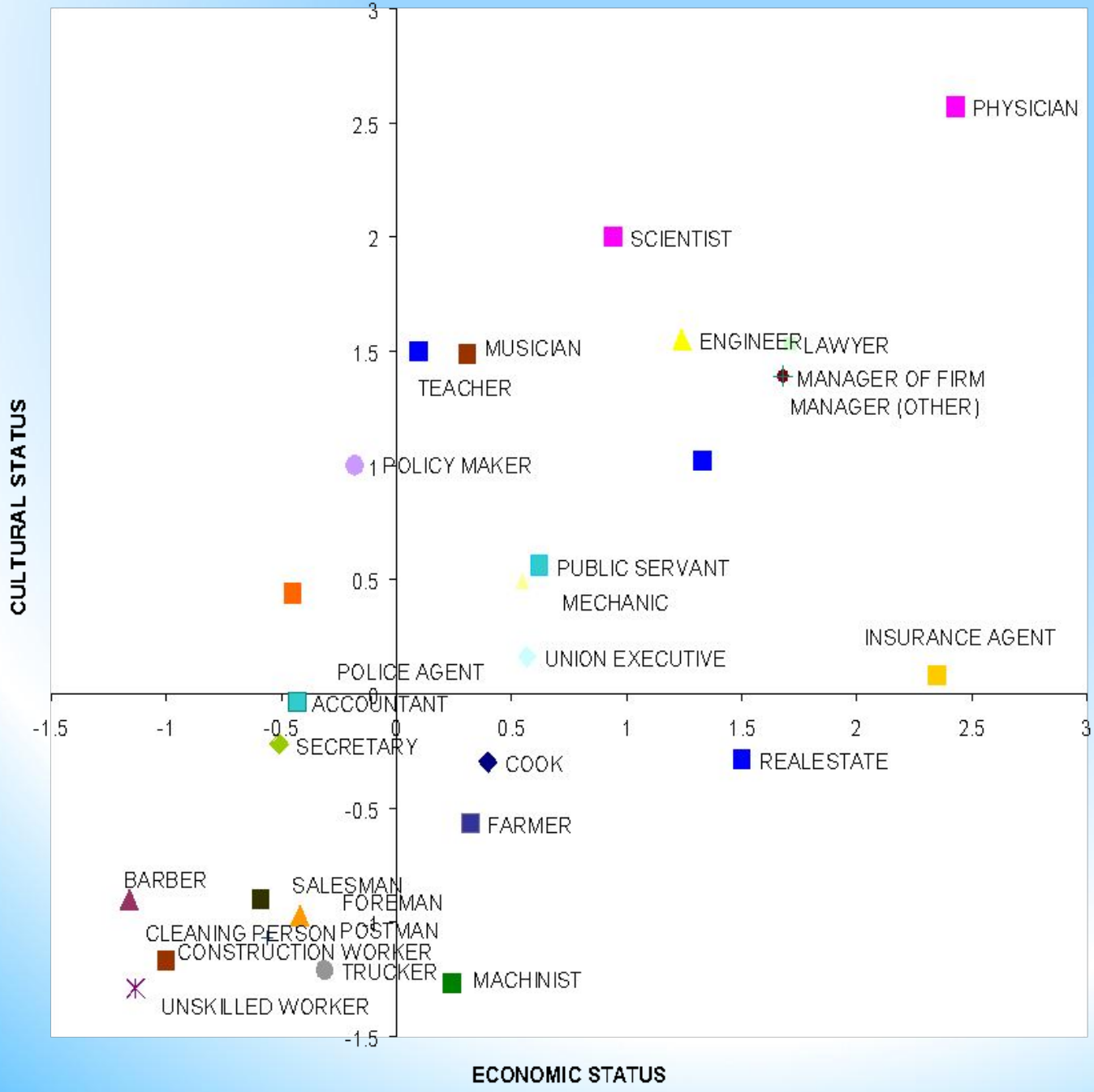
Position generator

Table 5: Access to social capital (position generator; access in %) (Source: SSND and The Hague sample)

	Natives (SSND; representative sample n = 915)	Migrants (SSND and the Hague sample, n = 383)
Physician (doctor)	49.1	26.2
Civil servant	52.4	14.4
Lawyer	45.7	19.8
Manager (mean sized firm)	70.8	23.5
Politician	45.1	12.3
Teacher at the university (scientist)	43.2	11.3
Teacher (secondary education)	73.4	32.9
Job in Labor Union	16.9	4.3
Real-estate manager	30.8	21.6
Accountant/clerk	63.0	14.7
Secretary	67.5	16.5
ICT-desk worker	66.9	23.7
Nurse	75.8	24.3
Police agent	41.1	16.4
Salesperson	62.1	45.7
Truck driver	51.4	22.6
Postman	27.8	15.2
Construction worker	67.0	27.1
Cleaning person	34.1	36.2
Unskilled worker	37.2	19.6

Average n of positions mentioned (sd)	10.2 (3.88)	5.39 (4.43)
Average n of family /friends (sd)	4.28 (2.63)	2.80 (2.62)
Average n of acquaintances (sd)	5.91 (3.99)	2.60 (3.47)
Highest prestige accessed (sd)	80.27 (11.28)	71.53 (20.32)
Highest prestige accessed through family/friends (sd)	70.50 (16.36)	65.89 (22.05)
Highest prestige accessed through acquaintances (sd)	75.06 (15.69)	67.26 (21.21)
Range of prestige accessed (sd)	61.12 (14.86)	48.34 (24.38)
Range of prestige accessed through family/friends (sd)	40.10 (22.17)	35.33 (25.77)
Range of prestige accessed through acquaintances (sd)	48.80 (23.04)	36.13 (27.00)

Example of using position generator approach in research: social capital of migrants vs natives in the Netherlands; Volker et al 2008



Decomposing ses into cultural and economic capital

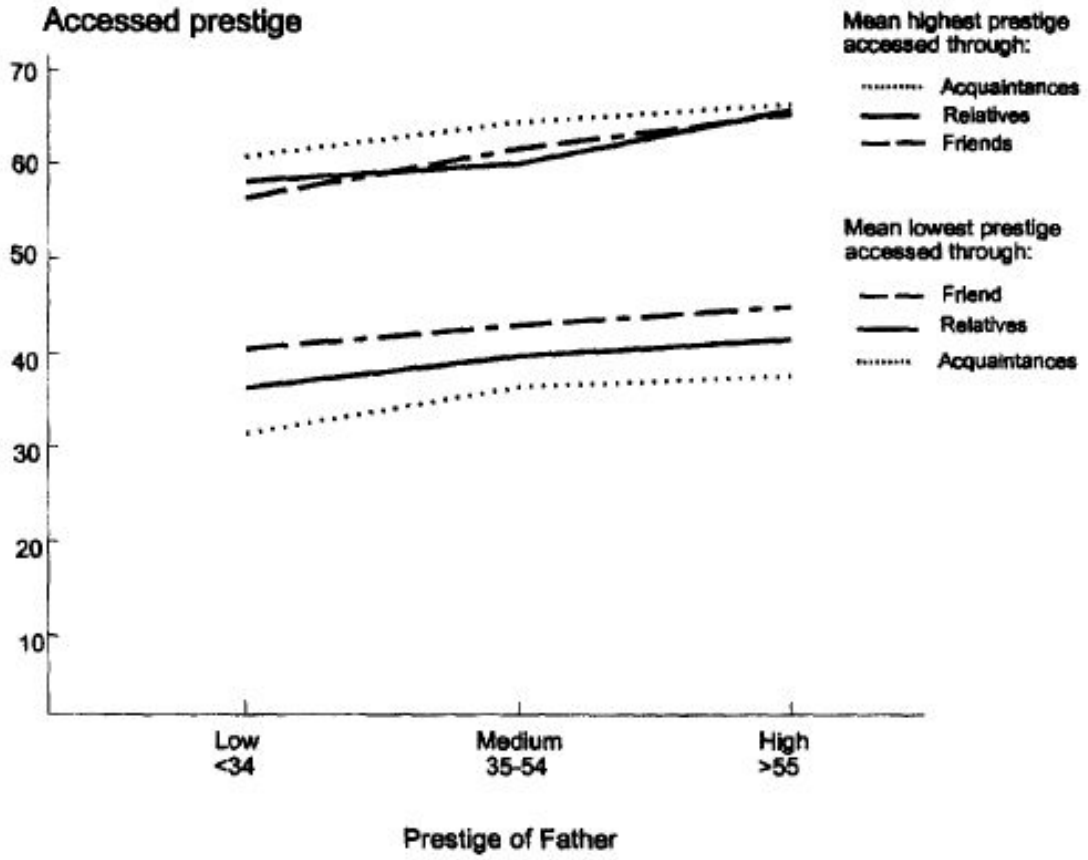


Figure 1. Prestige of occupations accessed through relatives, friends, and acquaintances by father's occupation.

Example of use position generator in data analyses; from Volker and Flap (1999)

Tabel 9.6 Verschillen in toegang tot sociaal kapitaal via familie, vrienden en kennissen, naar opleidingsniveau (gemiddelde scores, standaarddeviatie tussen haakjes); SSND 2013, n=1067[a]

	hoogste toegang via…			laagste toegang via…		
	familie	vrienden	kennissen	familie	vrienden	kennissen
opleiding respondent	M (Std.)	M (Std.)	M (Std.)	M (Std.)	M (Std.)	M (Std.)
laag	62,4 (20,3)	50,1 (22,2)	57,5 (20,8)	24,7 (13,2)	31,6 (1843)	28,8 (16,1)
midden	66,9 (17,9)	64,2 (18,3)	66,1 (19,7)	27,6 (16,0)	32,5 (17.9)	28,5 (16,1)
hoog	72,2 (14,4)	73,1 (15,4)	73,4 (15.9)	36,6 (19,5)	38,7 (14,1)	30,0 (16,9)

a Leesvoorbeeld: laagopgeleiden hebben toegang tot hogere prestigescores (op een schaal van 0 tot 100) via familie (max. gem. 62,4) dan via vrienden (max. gem. 50,1) en kennissen (max. gem. 57,5). Hogeropgeleiden hebben via familie, vrienden en kennissen toegang tot vergelijkbare prestigescores: resp. max. gem. 72,2; 73,1; 73,4.

Bron: SSND 2013 (n = 1067)

Position generator/ resource generator

- Present a list of positions/resources and ask whether ego can access people who have these positions
- Create some variation in ties strength by asking for family, friends or acquaintances
- Advantage: very easy to do, very practically, and not expensive
- Disadvantage (depending on research problem): alters delineated are not identified as persons with different characteristics

Topics and issues

1. How to measure people's network?

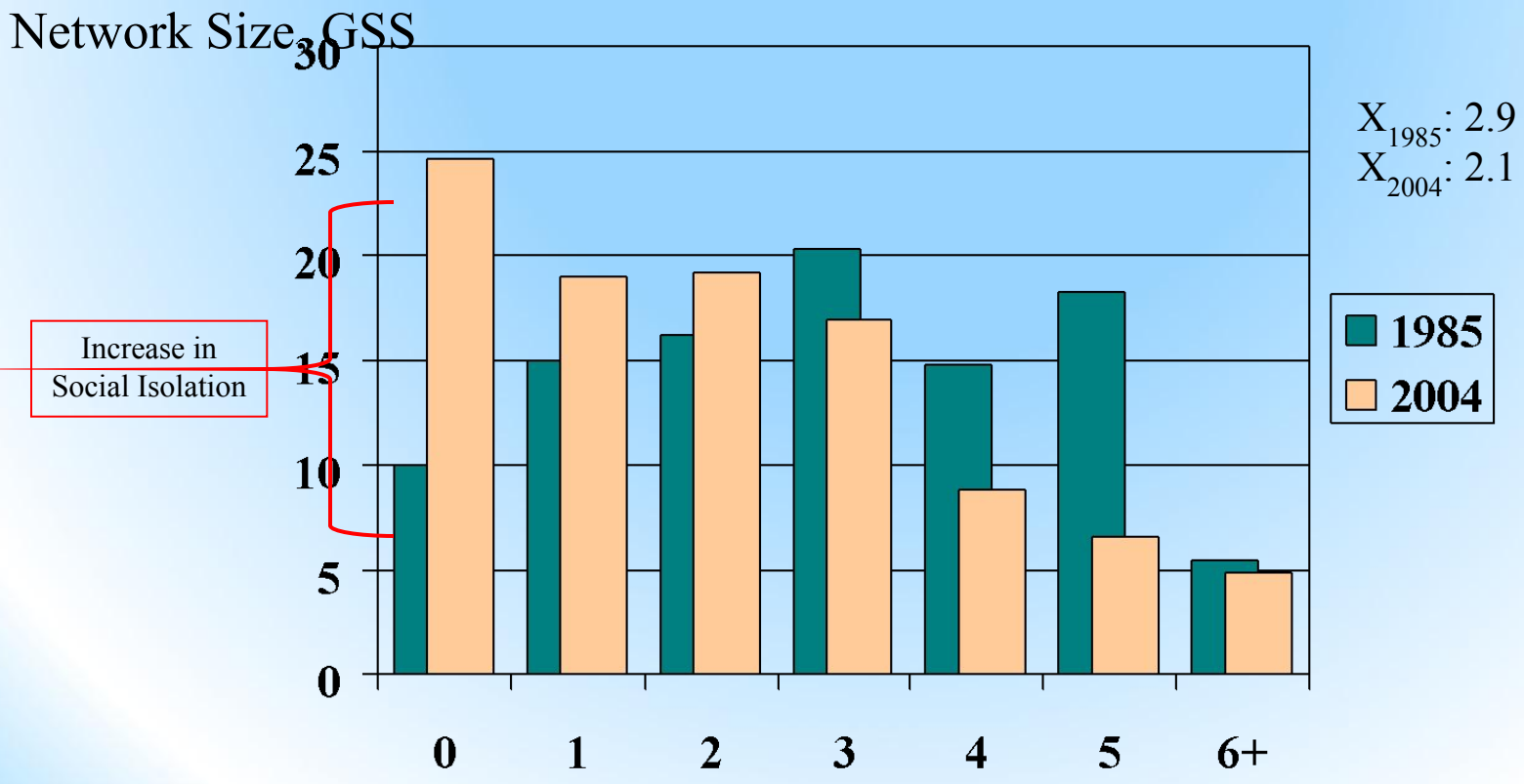
2. **How large are personal networks?**

3. What explains individual variation?

4. Size and connectivity

5. Practical assignment

Social Isolation in America…



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?

Social Isolation in America…

Table 1. Size of Discussion Networks, 1985 and 2004[b]

	Total Discussion Network		Kin Network[a]		Non-Kin Network[a]	
Network Size	1985	2004	1985	2004	1985	2004
0	10.0%	24.6%	29.5%	39.6%	36.1%	53.4%
1	15.0%	19.0%	29.1%	29.7%	22.4%	21.6%
2	16.2%	19.2%	21.0%	16.0%	18.1%	14.4%
3	20.3%	16.9%	11.7%	9.4%	13.2%	6.0%
4	14.8%	8.8%	5.8%	4.0%	6.8%	3.1%
5	18.2%	6.5%	2.8%	1.3%	3.4%	1.4%
6+	5.4%	4.9%	—	—	—	—
Mean	2.94	2.08	1.44	1.12	1.42	.88
Mode	3.00	.00	.00	.00	.00	.00
SD	1.95	2.05	1.41	1.38	1.57	1.40

Note: N (1985) = 1,531; N (2004) = 1,467.

[a] Information on kinship was collected on the first five alters cited. Therefore, the sum of kin and non-kin alters is not equal to the overall network size distribution.

[b] In all tables for this paper, cases are weighted to reflect the population. Weight variable for 1985 is a function of the number of adults in the household (ADULTS), while the weight variable for 2004 is WT2004NR.

Social Isolation in America…

Type of Relationship to Respondent[a]	1985, % (N = 1,531)	2004, % (N = 1,467)
No Confidant	10.0	24.6**
Spouse	30.2	38.1**
Parent	23.0	21.1**
Sibling	21.1	14.1**
Child	17.9	10.2**
Other Family Member	18.2	11.8**
Coworker	29.4	18.0**
Comember of group	26.1	11.8**
Neighbor	18.5	7.9**
Friend	73.2	50.6**
Advisor	25.2	19.2**
Other	4.5	3.1**
Spouse is only Confidant	5.0	9.2**
At Least One Non-spouse Kin	58.8	42.9**
At Least One Non-kin Confidant	80.1	57.2**

Note: The table displays, for example, "What percent of the sample mentioned a spouse/parent/etc. as a person with whom they discussed important matters?"

[a] Since more than one type of relationship can be mentioned for any given discussion partner (e.g., a coworker

Social Isolation in America…

* on average 1 person less in core discussion networks between 1985 and 2004!

* of those who mention nobody increased from 8 to 20%

* more mentioning of partner and family

Convinced?

Increase in social isolation in US?

.. And in general? In our society?

Agree with McPherson et al (2006)?

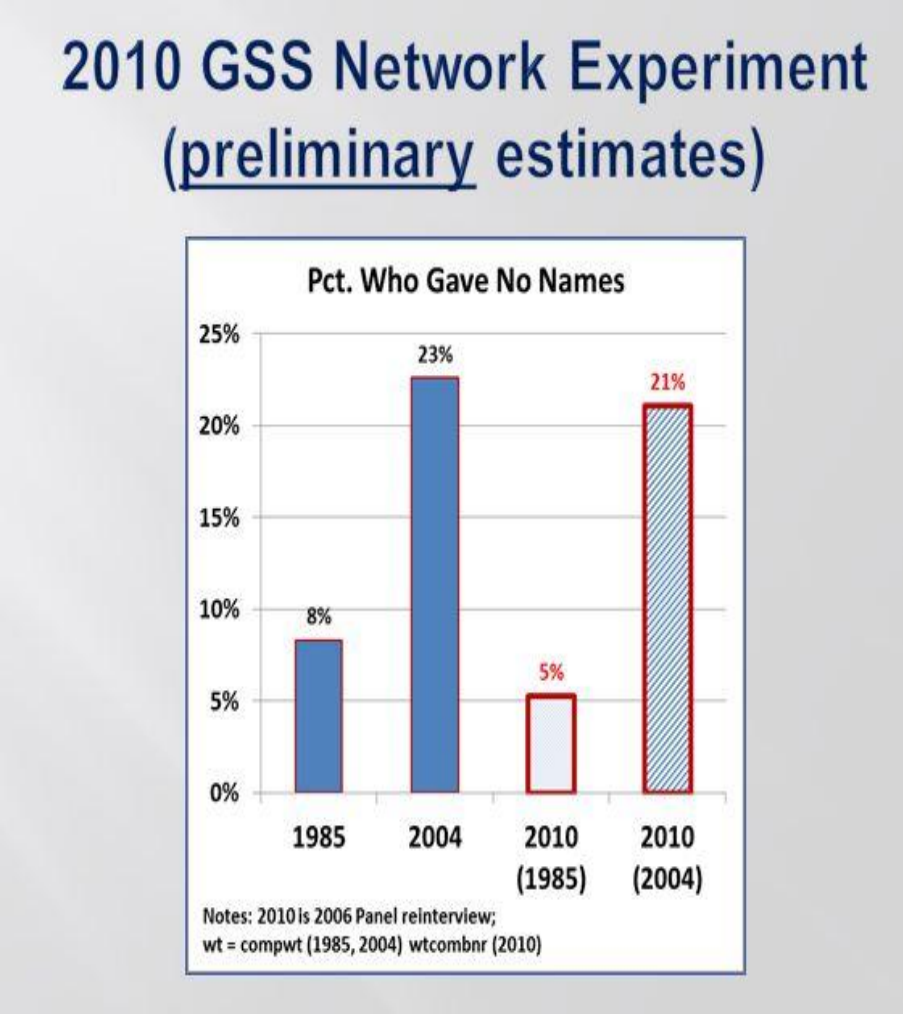
Criticism by Claude S. Fischer (2009/2011):

* Something is strange: other indicators such as education do not predict adequately network size in this data
* Wrong coding?

Criticism by Wang and Wellman (2007); Hampton (2011)

No replication, no confirmation!

Experiment (Paik, 2013)



Size personal networks

Ego Network: Name Generator US GSS (CORE NETWORK)

1985 (GSS)

- Marsden (1987)
- With whom discuss Americans important matters?
- Networks: small, kin-centered, dense

1985-2004 (GSS)

- McPherson et al. (2006)
- Increase of social isolation
- In line with Putnam, Bowling Alone
- Explanation: TV/Media/ Internet

1985-2004 (GSS)

Fischer (2009)

Decline is artifact. Measurement error

Other sources: no decline

2008 (GSS):

- Hampton et al. (2011)
- New measurement
- Challenge findings of McPherson: no decline

New survey

- Wang and Wellman (2007)
- No social isolation if different measure
- 2002-2007 trend: no decline
- *Positive* relation between Internet (social media) and connectivity

1985-2004 (GSS)

Anthony Paik and Kenneth Sanchagrin (ASR, 2013)

Interviewer effects: skipped long core

End of discussion?

NO!
composition and quality might have changed

(further discussion in afternoon lecture)

How large is our network?

- Likelihood of having common acquaintances in a given population depends on network size of an individual
- Gurevitch (1962 at MIT), Pool and Kochen 1978/1979

Question asked by Gurevitch:

How many different persons does one meet at how many different occasions?

Average n of 100 day contact:
1000!

But huge standardeviation

Table 1. *100-day contacts of respondents*

Sex	Job	Age	*(a)* No. of different persons seen in 100 days	*(b)* No. of contact events	Ratio *b/a*
Blue collar					
M	Porter	50 - 60	83	2946	35.5
M	Factory labor	40 - 50	96	2369	24.7
M	Dept. store receiving	20 - 30	137	1689	12.3
M	Factory labor	60 - 70	376	7645	20.3
M	Foreman	30 - 40	510	6371	12.5
F	Factory labor and unemployed	30 - 40	146	1222	8.4
White collar					
F	Technician	30 - 40	276	2207	8.0
F	Secretary	40 - 50	318	1963	6.2
M	Buyer	20 - 30	390	2756	7.1
M	Buyer	20 - 30	474	4090	8.6
M	Sales	30 - 40	505	3098	6.1
F	Secretary	50 - 60	596	5705	9.5
Professional					
M	Factory engineer	30 - 40	235	3142	13.5
F	T.V.	40 - 50	533	1681	3.2
M	Adult educator	30 - 40	541	2282	4.2
M	Professor	40 - 50	570	2175	3.8
M	Professor	40 - 50	685	2142	3.1
M	Lawyer-politician	30 - 40	1043	3159	3.0
M	Student	20 - 30	338	1471	4.4
M	Photographer	30 - 40	523	1967	4.8
M	President*	50 - 60	1404**	4340**	3.1**
Housewives					
F	–	30 - 40	72	377	5.2
F	–	20 - 30	255	1111	4.4
F	–	20 - 30	280	1135	4.0
F	–	30 - 40	363	1593	4.4
F	–	30 - 40	309	1034	3.3
F	–	50 - 60	361	1032	2.9
Adolescent					
M	Student	10 - 20	464	4416	9.5

*Data estimated from Hyde Park records.
**Record for 85 days.

VERY FIRST ARTICLE IN SOCIAL NETWORKS

Source: Pool and Kochen 1978:22

Our social world depends on the number of people we meet at different occasions.

Someone's social horizon is small if s/he meets always the same person, not matter where s/he goes.

Personal network size

Based on Twitter activity. Or Facebook friends?

OPEN ACCESS Freely available online

PLoS one

Modeling Users' Activity on Twitter Networks: Validation of Dunbar's Number

Bruno Gonçalves[1,2], **Nicola Perra**[1,3]*, **Alessandro Vespignani**[1,2,4]

1 School of Informatics and Computing, Center for Complex Networks and Systems Research, Indiana University, Bloomington, Indiana, United States of America, 2 Pervasive Technology Institute, Indiana University, Bloomington, Indiana, United States of America, 3 Complex Systems Computational Lab, Linkalab, Cagliari, Italy, 4 Institute for Scientific Interchange, Turin, Italy

Abstract

Microblogging and mobile devices appear to augment human social capabilities, which raises the question whether they remove cognitive or biological constraints on human communication. In this paper we analyze a dataset of Twitter conversations collected across six months involving 1.7 million individuals and test the theoretical cognitive limit on the number of stable social relationships known as Dunbar's number. We find that the data are in agreement with Dunbar's result; users can entertain a maximum of 100–200 stable relationships. Thus, the 'economy of attention' is limited in the online world by cognitive and biological constraints as predicted by Dunbar's theory. We propose a simple model for users' behavior that includes finite priority queuing and time resources that reproduces the observed social behavior.

Citation: Gonçalves B, Perra N, Vespignani A (2011) Modeling Users' Activity on Twitter Networks: Validation of Dunbar's Number. PLoS ONE 6(8): e22656. doi:10.1371/journal.pone.0022656

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Topics and issues

1. How to measure people's network?

2. How large are personal networks?

3. **What explains individual variation?**

4. Size and connectivity

5. Practical assignment

Determinants of Individual Variation

1. Genes versus environment

Model of genetic variation in human social networks

James H. Fowler[a,1], Christopher T. Dawes[a], and Nicholas A. Christakis[b]

Model of genetic variation in human social networks

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PNAS

Determinants Individual Variation: genes or environment?

* **1,110 twins** from a sample of 90,115 **adolescents** in 142 separate school **friendship networks** in the National Longitudinal Study of Adolescent Health (the "Add Health" study; see SI for description).

* Genetic factors account for 46% of the variation in in-degree (how many times a person is named as a friend),

Model of genetic variation in human social networks

James H. Fowler[a,1], Christopher T. Dawes[a], and Nicholas A. Christakis[b]

1. Genes versus environment

2. Activity level

* Higher educated, younger people

3. Network dynamics

* Matthew effect (Merton), preferential attachment (Barabasi), popularity-attraction
* Long tail, skewed distribution
* See Feld: why your friends have more friends than you….

Table 1. *100-day contacts of respondents*

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1. How to measure people's network?

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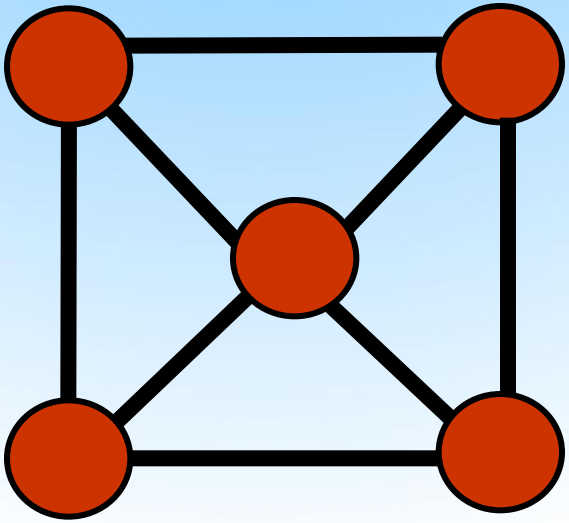
3. What explains individual variation?

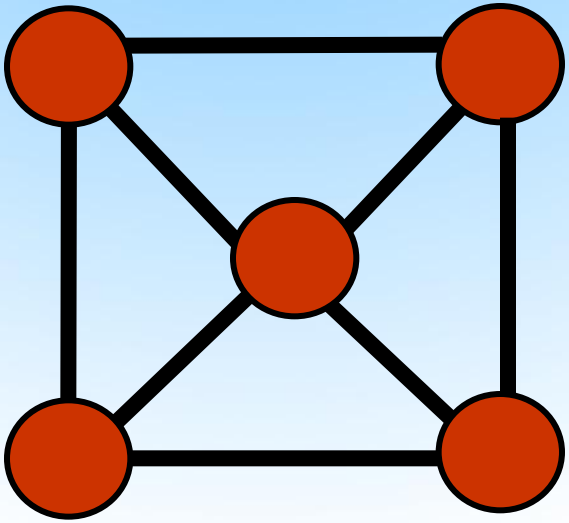
4. **Size and connectivity**

5. Practical assignment

The issue behind connectivity
=
basic question of sociology



Is there a trend in contemporary society towards the erosion of social networks and communities?



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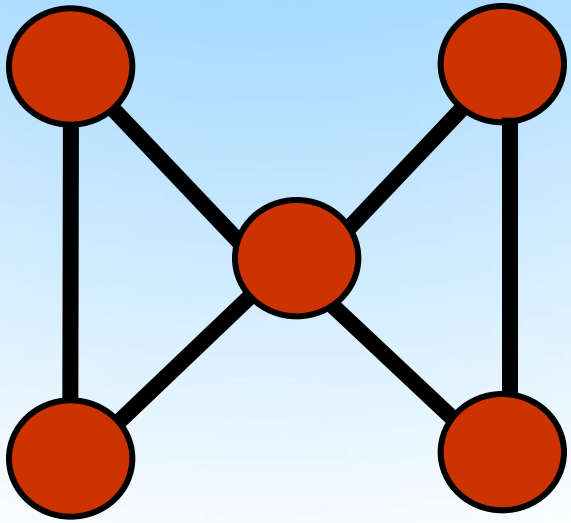

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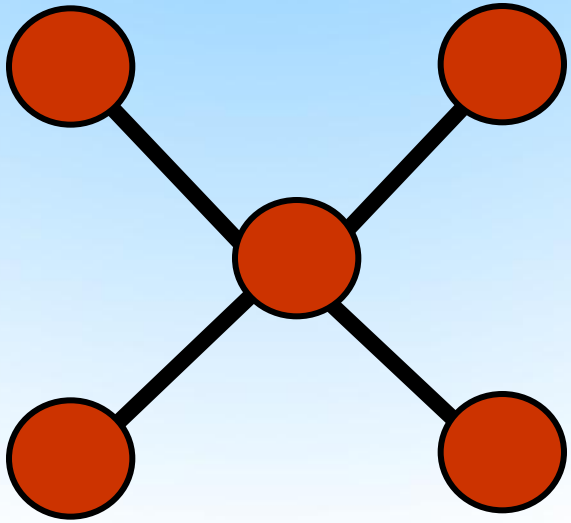

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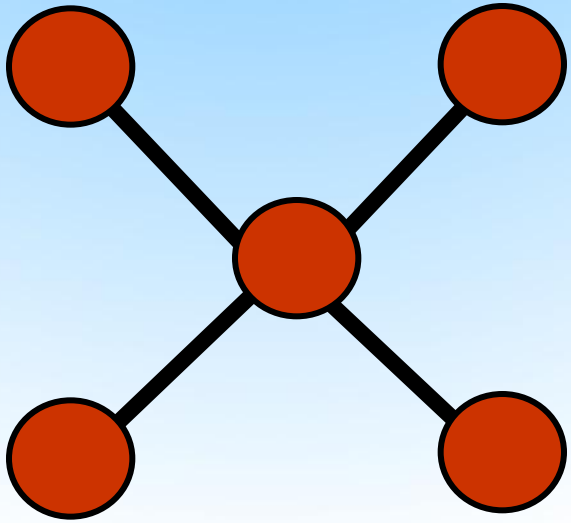


The Community Question

Has community declined in modern societies?

First basic arguments:

* Toennies (1887)
  * Gemeinschaft – Gesellschaft

Influences:Chicago school of sociology (1920 onwards)

* Ecological perspective on sociology
* Ethnographic, descriptive tradition
* Studied Urban life and consequences of urbanization
* Became later influential in studies in crime
* See a.o.: Wirth, Park, Sutherland, Burgess

Usual implications

* Community = locally bounded
* Community = a thing that has to be desired since it facilitates solidarity behavior and individual wellbeing and it hampers asocial behavior like crime or vandalism.

Community controversy resulted in 3 different arguments/perspectives:

* Community is lost
* Community is saved
* Community is liberated

(1) community is lost

* Prominent defenders (e.g.):
  * Toennies (1887)
  * Park (1925)
  * Wirth (1938)
  * Nisbeth (1966)

* Argument: Contemporary division of labor has affected primary relationships: Primary relationships have become impersonal, transitory, and segmental.

* Evidence: rates of crime, poverty, collective action

(2) Community is saved

* Prominent defenders (e.g.):
  * Suttles (1972)
  * Gans (1962)
  * Young and Wilmot (1957)

* Argument: Human beings are social and will always create communities. Neighborhoods and kin relationships still provide support and sociability.

* Evidence: solidarity among minorities, studies on ‘urban villages’

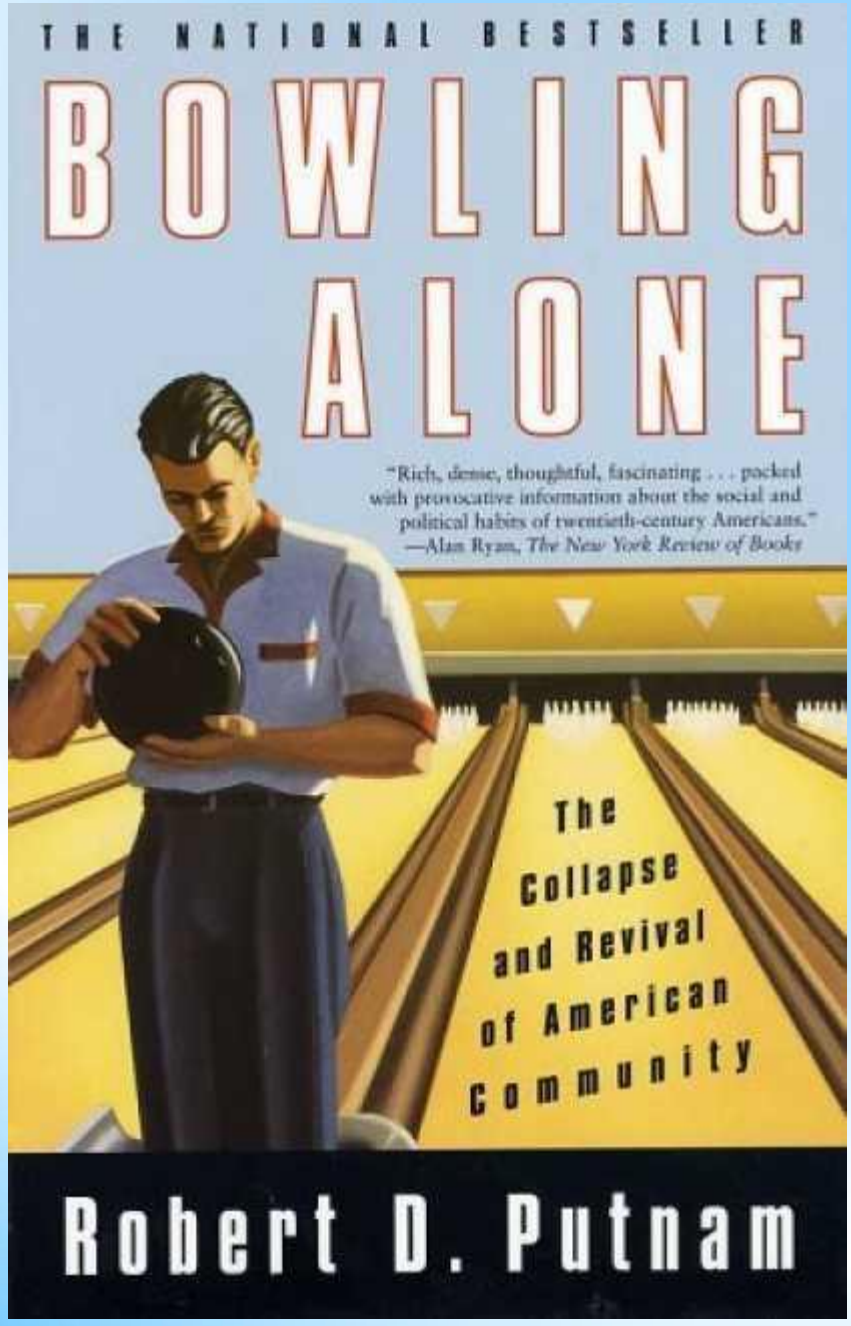
(3) Community is liberated

* Prominent defenders (e.g.):
  * Wellman, (1979 en passim)
* Arguments:
  * Primary ties are spatially dispersed.
  * Dispersed primary ties can easily be maintained because of cheap and effective transport and communication possibilities.
  * People are involved in multiple social networks with weak solidary attachments.
  * High residential mobility weakens existing ties and retards the creation of new strong ties.
  * Possibilities for accessing loosely bounded networks have increased through the diversity of cities.

More recently:
Revival of the Community Controversy

* New wave I: The Asymmetric Society
* (Coleman 1982)

* New wave II: Bowling Alone (Putnam 2000)



2000

Robert Putnam

Putnam: Declining Social Capital:

Trends over the last 25 Years

Attending Club Meetings

Family dinners

Having friends over

Surprising Facts…

Joining one group cuts in half your odds of dying next year.

Ten minutes of commuting reduces social capital by 10%

(Source: Putnam, 2001)

Putnam's evidence for declining social capital:

* Decline in political participation
* Decline in civic participation
* Decline in religious participation
* Decline in connections at the workplace
* Decline in informal social connections
* Decline in altruism, volunteering and philanthropy
* Decline in reciprocity, honesty, and trust

Examples

* Voting declined by a quarter over the last three decades
* Between 1973 and 1994 the number of Americans who attended even one public meeting on town or school affaires in the previous year was cut by 40%
* Union membership declined from 32 to 14 percent since the 50s.
* Between 1974 and 1998 the frequency with which Americans spend a social evening with someone who lives in the neighborhood fell by 30 % from 30 times to 20 times a year
* Perception of honesty and trust declined for about 40% (from 50% agreement to 28% agreement between 1952 and 1998)

Putnam's explanations

* Women movement into labor force (see also Coleman 1990). Therefore, women membership in organizations declined heavily (like the Red Cross or Parent-Teacher-Associations).
* Mobility disrupts the roots, sprawl disconnects
* Demographic transformations: fewer marriages, more divorces, fewer children etc.
* Technological transformation of leisure … individualization. E.g. revolution of television

Criticism

* Social connections -> trust
* Trust -> social connections

* Evidence unclear

* For a critical review of Putnam's 'Bowling alone', see Durlauf (2002)

More recently:
Revival of the Community Controversy

* New wave I: The Asymmetric Society
* (Coleman 1982)

* New wave II: Bowling Alone (Putnam 2000)

* **Note: community question became a social capital question!**

Social Capital and Community

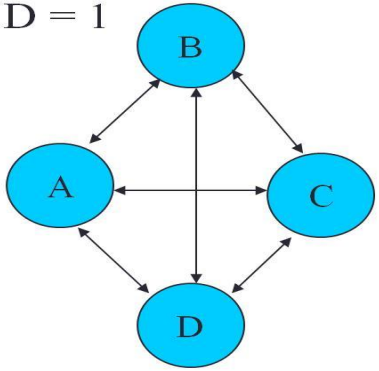
Social Capital (micro level)	Community (macro level)
Creation through investment in relations with others – social capital is largely achieved	Can be a 'gift', acquired through membership in a certain group – community is largely ascribed
Elements: presence, willingness, and ability of others to provide support	Elements: sharing, joint production of wellbeing, sense of identity, belonging
Different network positions can provide social capital, depending on the goal that has to be achieved, e.g. structural holes in one's network can imply social capital	Networks are assumed to be close and highly connected to provide community benefits. In a community there are rarely benefits of structural holes
Steering of individual behavior via expected returns	Steering of individual behavior via sanctions, e.g. becoming excluded
Social capital is discounted	There is no (or a very low) discount rate

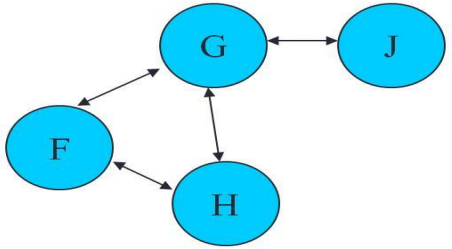
Decline of community = change towards less network density

Changes in density

6 ties of 6 possible ties

D = 1





4 ties of 6 possible ties

D = .67

To dwell among friends – *C.S. Fischer (1982)*

* Study of urban – rural differences (because of lack of longitudinal data)
* Important works:
  * Networks and Places (1977)
  * To dwell among friends (1982)

Thesis: urban life is socially, mentally, and morally unhealthy. Chicago School (Wirth, Park)

Counter thesis:

The city intensifies differences between subcultures. – mor meeting opportunities -> more opportunities to select others according to own preferences.

Hence: life in the city is nothing to suffer from

Data:

Between 1977 and 1978, Fischer interviewed 1050 men and women living in fifty localities of varying urbanism to ask them about the people who were important in their lives (using an exchange method).

Results

high urbanization versus low urbanization

- **Larger** networks in cities (2 persons more on average)
- No difference regarding the **quality** of relationships
- People in the city meet individual network members **less frequently** than people in less urbanized regions
- Urban residents included 40 % **fewer relatives** and 50% more non-relatives in their personal networks than the least urban residents
- Urban residents have considerable **less dense** networks
- Furthermore: urban residents are **less traditional** in their attitudes than non-urban residents
- The networks of urban residents are **more homogeneous on average (!!)**

* Fischer: Urbanism influences Community

* Putnam: ‘ something’ influences social capital

Measuring ego- network density in survey research

Alter no:	1	2	3	4	5
1		X	X	X	X
2			X	X	X
3				X	X
4					X

Measuring network density

* density= n of actual ties/
  n of potential ties

Note: in ego- networks every node has per definition a tie with the focal actor (ego)

Calculation of maximal possible ties:

n networkmembers X (n networkmembers-1)/2

/2 if ties are always confirmed

N-1 because no tie with oneself

Topics and issues

1. How to measure people's network?

2. How large are personal networks?

3. What explains individual variation?

4. Size and connectivity

5. **Practical assignment**

Practical assignment

Short practical assignment:

Analyzing personal networks of citizens in the Netherlands

Source: SSND1 (data enclosed in SPSS and STATA format)

1) How large are the networks? How does size differ?

2) What is the average density of the networks of citizens in the Netherlands?

3) How do size and density differ among:

* People in more or less urban areas?
* Men and women?
* Higher and lower educated?
* Younger and older people?

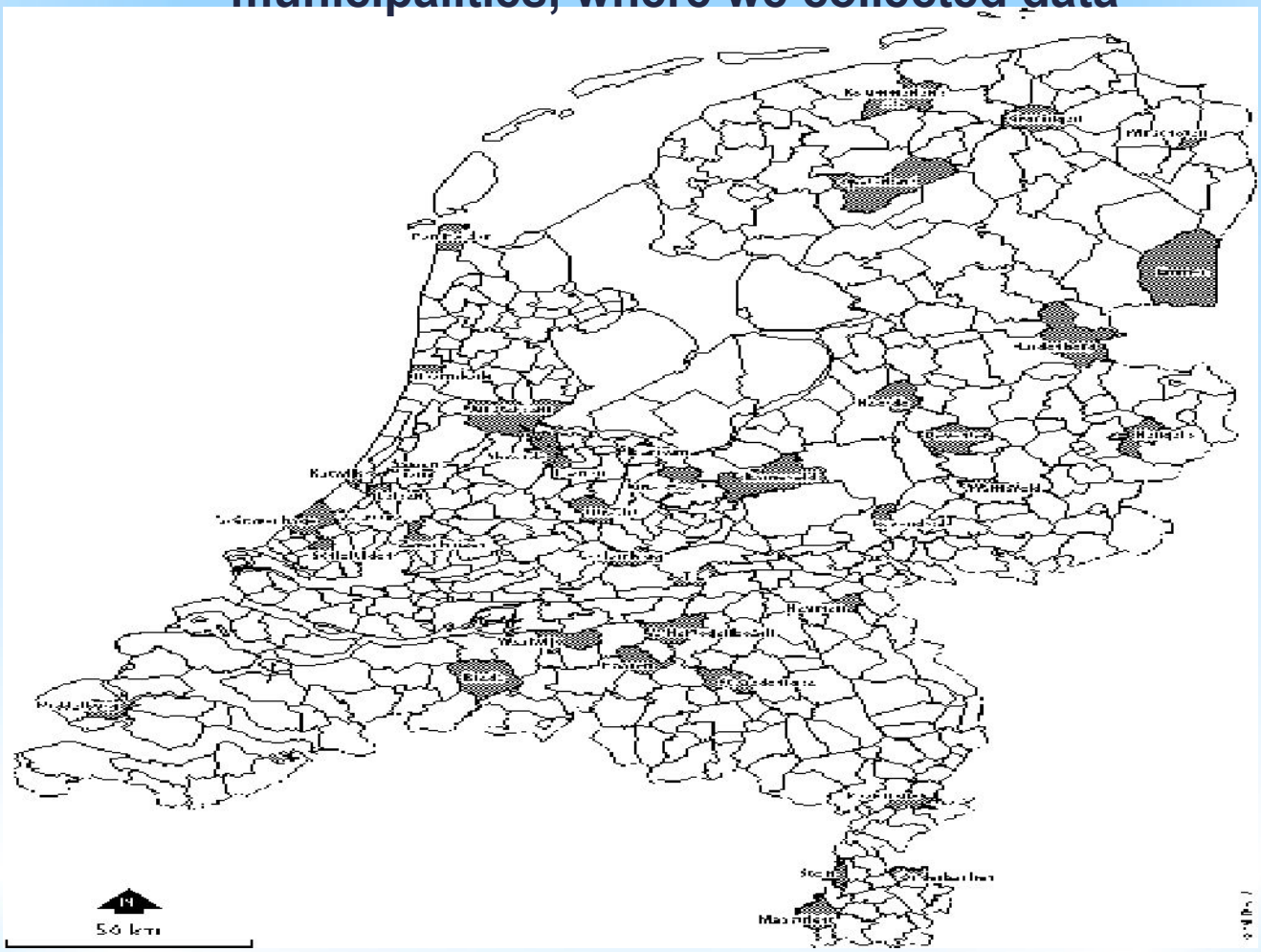
Data

* SSND – the survey of the social network of the Dutch
* Random sample of residents in neighborhoods; three points of measurement:

  2000 – 2008 - 2014
* Same respondents plus refreshment group
* appr. 1000 respondents in each wave

The Survey of the Social Networks of the Dutch (SSND)

– municipalities, where we collected data -



* N=**1007/988/1096**
* Panel+ refreshment sample
* Panel 1-2= 604
* Panel 2-3= 249
* Panel 1-2-3= 355
* Sample of: 161 neighbourhoods, 5 position postcodes
* Last wave: additional sample of 19 disadvantaged neighbourhoods (196 individuals)
* 2nd and 3rd wave: inclusion of other type of actors: e.g., entrepreneurs
* Average time: 90 minutes in all waves

* This inquiry: panel 1-2-3

What is ‘special’ in the SSND?

* Steered by substantive questions, inspired by the research programme of **social capital theory**

* ***Neighbourhood*** sample
* Different measurements of **social capital**
* Networks and **contexts:** where did you meet first/where do you meet currently?
* **Multiple name generators** and ample information about: **alter and relationship** ego – alter
* Inquiry on persons who were **not** mentioned in a second/third wave->network changes

Measurements of networks and social capital

Name generator

Position generator

Resource generator

Community measurements

….Break…..

Topics and issues,
- afternoon -

1. Theories about urban life and community – on the emergence of social and physical disorder:

collective efficacy

broken windows

2. Does the internet change our social relationships?

Lost letters in Dutch Neighborhoods.
A field experiment on informal control, formal control and collective good production

messages:

1. Informal control/collective efficacy, measured as shared belief that someone will intervene on behalf of the collective good affects actual prosocial behavior

2. Contrary to US-measurement of collective efficacy, cohesion is not a dimension of collective efficacy in the Netherlands

3. Formal control does not influence prosocial behavior and the effect of collective efficacy/informal control (on prosocial behavior)

Collective efficacy in neighborhoods

- See Bandura 1982, 1999: collective efficacy= 'yes, we can!' – many studies on team sport and the class room, (e.g. Goddard 2001)

- Sampson (et al. 1997/2012) Collective efficacy/informal control = the shared belief that residents would intervene on behalf of the common good – if it is necessary; plus trustful, cohesive relationships
- in neighborhoods with high collective efficacy crime rates are lower. It mediates effects of social disorganization indicators: residential mobility, poverty and ethnic heterogeneity.

Table 4. Neighborhood correlates of perceived neighborhood violence, violent victimization, and 1995 homicide events.

Variable	Model 1: social composition			Model 2: social composition and collective efficacy		
	Coefficient	SE	*t*	Coefficient	SE	*t*
	*Perceived neighborhood violence**					
Concentrated disadvantage	0.277	0.021	13.30	0.171	0.024	7.24
Immigrant concentration	0.041	0.017	2.44	0.018	0.016	1.12
Residential stability	−0.102	0.015	−6.95	−0.056	0.016	−3.49
Collective efficacy				−0.618	0.104	−5.95
	Violent victimization†					
Concentrated disadvantage	0.258	0.045	5.71	0.085	0.054	1.58
Immigrant concentration	0.141	0.046	3.06	0.098	0.044	2.20
Residential stability	−0.143	0.050	−2.84	−0.031	0.051	−0.60
Collective efficacy				−1.190	0.240	−4.96
	1995 homicide events‡					
Concentrated disadvantage	0.727	0.049	14.91	0.491	0.064	7.65
Immigrant concentration	−0.022	0.051	−0.43	−0.073	0.050	−1.45
Residential stability	0.093	0.042	2.18	0.208	0.046	4.52
Collective efficacy				−1.471	0.261	−5.64

*Estimates of neighborhood-level coefficients control for gender, marital status, homeownership, ethnicity, mobility, age, years in neighborhood, and SES of those interviewed. Model 1 accounts for 70.5% of the variation between neighborhoods in perceived violence, whereas model 2 accounts for 77.8% of the variation. †Neighborhood-level coefficients are adjusted for the same person-level covariates listed in the first footnote. Model 1 accounts for 12.3% of the variation between neighborhoods in violent victimization, whereas model 2 accounts for 44.4%. ‡Model 1 accounts for 56.1% of the variation between neighborhoods in homicide rates, whereas model 2 accounts for 61.7% of the variation.

Source: Sampson et al. 1997)

This study: collective efficacy, formal control and prosocial behavior

- '***Collective efficacy***' has been shown to be an important predictor for low crime rates, but does it also stimulate prosocial action?

- Studies on **prosocial behavior** are usually reports of intentions or reports on actions but not real actions

- Considerably less is known about the effects of **formal control** by institutions or the police

Waar deze agent loopt

Maar zodra hij de hoek om is, neemt het aantal

daalt de criminaliteit

misdrijven net zo hard weer toe

WHERE THIS MAN WALKS, CRIME RATES GO DOWN. BUT IF HE TURNS AROUND THE CORNER THEY INCREASE AGAIN

… two contributions

* Studying the influence of neighborhood collective efficacy on prosocial behavior
* Studying the influence of formal control, next to collective efficacy on prosocial behavior

Studying prosocial behavior: the lost letter technique

* Dates back to Milgram et al. (1965): external conditions for people's helpfulness

* General approach: letters with different types of addresses are dropped in streets and rate of letters returned is counted.

* Addresses are for example extreme political parties, medical institutions, opposed to private persons

* Here: technique applied to study *neighborhood* effects

The lost letter technique in our study

- 1240 letters dropped in 110 Dutch neighborhoods, randomly sampled
- Half of the letters behind car windshield wiper*), half on the ground/half of the letters addressed with a Dutch name, half with a Turkish/Moroccan name
- All letters were stamped, but contained no clear sender's information, only a postal code, which is rather common

Overview of quasi-experimental conditions		
	Place where letter is dropped:	
Address on letter:	Ground	Car
Dutch	310	310
Turkish/Moroccan	310	310

***) Letters behind the windshield wiper got a pencil written note 'found next to your car'**

Research questions

- Do structural neighborhood conditions like poverty, residential mobility and ethnic heterogeneity, together with collective efficacy and formal control influence rate of posted letters?
- Are there mediator effects of collective efficacy?
- Does it matter whether letters are found in the street or behind the windshield wiper of a car?
- Does it matter whether the address is a Dutch or a Turkish/Moroccan name?

Arguments

* Action possibilities for a person finding a letter:
  * Do nothing
  * Throw it in a garbage container
  * Post it

Do something for the neigh-borhood's cleanness

Do something for an unknown stranger, who presumably lives close by

…and hypotheses (1a)

- = volunteers dilemma (cf. Diekmann 1985).

  Such a dilemma is solved if an individual maximizes utility under the restriction of Kant's imperative.

* we expect that norm activation depends on **neighborhood collective efficacy**.

…hypotheses (1b)

- In addition: presence of formal control has been shown to affect norm-conform behavior, at least in classrooms (e.g. Junger-Tas 2000, Hirschi 1990)
- Hence: expectation is that formal control matters

…hypotheses (2)

- Furthermore: residential mobility, ethnic heterogeneity and poverty (cf. Shaw and McKay, 1942)
  - *High residential mobility:* impedes creation of relationships with each other as well as with the neighborhood in general
  - *Ethnic heterogeneity:* impedes creation of networks and production of collective goods
  - *Poverty*: no resources to produce collective goods; in addition, value of collective goods might be less appreciated because important individual goods are lacking

And hy 3

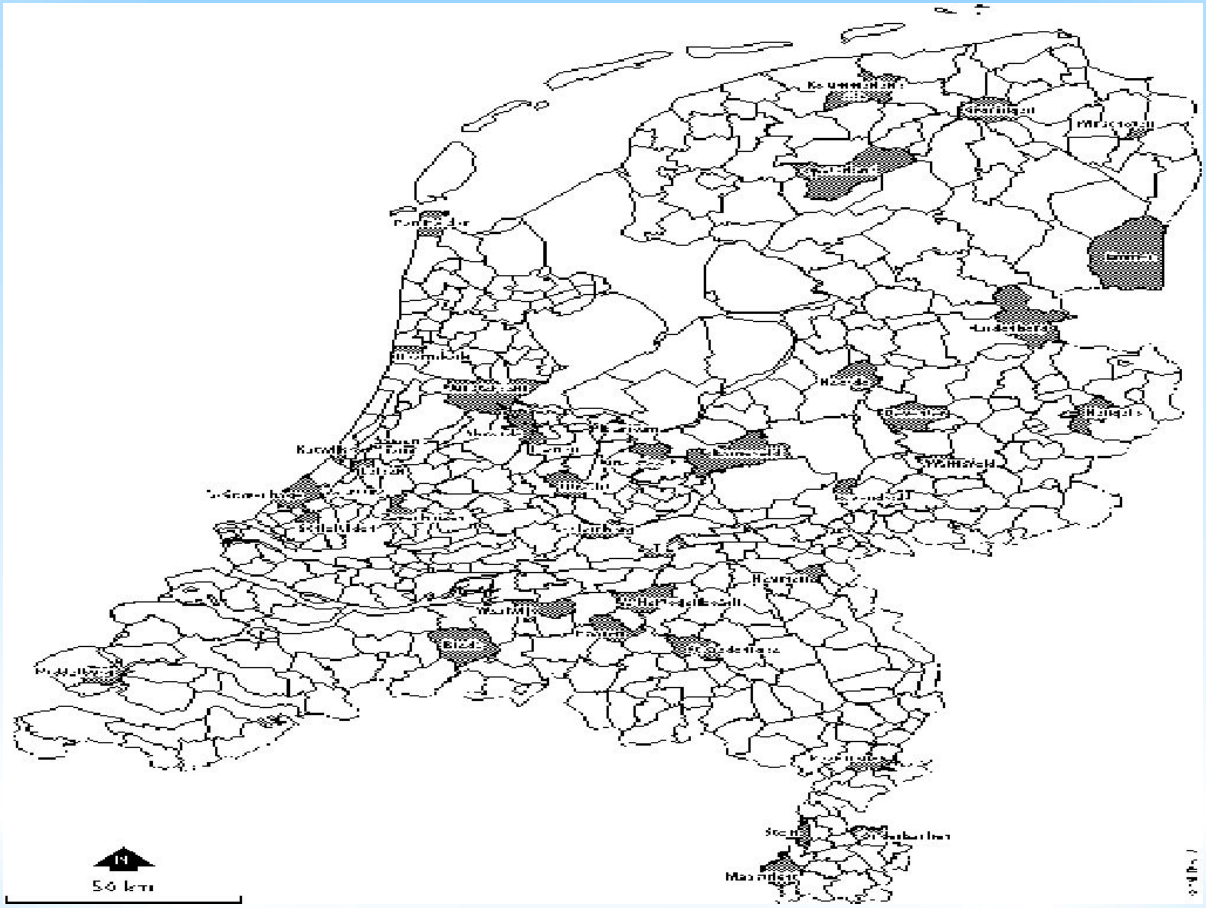
* Interaction neighborhood composition*adress on letter: in neighborhoods with many foreigners letters with foreign addresses have a higher chance to be posted

Data

- Structural neighborhood characteristics: Statistics Netherlands (2007/2008)
- Police and safety monitor (2005-8), information about visibility and functioning of the police in neighborhoods
- Information about collective efficacy/informal control: Survey of the Social Networks of the Dutch (SSND, 2008) held among respondents in the selected neighborhoods, n=984

The Survey of the Social Networks of the Dutch (SSND)

– municipalities where we collected data -



Measurement of collective efficacy

Do you expect that people living in this neighborhood will intervene if…

- children are hanging around and playing truant
- adolescents are spraying graffiti
- people are having a tough arguing here
- one observes a burglary
- a person walking strangely around and seemingly trying to break into a parked car
- children quarrelling and fighting in the street
- the municipality plans to open a center for drug addicted here
- the play ground would be broken up and replaced with something different
- a dance club/disco would be opened in this neighborhood.

Items form a scale, Cronbach's alpha: .81

Measurement of neighborhood cohesion

- we have close relationships
- in this neighborhood, everyone can be trusted
- you get help when you need it
- I would not accept a house in another neighborhood, even if it is better; I like living here

(…)

Items form a scale, Cronbach's alpha: .80

Collective effcicacy and trust/cohesion

* In the US a consistent association between collective efficacy and cohesion has been found

* In the Netherlands, adding trust or cohesion measurement to the scale causes a decrease in Cronbach's alpha. Trust/cohesion and collective efficacy/informal control are strongly enough related to constitute a scale.

Formal control
(Safety monitor)

* ‘blue on the street’

Items

* Police is rarely seen in this neighborhood
* They almost never leave the car
* Police agents are not approachable for us
* Police agents have little time for the matters of the neighborhood
* They almost never intervene

Analytic strategy

- Neighborhoods:4 position postal code areas
- Collective efficacy: aggregated to the neighborhoods level, employing ecometric procedures, i.e. accounting for systematic response patterns by social groups (SSND)
- Formal control: same procedure, different data source; reports about police behavior in neighborhoods (Safety monitor).

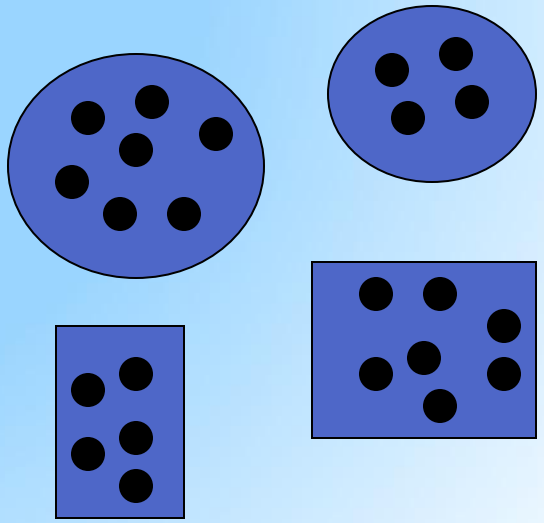
- Binomial two-level model, dependent variable: posting of letters in a given neighborhood

Assessing properties of ecological settings (1)

* Different ways of neighborhood delineation:
* Postal codes
* Geographical Area
* Administrative area
* ‘ego’ hoods

Methodological Remark:

Data have a nested structure



persons in groups:

- pupils in schools
- employees in organizations
- voters in municipalities
- Neighbors in neighborhoods
- **Alters in ego's networks**

longitudinal or multivariate data:

measurements in individuals

meta-analysis:

subjects in studies

(…) examples can be much more complicated, e.g. think of three or more levels

etc.

How to analyze multilevel data?

- Forget about the levels and disaggregate group variables to the lowest level
- **Problem:** observations are not independent of each other: e.g., the relations to alters in a personal network influence each other. This violates assumptions of OLS regression analysis
- Aggregate lowest level information to the group level
- **Problem**: loss of information
- Ancova with the different groups as factors
- **Problem:** boosts the amount of variables

These are very questionable procedures

✔ **Instead: Two-level analysis**

✔ Hierarchical Linear Model with random differences between individuals and random differences between groups.

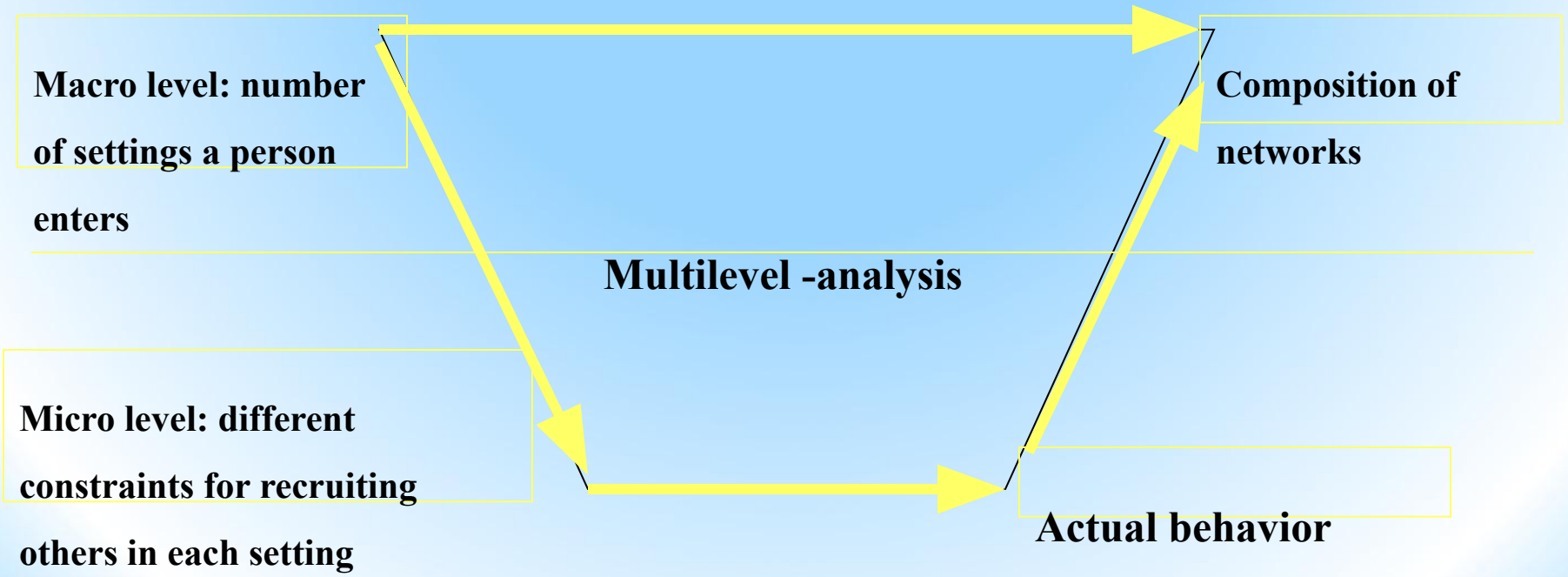
Also referred to as : Random Coefficient Model

Basic idea of multilevel analysis

* Multilevel Analysis based on the Hierarchical Linear Model (HLM) is a kind of regression analysis / ANOVA for situations with several, nested sources of unexplained variation.
* It is suitable for nested data sets where the dependent variable is at the lowest (= most detailed) level
* The independent variable can be on each level

* Literature: Tom Snijders and Roel Bosker (1999) Multilevel analysis. Sage
* Check out Tom Snijders website for more information
* Robert Sampson,1988 onwards

Multilevel methods are not only important from a technical point of view. They cover one side of the micro-macro problem: *macro*-micro-link.



In the future, similar methods for the micro-macro link should be developed. There are already programs that follow this direction: SIENA (**S**imulation **I**nvestigation for **E**mpirical **N**etwork **A**nalysis)

Assessing properties of ecological settings (2)

* - use of individual scores: ignoring the macro level

* - aggregation: aggregates also the measurement error

Both are questionable procedures. In addition: Response patterns partially due to individual characteristics: e.g. young boys feel safe; people who are not often in the neighborhood expect less intervention; women perceive more disorder etc.

Solution: ecometrics

* Similar approach as in psychometrics
* Raudenbush and Sampson (e.g. 1999)
* Response patterns partially due to individual characteristics: e.g. young boys feel safe; people who are not often in the neighborhood expect less intervention; women perceive more disorder etc
* Constructing neighborhood properties in separate three-level analysis: item-respondent- neighborhood; controlling for individual characteristics
* Residuals = NOT explained by the individuals

Back to the Lost Letters…

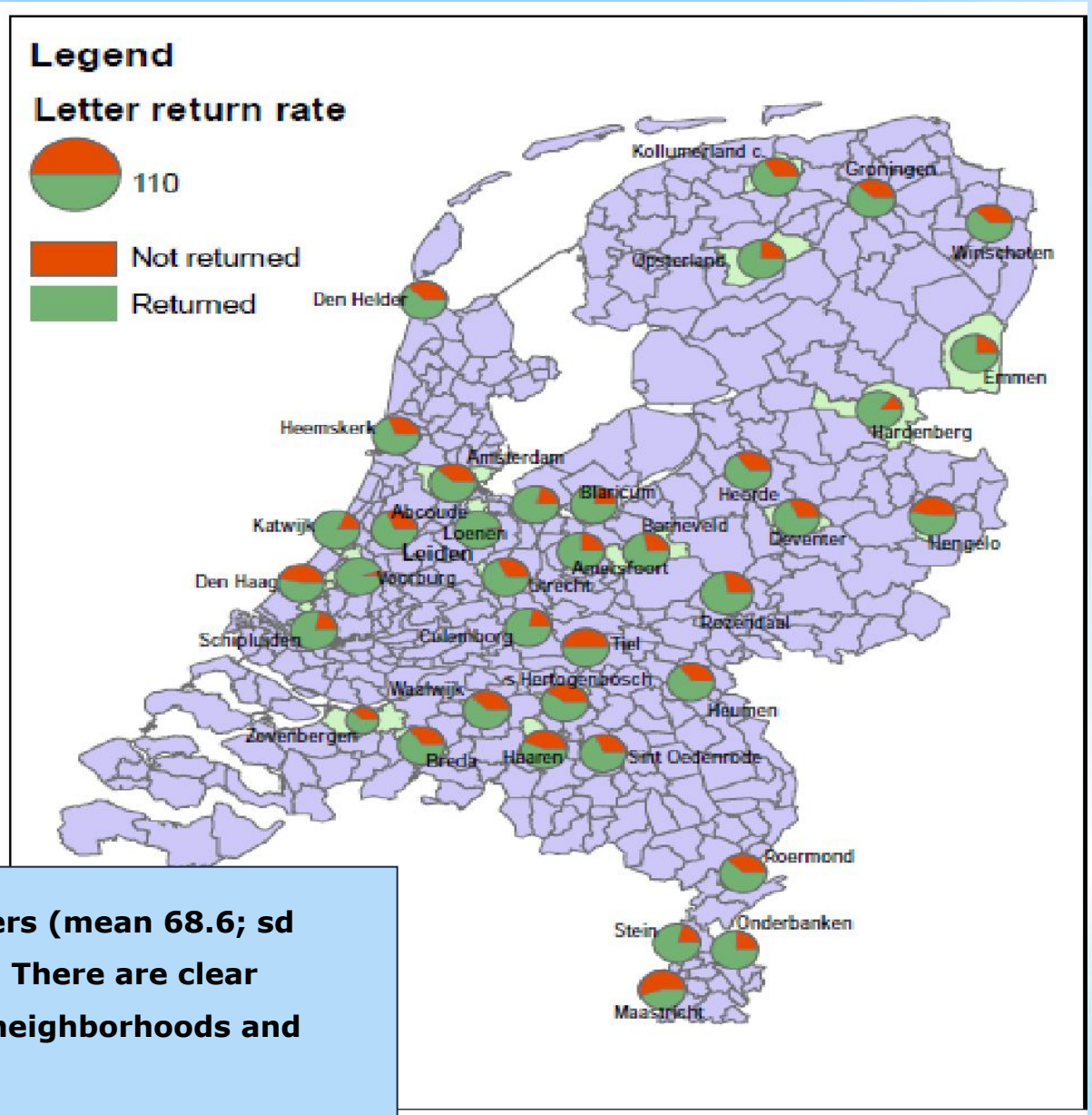
* Letters dropped in neighborhoods
* Different places: car/sidewalk
* Different addresses: Dutch/foreign

Ladies and gentlemen……

I take your bid….

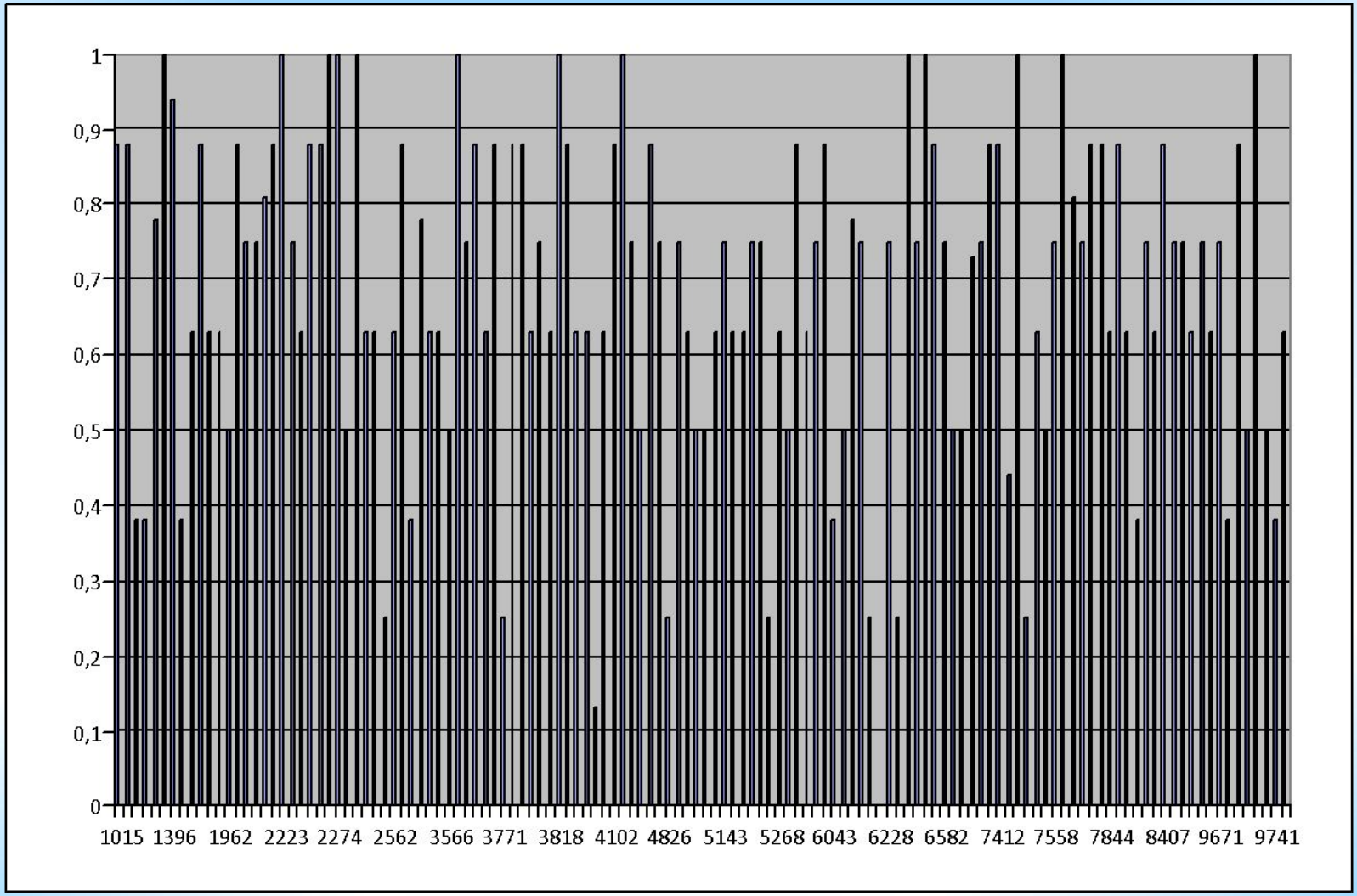
Rate of posting: ???

Results



About 70% of all letters (mean 68.6; sd 21,7) have been sent. There are clear differences between neighborhoods and municipalities

Posting rate of letters by neighborhood postal code



Letters posted in the field-experimental conditions

Returned letters by place dropped

Place where letter is dropped	Returned yes	no	total
Ground	**461**	159	620
Car	402	218	620
OR: **1.6**	863	377	1240

Returned letters by addressees' name

Name of addressee	Returned yes	no	total
Dutch	**443**	177	620
Turkish/Mor.	420	200	620
OR: 1.19	863	377	1240

Table 5: Multilevel binomial regression models, (n = 110 neighborhoods and 1240 letters, coefficient, SE)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant (se)	.810*** (.085)	.823*** (.084)	.857*** (.080)	.867*** (.079)	1.25*** (.125)	.867*** (.078)	1.217*** (.126)
N letters dropped in a given neighborhood	.009 (.014)	-.003 (.013)	-.003 (.013)	-.003 (.013)	-.004 (.014)	-.004 (.014)	-.004 (.014)
Population density	.090 (.089)	.018 (.093)	.-315** (.134)	-.377** (.132)	-.358** (.133)	-.363** (.134)	-.363** (.134)
Rain	-.136 (.090)	-.136 (.089)	-.149 (.089)	-.150 (.088)	-.154 (.089)	-.151 (.087)	-.154 (.089)
Distance to mailbox	-.050 (.067)	-.054 (.067)	-.085 (.067)	-.092 (.067)	-.086 (.067)	-.102 (.068)	-.102 (.068)
Temperature	-.005 (.090)	.007 (.089)	.011 (.086)	.022 (.085)	.031 (.086)	.031 (.085)	.031 (.086)
Wind	.042 (.100)	.040 (.099)	.034 (.099)	.028 (.097)	.039 (.099)	.038 (.097)	.039 (.099)
Shared control expectations	---	.296*** (.088)	----	.286*** (.082)	.305*** (.090)	.308*** (.089)	.308 *** (.090)
% non-Western migrants			-.305** (.103)	-.295** (.101)	-.327** (.108)	-.322** (.107)	-.410*** (.125)
Residential mobility			-.235** (.101)	-.248** (.099)	-.247** (099)	-.243** (.098)	-.247** (.100)
Income: 1st quintile			.225 (.151)	.216 (.149)	.221 (.149)	.224 (.151)	.225 (.151)
Income: 2nd quintile			-.295+ (.152)	-.279+ (.152)	-.280+ (.152)	-.284+ (.154)	-.285+ (.154)
Neighborhood cohesion					-.052 (.103)	-.051 (.101)	-.051 (.103)
Intention to leave					-.062 (.082)	-.061 (.080)	-.062 (.082)
Foreign address						-.186 (.127)	-.285+ (.146)
Windshield wiper						-.475*** (.128)	-.476*** (.128)
Interaction: % non-Western migrants * Turkish surname on address							.162 (.121)
Variance (u_{oi})	.401 (.114)	.372 (.110)	.257 (.096)	.233 (.094)	.223 (.096)	.213 (.093)	.214 (.096)
-2 log likelihood	1561.31	1553.77	1522.82	1514.03	1511.86	1482.97	1481.02
ICC	.108	.101	.072	.066	.063	.060	. 061

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… including formal control..

	M8
Address (1=foreign)	--
Location (1=windshield)	--
Population density	-.120 (0.60)*
Residential mobility	-.247 (120)*
Income (ref_qu3) Qu1	--
Qu2	--
% nonwestern migrants	-.486 (.135)**
Cohesive neighborhood	--
Collective efficacy/shared control norms	**.312 (.100)****
Formal Control	.043 (.073)
Collective efficacy*Formal Control	**-.222 (.080)****
Variance (U_{0j})	.214 (.094)

Note: not the complete model is shown here, some control variables are not on slide

in addition:

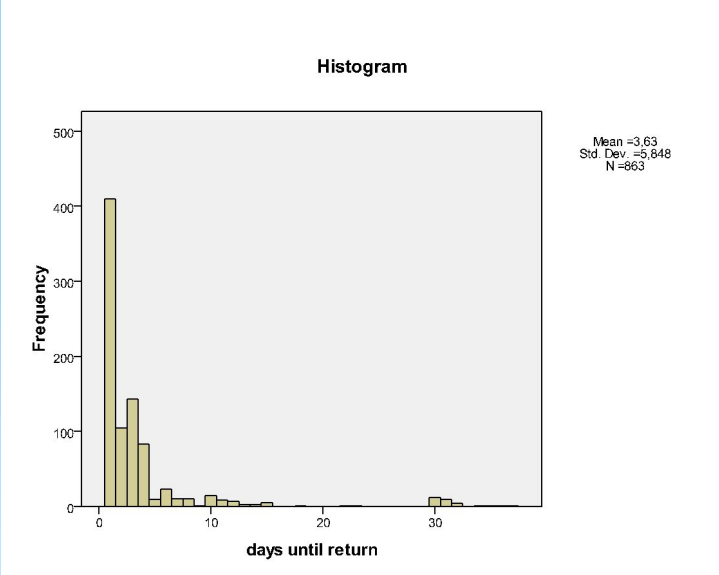
* Formal control most clearly affects feelings of safety, but the effect of informal control/shared norms is even stronger here
* Formal control affects most clearly occurrence of burglaries
* Shared norms influence also degree of littering
* Shared norms matter for helping behavior among neighbors, i.e. the belief that you can knock on your neighbors door in case of need
* Heterogeneity, poverty and residential mobility

Conclusion

- Collective efficacy/shared norms matters for collective good production! … even more than formal control
- Neighborhood cohesion not important for posting letters
- No independent effect of control by the police

Discussion

* Confounding conditions: weather and distance to mailbox is controlled for!



* Also variation in days until return: 1-30! Not fully analyzed, seemingly, collective efficacy does not matter here!

* It is also controlled for numbers of passers by – this influences the odds for a letter to be posted.

Topics and issues,
- afternoon -

1. Theories about urban life and community – on the emergence of social and physical disorder:

collective efficacy

broken windows

2. Does the internet change our social relationships?

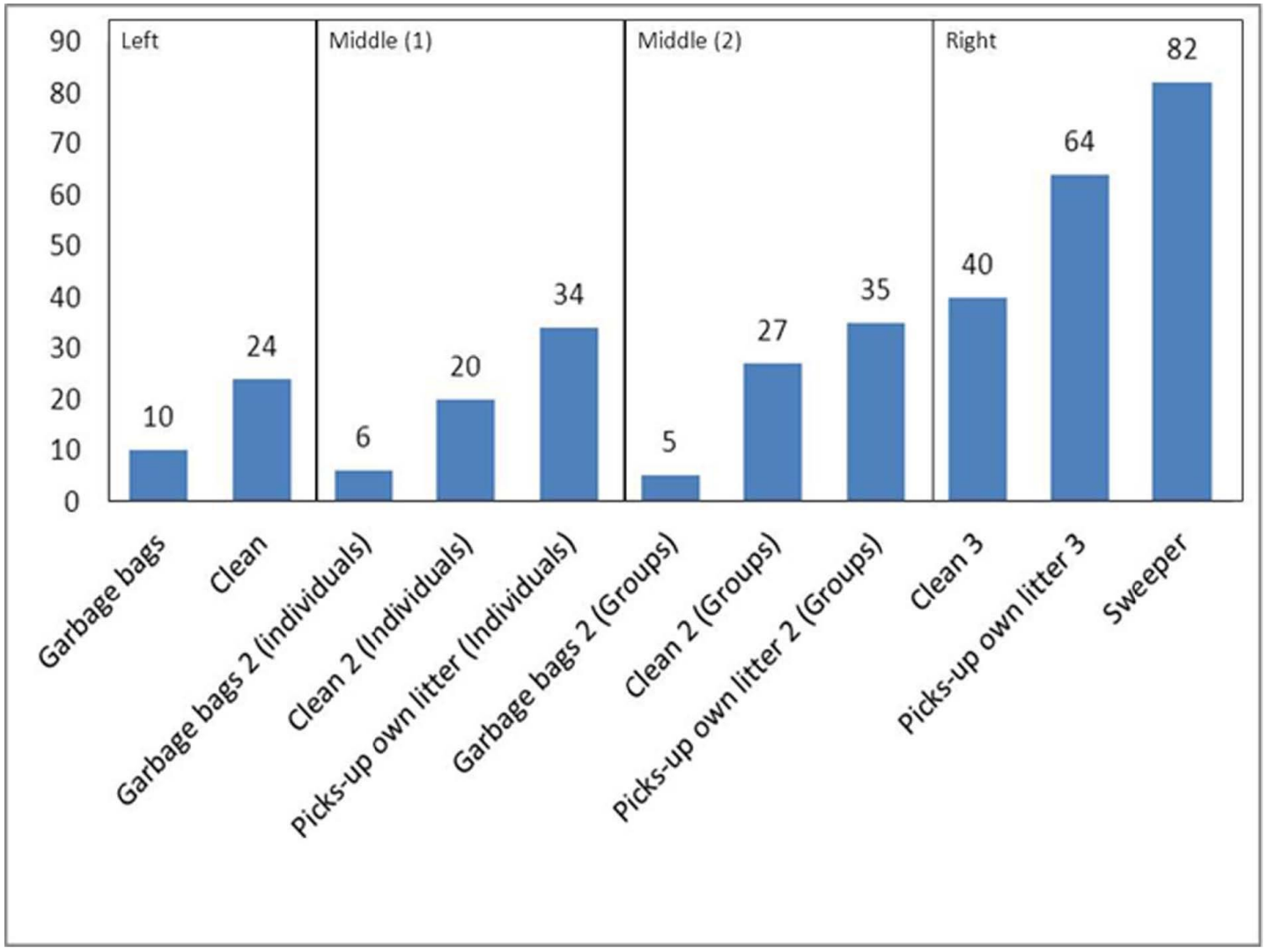
Broken windows theory

* Keizer, Lindenberg & Steg (2008/2013)


postcodes
EURO


Left


Right


90
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Left
Middle (1)
Middle (2)
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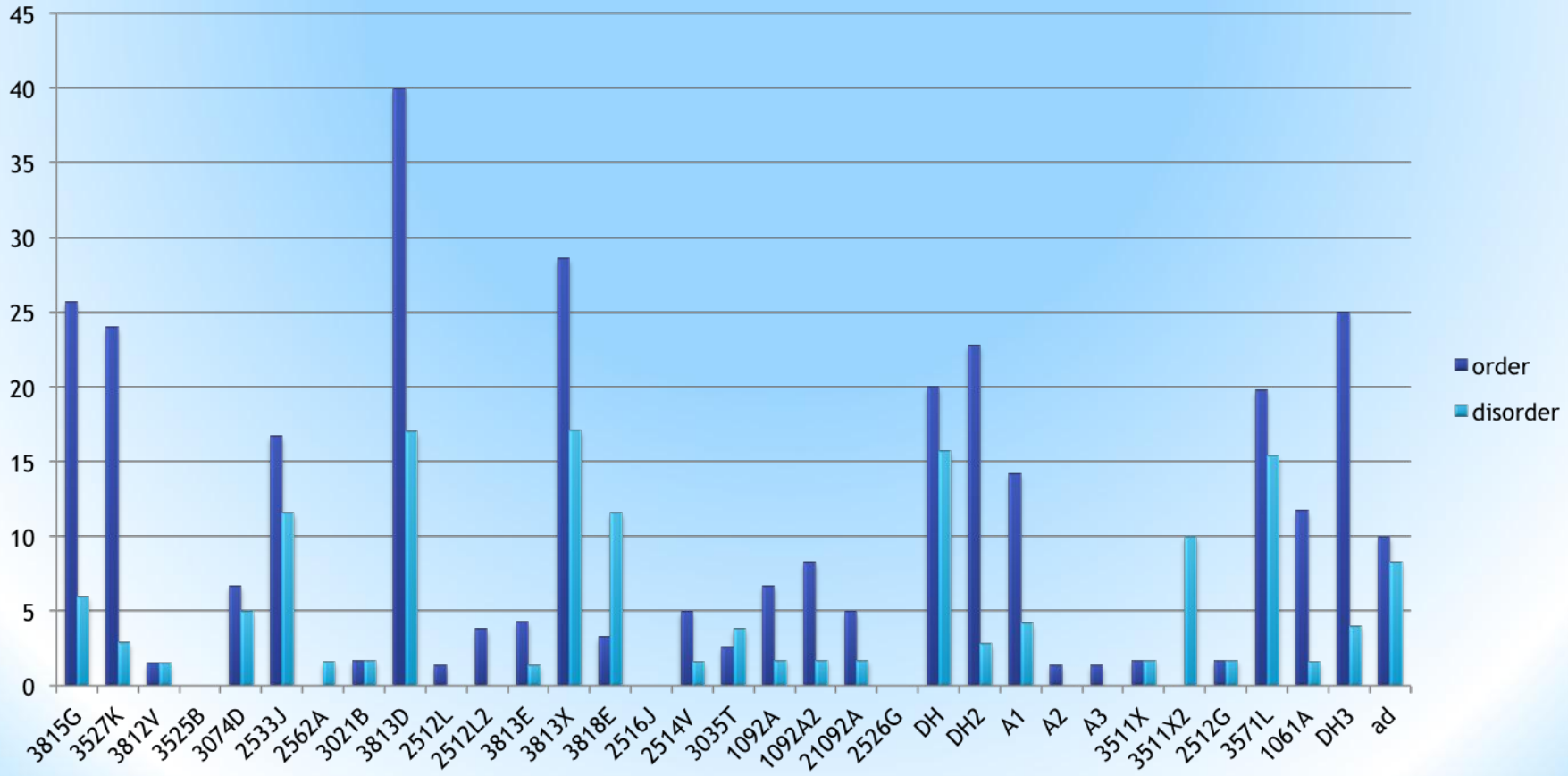
27
35
40
64
82
Garbage bags
Clean
Garbage bags 2 (individuals)
Clean 2 (Individuals)
Picks-up own litter (Individuals)
Garbage bags 2 (Groups)
Clean 2 (Groups)
Picks-up own litter 2 (Groups)
Clean 3
Picks-up own litter 3
Sweeper

Replication

* 28 neighborhoods; appr 4000 observations (70 per condition, at least 2 conditions per experiment)
* Neighborhoods: from SSND

* Plus: replication in Groningen at the very same location
* In addition: respondent characteristics collected


Verboden
rijwielen
te plaatsen
Rijwielen
worden
verwijderd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3527K
3812V
3525B
3074D
2533J
2562A
3021B
3813D
2512L
2512L2
3813E
3813X
3818E
2516J
2514V
3035T
1092A
1092A2
21092A
2526G
DH
DH2
A1
A2
A3
3511X
3511X2
2512G
3571L
1061A
DH3
ad

* Cues have different effects in different places
* The wider environment determines cues effects
* Replication of Keizer et al. (2013) 2 years later was not successful

Topics and issues,
- afternoon -

1. Theories about urban life and community – on the emergence of social and physical disorder:

collective efficacy

broken windows

2**. Does the internet change our social relationships?**

Introduction to online social networks

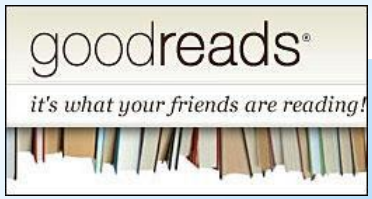
Definition of online social networks

Web-based services that allow individuals to:

- Construct a public or semi-public profile within a bounded system;
- Articulate a list of other users with whom they share a connection;
- View and traverse their list of connections and those made by others within the system.

(Boyd and Ellison, 2007)

Online social networks are everywhere...



Information on online social networks

- Personal information from profiles, including profile pictures
- For each member, a list of friends
- *Status updates*, i.e., general announcements to (a subset of) other members, including pictures
- Reactions to status updates (comments and *likes*)
- Personal communication (member-to-member, private or

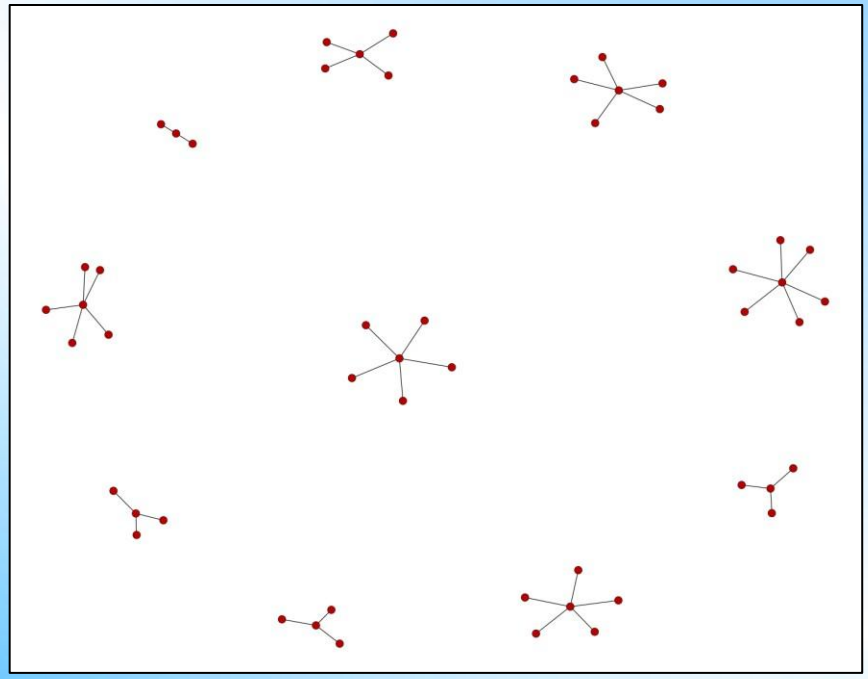
Why study online networks?

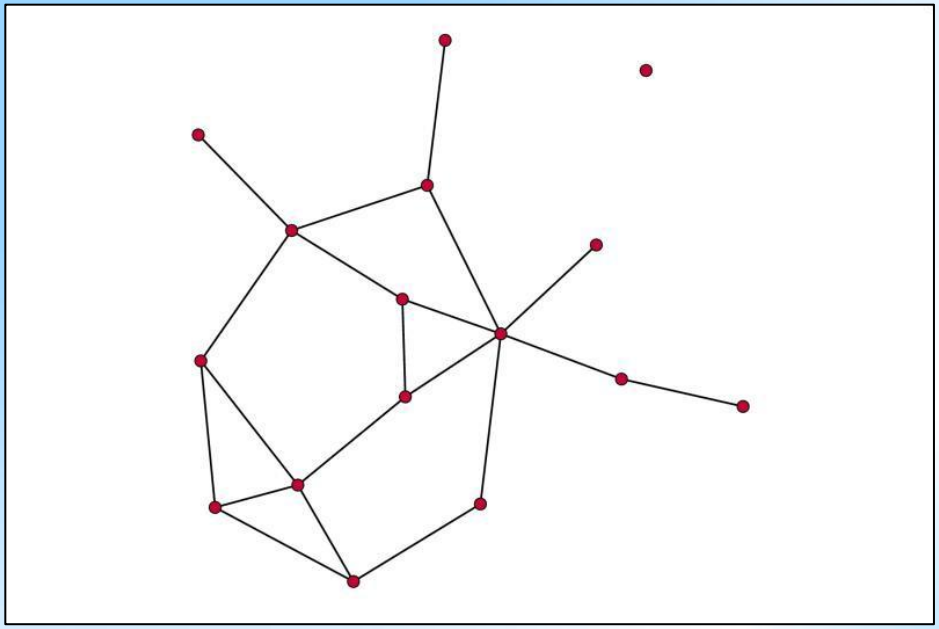
Two types of reasons:

- Methodological
  - study old questions in new ways
- Substantive
  - study *new* questions

Traditional social networks research

Ego-networks





"Sociometric" networks

A globe-spanning network

Online networks vs "traditional" methods

	Ego-networks	Sociometric	Online networks
Large *N*	Yes	No	Yes
Diverse population	Yes	No	Yes
Study structure		Yes	Yes

Other advantages of online networks:

- Oberserve *spontaneous* behavior, instead of via questionaires
- Observe in continuous time (sometimes); no “snapshots”
- No samples (sometimes)
- Data collection can be cheap and quick as compared to traditional survey methods

New questions

Inequality: effects on individual social capital. Positive or negative? Do internet and online social networks reduce or increase inequality?

Social cohesion: effects on community formation. Do communities become more or less diverse? What does this mean for the cohesion of society as a whole?

Rationalization: effects on diffusion of ideas and information. Information via OSNs reaches more people

Questions on different levels

* **Micro level:** How does the internet affect individuals' lives?

* **Macro level:** How does the internet affect the diffusion of information, social movements, inequality, etc?

* Note: macrolevel questions always have microlevel components, and vice versa

Online networks research in practice

example of a microlevel question

Does the internet make us lonely?

'Took all my pills, bye bye': Woman commits suicide on Facebook... and none of her 1,082 online friends help

By DAILY MAIL REPORTER
UPDATED: 03:14 GMT, 6 January 2011

A depressed charity worker killed herself as Facebook users mocked a suicide note she left on the social networking website.

So-called Facebook 'friends' of Simone Back responded with cruel messages after she posted a message that read: 'Took all my pills be dead soon so bye bye every one.'

One user replied calling her a liar who 'overdoses all the time' while another said it was 'her choice'. Miss Back, 42, is thought to have been dying of an overdose as the messages were posted on Christmas Day.

Yesterday Miss Back's mother demanded to know why none of her daughter's 1,082 Facebook friends tried to save her.

Jennifer Langridge, 60, said: 'Nobody told me anything about it until the following day when I was sent a text saying "Get help". I am disabled so can't get up the stairs to Simone's flat so I called the police straight away. It is upsetting to think nobody did anything for my daughter.'

Miss Back's friend, Samantha Owen, said: 'Everyone just carried on arguing with each other on Facebook like it wasn't happening. Some of those people

Simone Black: Some of her so-called online'friends' sent cruel messages after she posted her goodbye message on Facebook

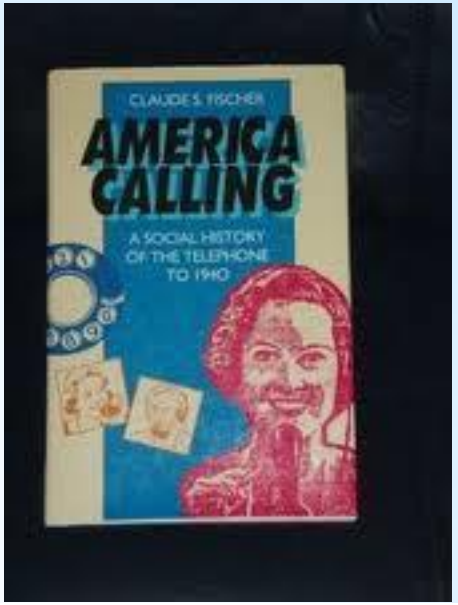
Does the internet make us lonely?

Framework of the discussion:

- Consequences of rationalization for
  - Social Cohesion
  - Social Inequality
- Debate is important but very old

Claude Fischer (1992)

America calling: A social history of the telephone to 1940



Loneliness on facebook?

Facebook shows what others are doing:

-Also that they have fun without you….

-You see that your friends have many friends…

Classical study by Kraut et al.

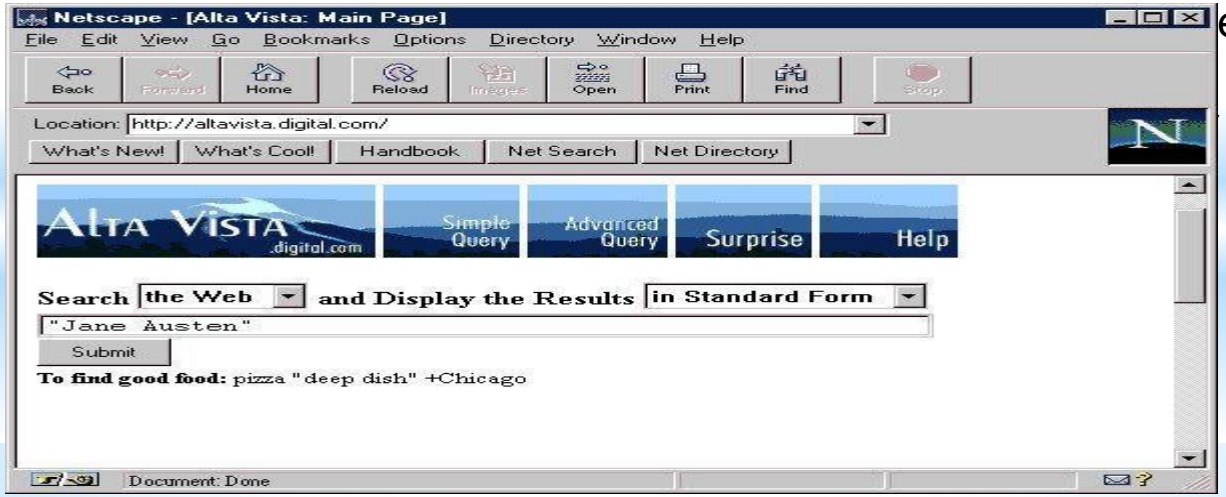
Kraut et al. (1998) "Internet paradox: A social technology that reduces social involvement and psychological well-being?" *American Psychologist.*

- Does Internet usage affect our well-being?
- Does Internet usage affect our social lives?

Real-life experiment (1995 & 1996): 169 persons in 73 households

“Families received a computer and software, a free telephone line, and free access to the Internet in exchange for permitting the researchers to automatically track their Internet usage and services, for answering periodic questionnaires, and for agreeing to an in-home interview.

The families used Carnegie Mellon University's proprietary software for electronic mail, MacMail II, Netscape Navigator 2 or 3 for web



embers also

electronic

Results:

- Increase in depression and loneliness
- Decline in communication with friends and family
- Smaller social networks

- "displacement hypothesis": internet usage replaces social activities, and replaces strong ties with weak ties

Kraut et al. (2002): the sequel

- Follow-up to the original sample
- New sample with control group
- Negative effect has dissapeared!
- Internet usage associated with *higher* wellbeing and *more* social involvement

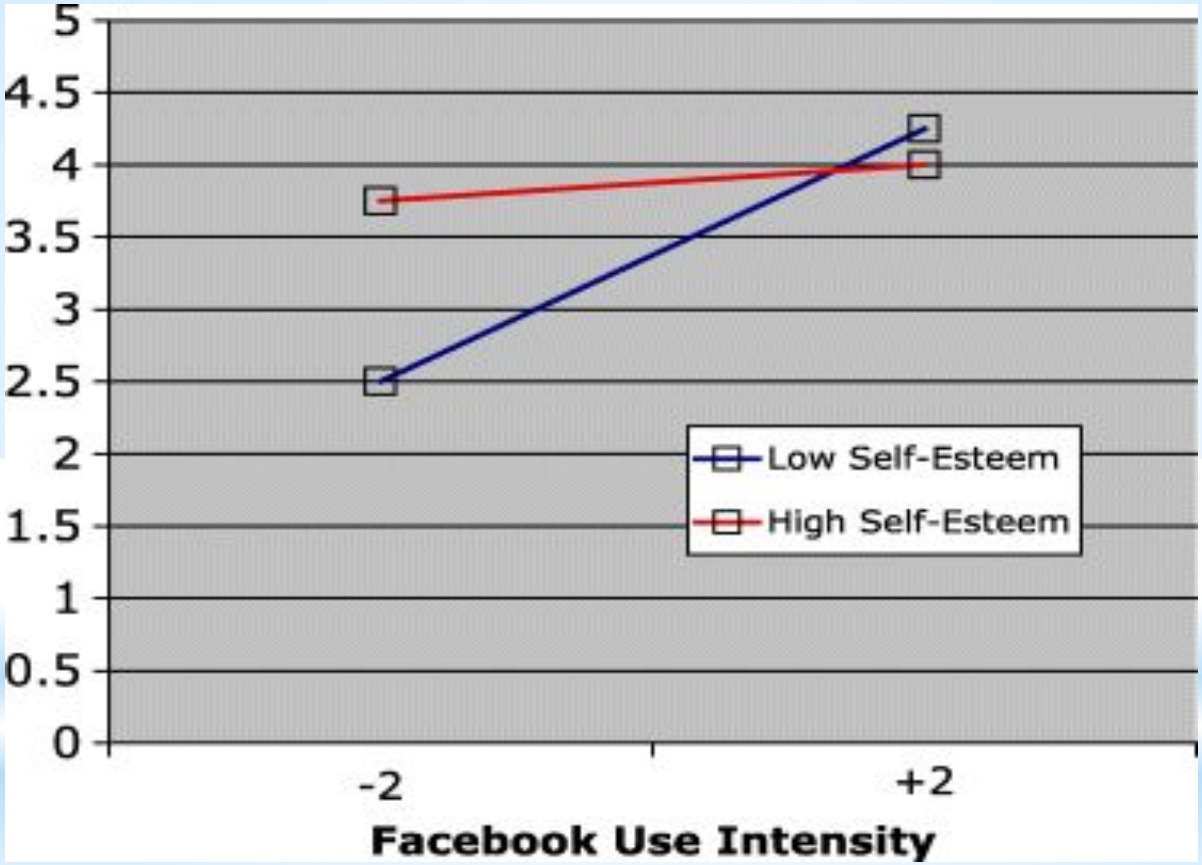
More evidence for a lack of a negative effect: Franzen (2000)

- Survey among 15842(!) respondents + control group
- No effect of internet usage on networks
- Positive effect of e-mail usage

Facebook and social capital: Ellison et al (2007): The Benefits of Facebook "Friends:"

- Sample of 286 students
- Measures of Facebook usage, bonding and bridging social capital, psychological wellbeing
- Results: Facebook usage positively

But: effect depends on psychological wellbeing



Recent meta-analysis over question on causality:

Song et al. (2014) Does Facebook make us lonely? – A metaanalysis. *Computers in Human Behavior, 36:446-452*

Result:

association between loneliness and facebook use

However:

in particular those who need support and feel lonely use facebook!

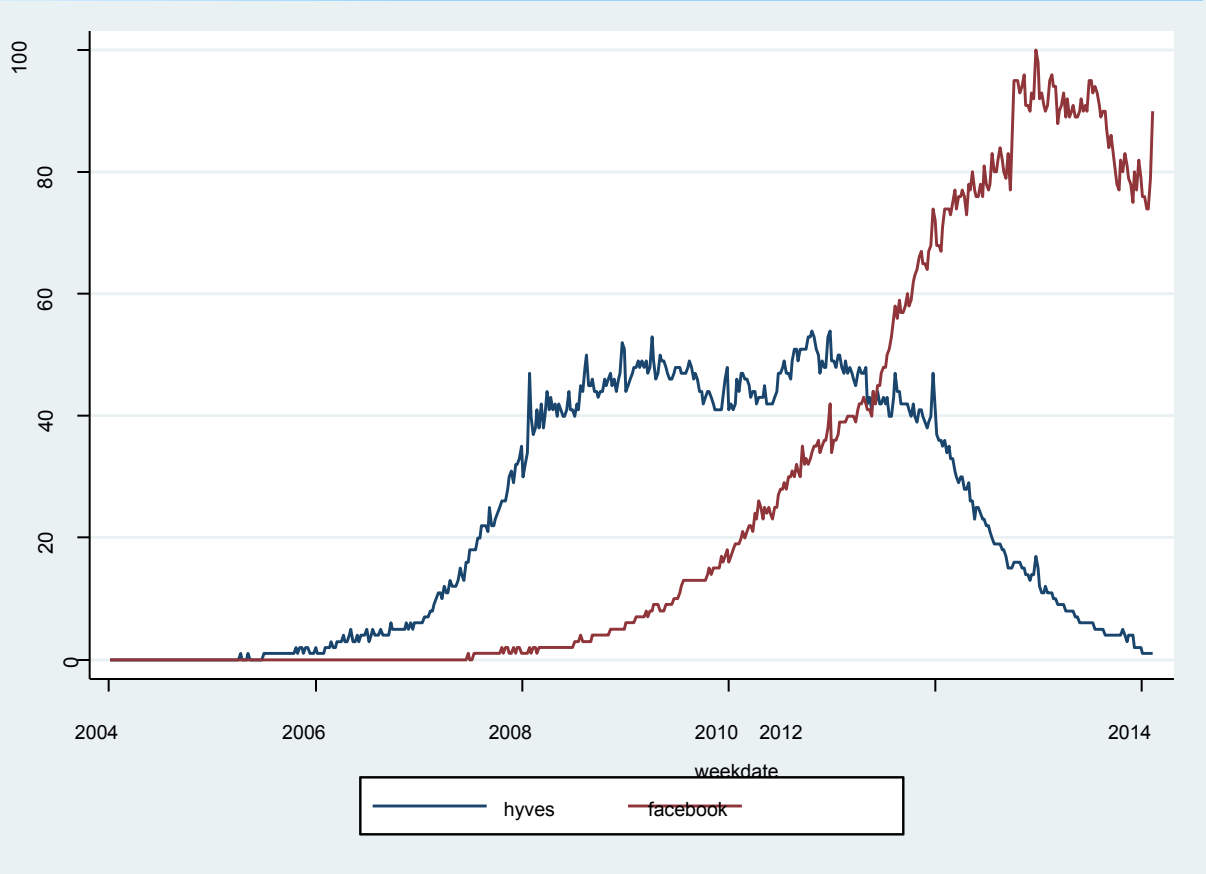
So, does internet make us lonely?

- Debate on internet and loneliness echoes old debates about technology and society
- Internet effects as a "moving target"
- Importance of continued research
- Much research based on small samples and traditional research methods (surveys)

Example of large online networks research: Hyves

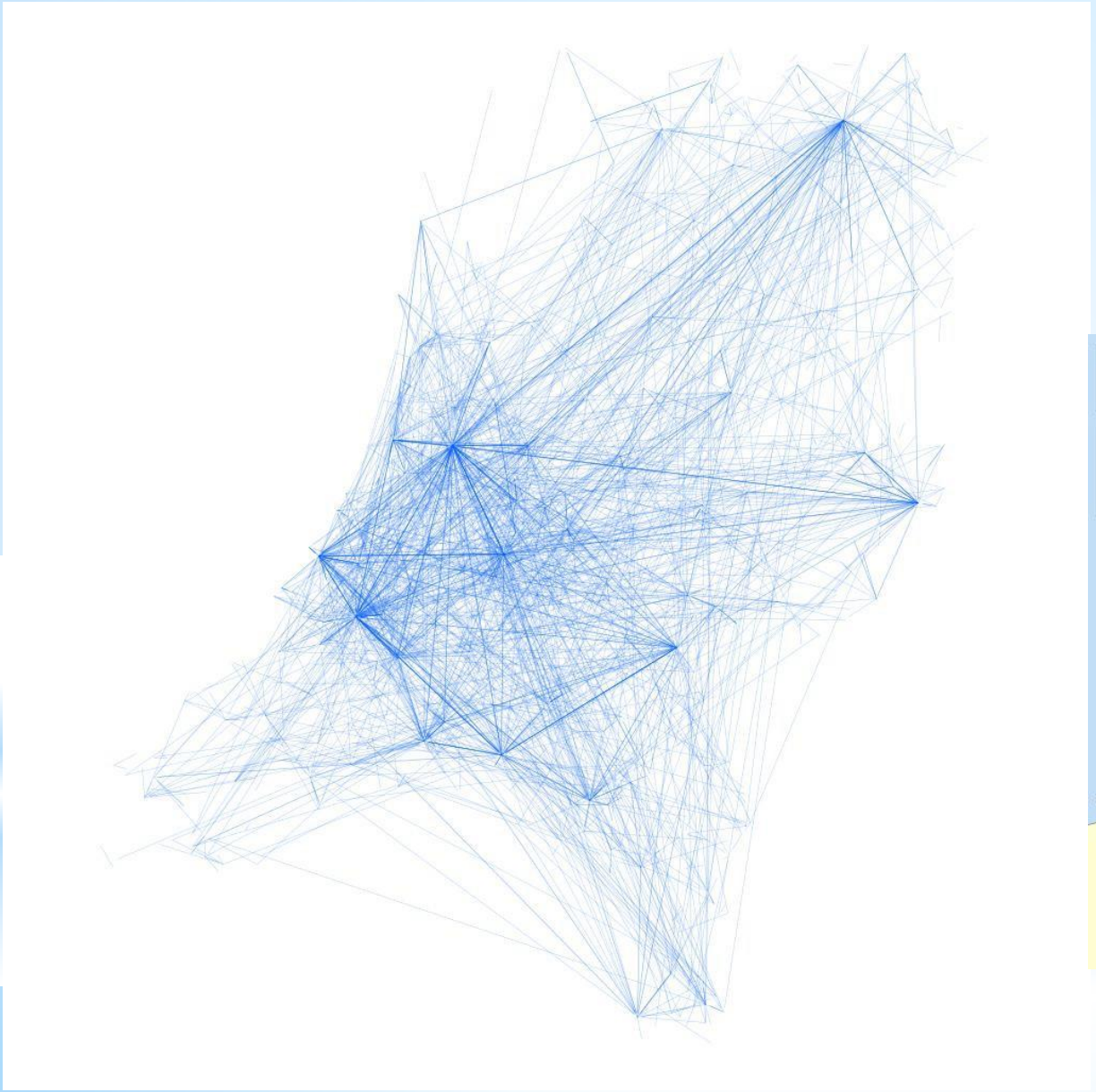
- Hyves: Facebook-like Dutch online network platform. Highly popular until +/- 2010, now outcompeted by Facebook
- Data collection: access via service provider (Hyves.nl), in 2010
- Data:
  - Snapshot of the network, *N≈ 10,000,000*
  - All (anonymous) individual profiles and "friendship"

Hyves vs Facebook: trends in Google search volume



Source: http://www.google.com/trends/ explore

The online social structure of the Netherlands, visualized



Source: Corten & Völker, in preparation

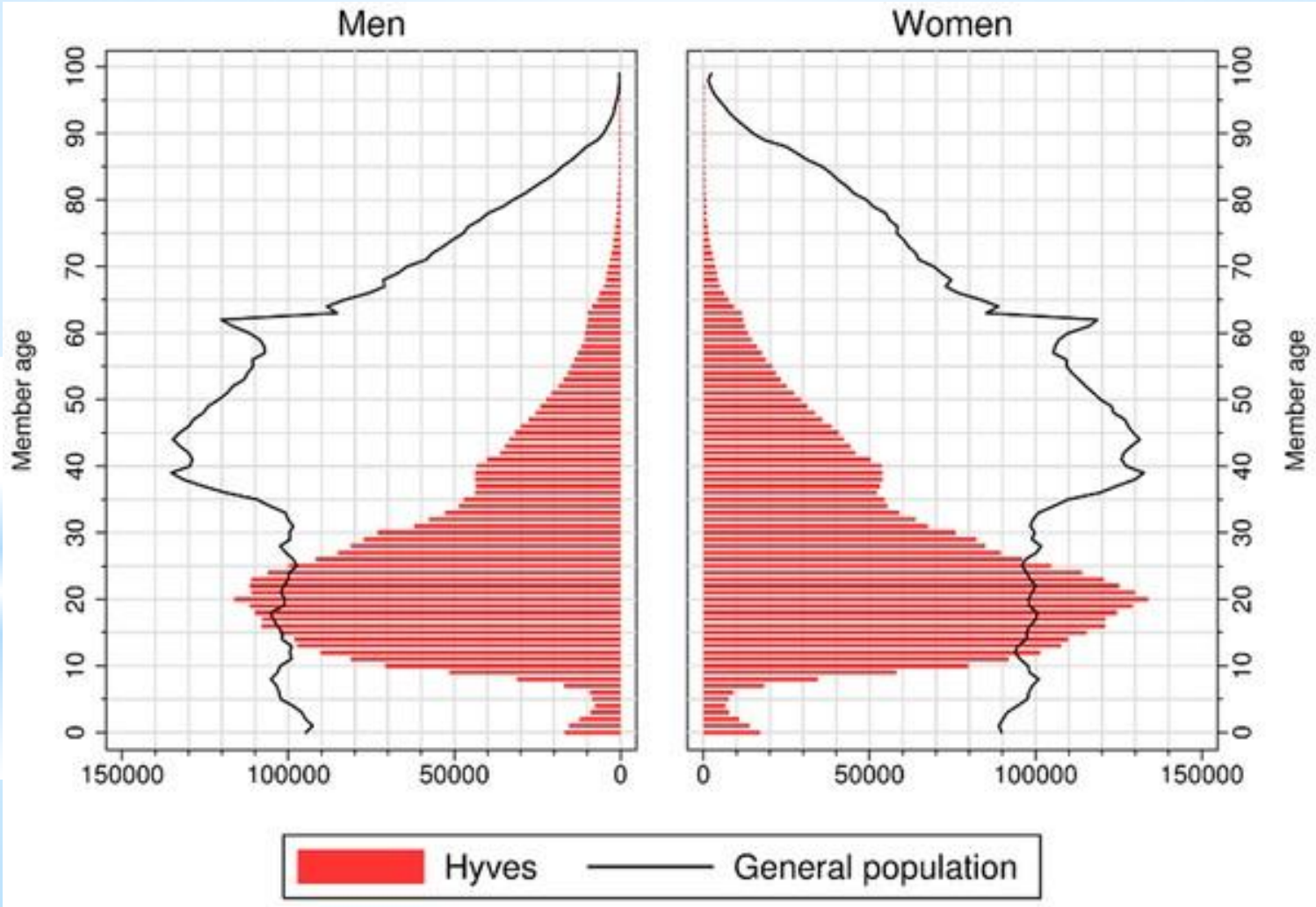
Descriptive statistics on Hyves

Variable	Valid N	Mean	Std. dev.
Degree	10431075	82.09	135.23
Degree >0	8047530	106.40	145.32
Age	8806651	27.12	14.55
Male	9370671	0.49	–
Lives in NL	674	0.86	0.01

"Valid N" differs between variables because not all members provide complete information. "Male" and "Lives in NL" are binary variables with $0=$"no" and $1=$"yes." The mean of "Lives in NL" is estimated from a hand-coded sample, with the standard error of the estimate reported in the column "Std. dev.".

doi:10.1371/journal.pone.0034760.t001

Is Hyves "representative"?



Is Hyves a "small world"?

- **Small world = high clustering + small distances**
- **The clustering coefficient:**
  - What is the probability that two of your friends are friends of each other?
  - Clustering = 0: none of your friends are friends.
  - Clustering = 1: all of your friends are friends.
- **Effective diameter: maximum number of steps by which 95% of all pairs can be connected**

Is Hyves a "small world"?

Fitted r	4.72
Number of components >1	10162
% nodes in largest component	99.6
Average clustering	0.18
Effective diameter	7.26
Degree assortativity	0.30

Small world!

doi:10.1371/journal.pone.0034760.t002

Table 2: Structural properties of the Hyves network

Some conclusions on Hyves

Hyves is not representative, but almost the entire young population of the Netherlands is (was) covered

Hyves is a small world. Information will spread quickly!

Hyves and Facebook have similar structures. Are the same mechanisms driving the evolution of the network?

Focus=local!

Ways to collect online network data

- Public download (Twitter!)
- Surveys
- Automated web “scraping”
- Download profiles from a fixed population
- Arrange direct access to data via service

Problems in online networks research

- Most data are the property of large companies
- Collecting and analyzing extremely large datasets is difficult. Social scientists need to learn some skills from computer science.
- Ethical problems of collecting data. Is it OK to use "public" data for research? Is it OK to use anonymized private data for research?
- Online social networks are a "moving target" (case in point: Hyves)
- Online data sometimes hard to interpret. Do participants provide

Concluding remarks

Prediction: within 10 years, the majority of empirical sociology will be using data on online behavior

Sociologists need to develop new skills. Every research-oriented student should learn how to program

We know very little about the mechanisms behind large online networks. Lots of open research questions!

Network studies will stay!

THANKS!!!!

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