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Surveying data on connected personal networks

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Why Social Network Analysis in transport planning?

Leisure is an important travel segment

Leisure travel is mostly done to join others in leisure activities

→ Social contacts have influence on individual leisure behavior

Trip purpose	Switzerland	Germany	UK	US
Leisure	51.5	35.0	26.1	42.9
Work / school	28.9	18.2	24.8	22.6
Shopping / private business	13.3	34.8	31.2	22.6
Escorting others	1.0	6.4	13.6	10.1
Others	5.4	5.6	4.3	1.7

Source: Own calculations from BFS/ARE (2007); Deutsches Institut für Wirtschaftsforschung (2003); DfT (2006); U.S. Department of Transportation (2004)

Surveying personal networks: Survey instrument

- Ego's characteristics
- Name generator
 - Leisure contacts
 - Emotionally important contacts
- Name interpreter
- Sociogram

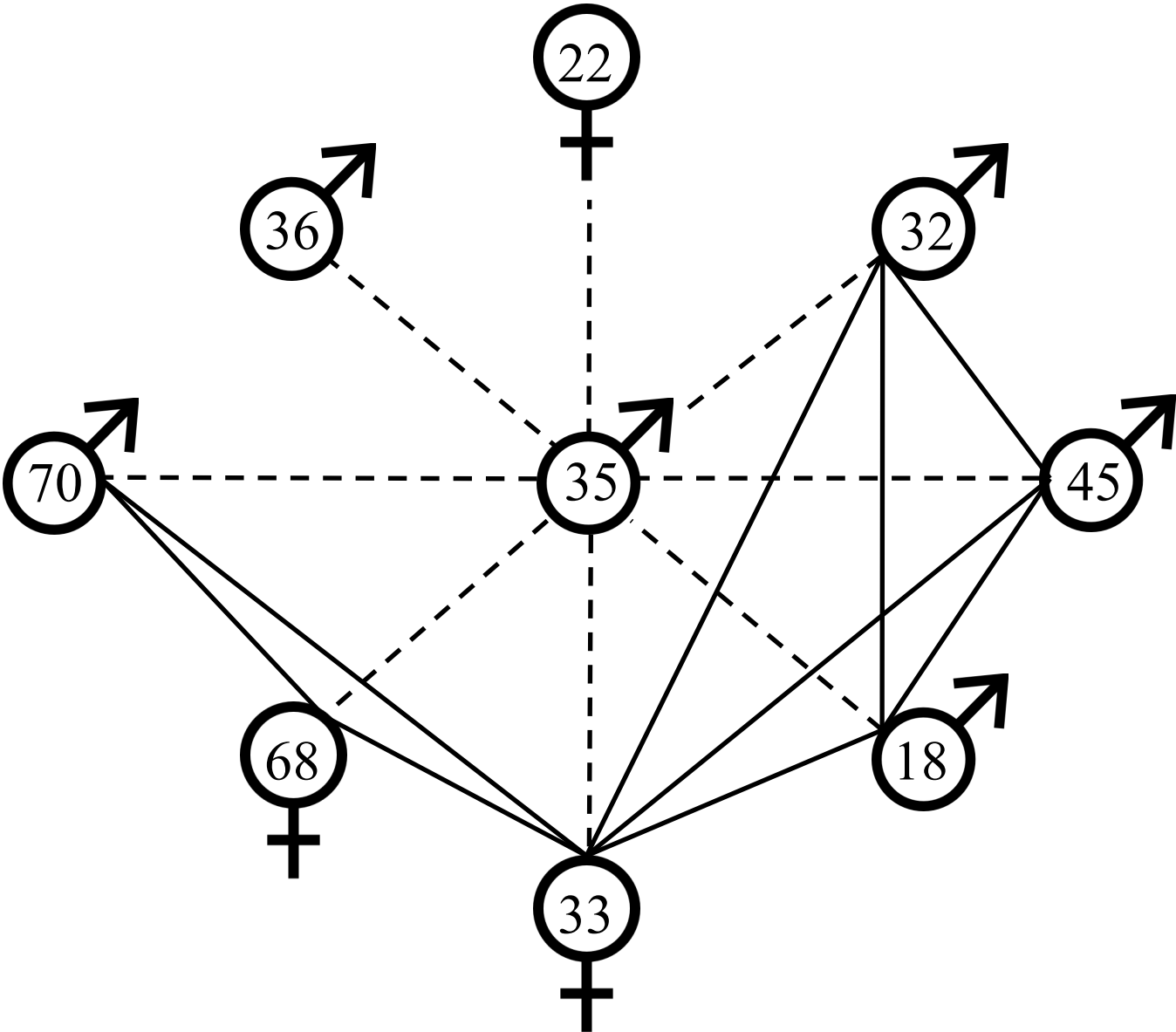
Surveying personal networks: Name generator

Please list the people with whom you make plans to spend free time. (Examples: errands, sports, club or organized activities, cultural events, cooking together or going out to eat, taking holidays or excursions together)

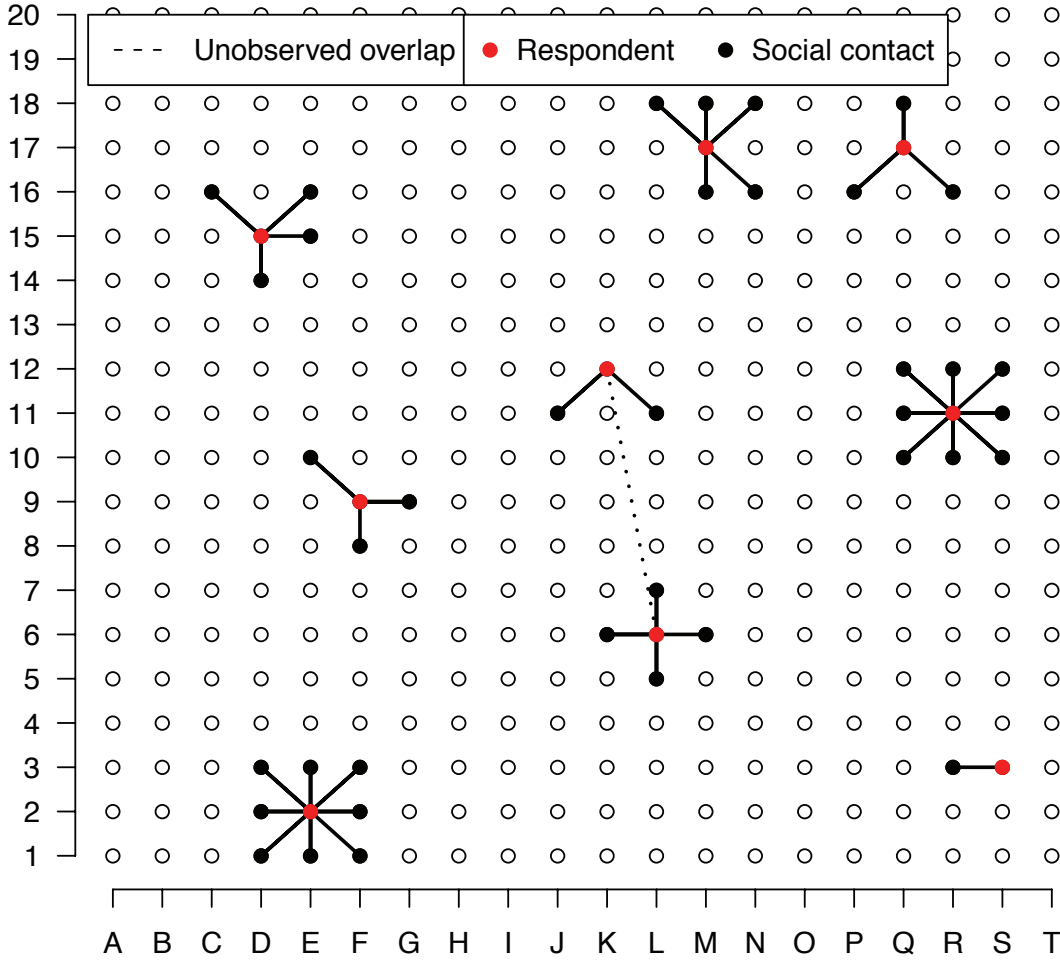
No.	Name	No.	Name	No.	Name
<i>e.g.</i>	<i>John Q. Public</i>	3		11	
1		4		12	
2		5		13	
3		6		14	
4		7		15	
5		8		16	
6		9		17	
7		10		18	

If there are other people with whom you discuss important problems, please list them here.

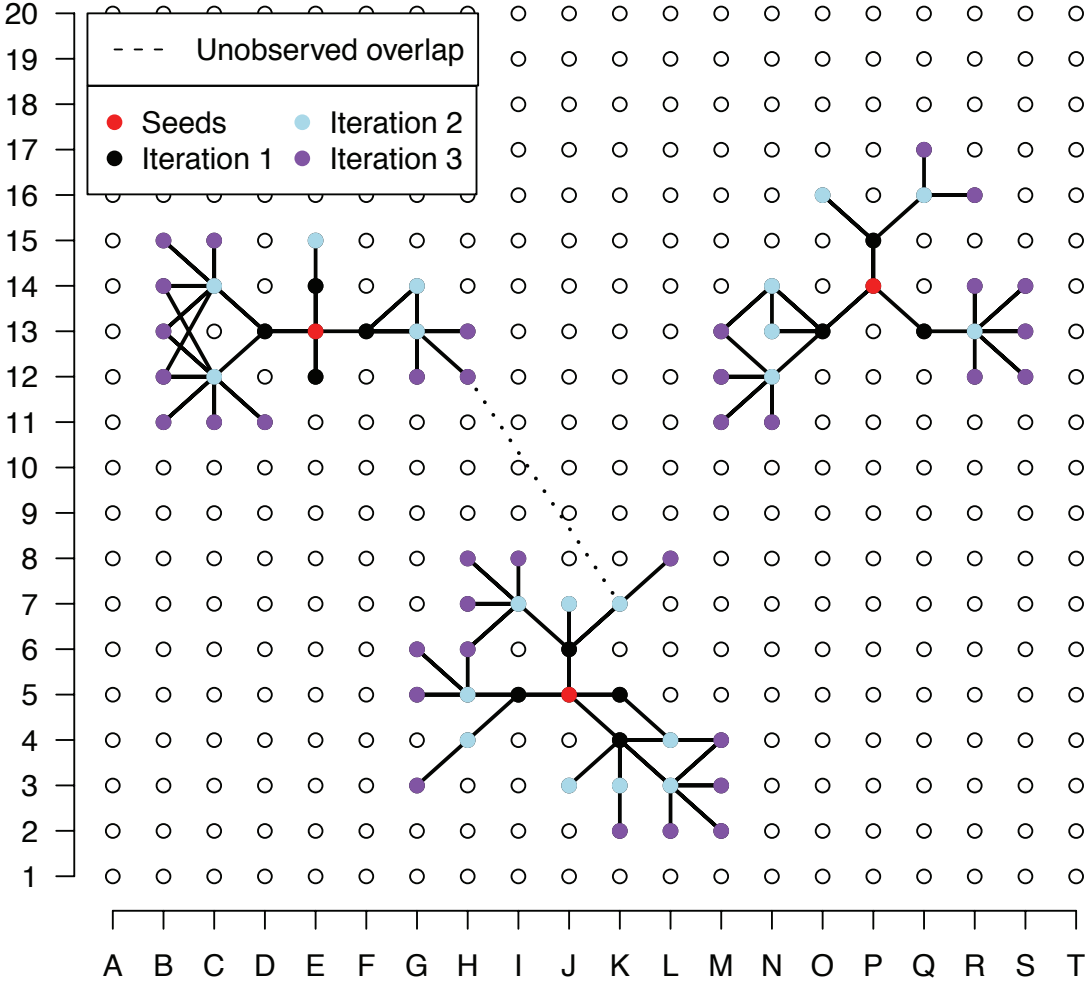
Surveying personal networks: Network structure



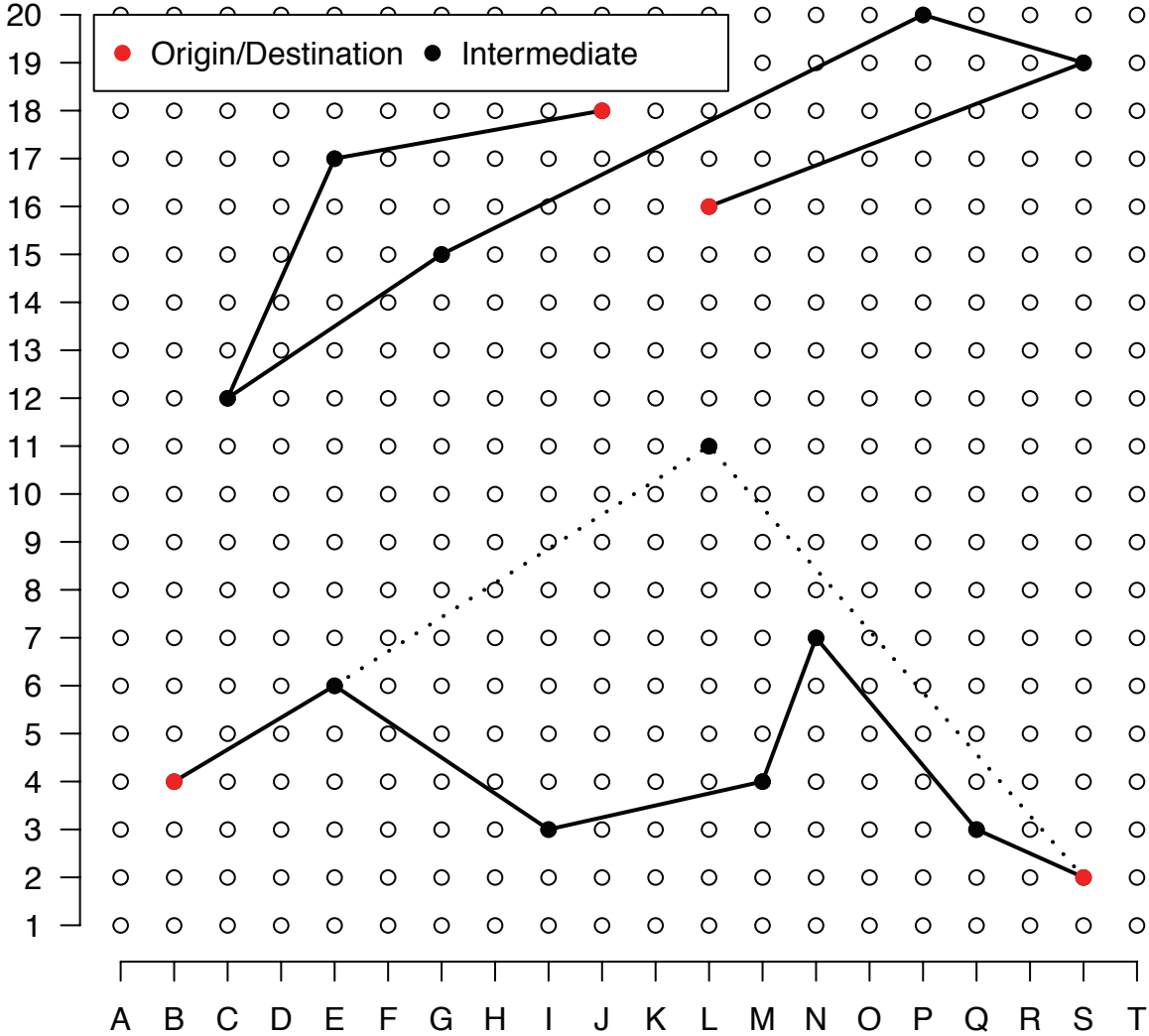
Surveying personal networks: Problems



Surveying connected personal networks



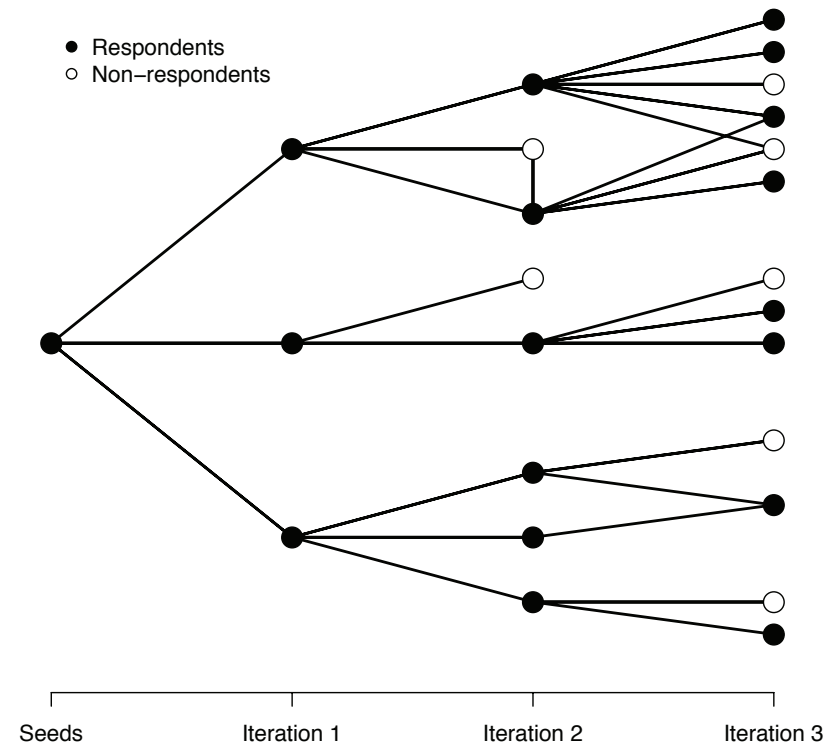
Surveying connected personal networks



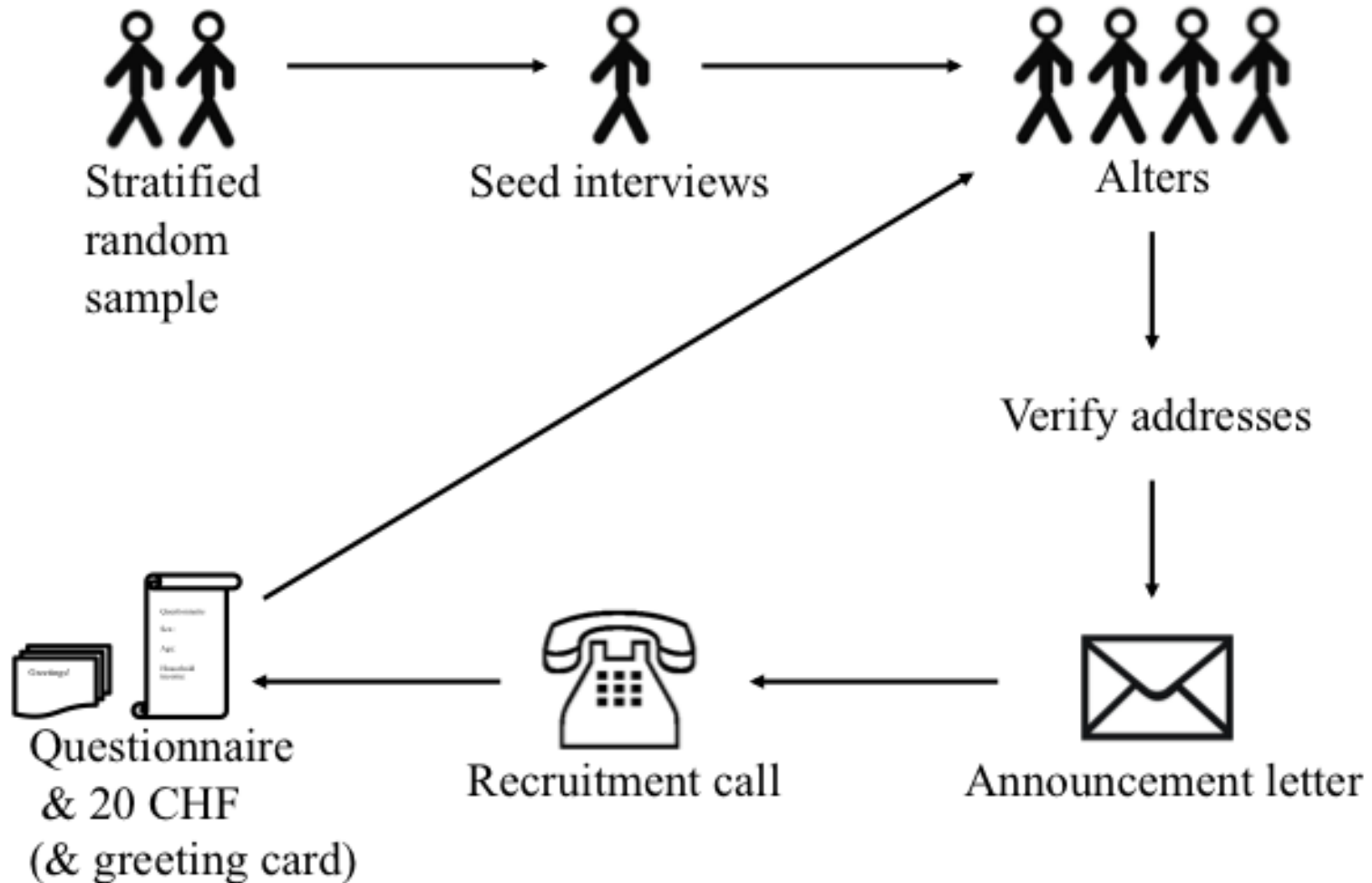
Surveying connected personal networks

Challenges:

- Represent a target population's characteristics
- Avoid selection bias
- React to homogenous clusters
- Correct the overrepresentation of 'socializers' and underrepresentation of 'isolates'



Snowball sample: Survey protocol



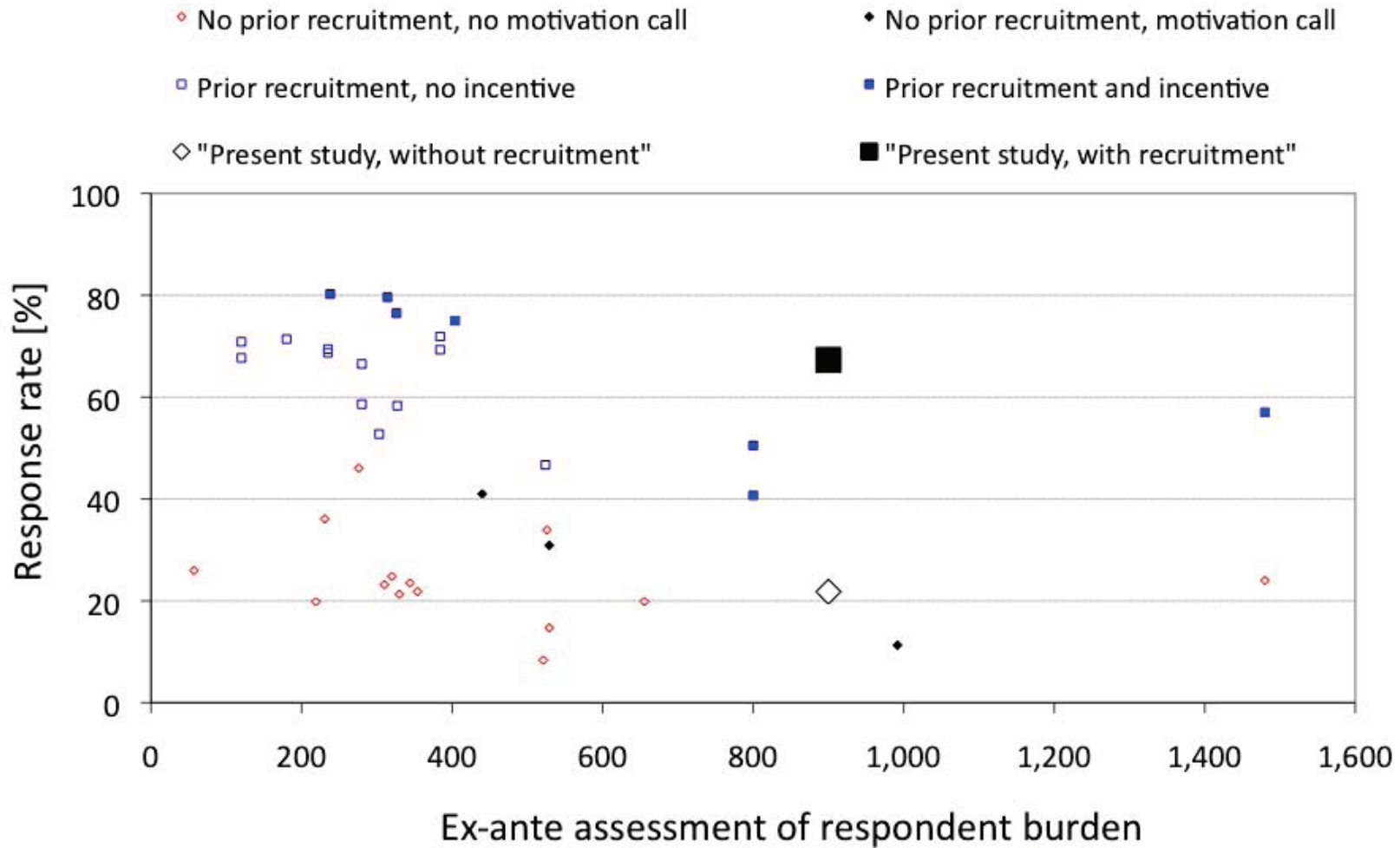
Consecutive sub-samples to balance homophily bias

Age in sample and target population

Age categories	Egos Sub-sample 1		Egos Sub-sample 2		All alters		Microcensus
	%	Ø	%	Ø	%	Ø	Ø
	obs.	age	obs.	age	obs.	age	age
0 - 20	0.9	18.0	0.4	19.5	3.0	14.8	13.3
21 - 40	17.9	33.4	17.6	32.3	22.0	32.5	31.4
41 - 60	35.4	49.8	63.1	49.6	49.8	49.6	49.9
61 - 80	42.4	68.9	17.8	66.8	22.8	68.1	69.4
81 +	3.5	82.3	1.1	83.0	2.4	84.4	84.6

Source: Microcensus data taken from ARE/BfS, (2007)

Multi-contact strategy and response rate



Multi-contact strategy and response rate

Logistic regression model on participation [yes/no]

Coefficients	Estimate	Std. error	p-value
Intercept	-1.246	0.134	< 0.001
Full multi contact strategy [yes/no]	2.004	0.151	< 0.001
Postcard [yes/no]	0.345	0.162	0.033
Null deviance	1643.9		
Residual deviance	1424.5		df = 1201

Incentive strategy

Incentive and response behaviour

	Respondents	Nonrespondents	Marginal frequencies
Incentive kept	666	362	1028
Incentive returned	61	178	239
Marginal frequencies	727	540	n=1267
Chi ² independence test		120.6	p-value: < 0.001

Incentive strategy

Logistic regression model on returning the incentive

Coefficients	Estimate	Std. error	p-value
Intercept	-1.758	0.348	< 0.001
Participation [yes/no]	-1.888	0.179	< 0.001
Postcard [yes/no]	-0.427	0.214	0.046
Full multi contact strategy [yes/no]	0.617	0.183	< 0.001
Age	0.016	0.007	0.013
Null deviance	1178.0		
Residual deviance	1040.0		df = 1194

Conclusion

The survey used:

- Snowball sampling with only few restrictions (leisure contacts)
- Measures to decrease bias (with surprising results)

It resulted in:

- Information on personal and connected personal network structure

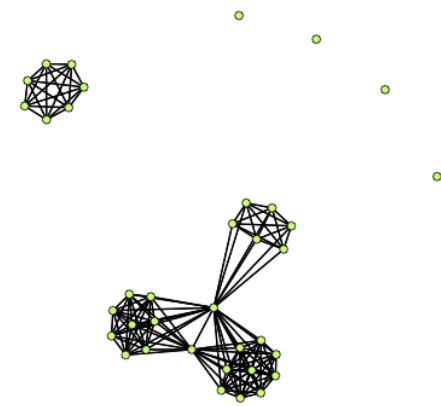
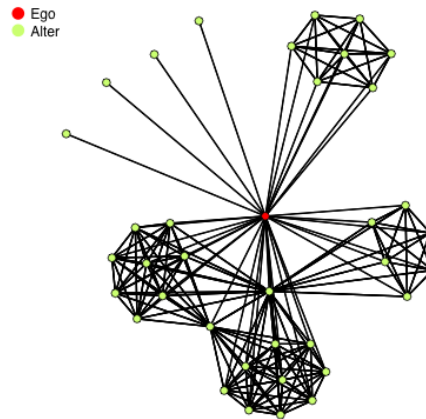
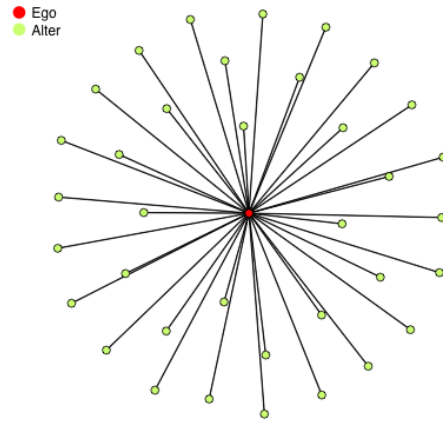
Open questions:

- Are there still shortcuts in the network?
- How many ties were unmentioned?
- Influence from multi-relational ties

Fit between sample and target population

		All Egos (n = 789)	All Alters (n = 15515)	Microcensus Switzerland	
[%]	Sex				
	- Male	38.2	42.0	48.7	
	- Female	61.8	58.0	51.3	
[%]	Civil status	- Single	13.5	22.2	29.9
		- Married	70.7	64.1	54.5
		- Divorced	9.2	8.1	7.6
		- Widowed	5.3	4.5	6.6
		- Living seperately	1.3	1.1	1.4
[Ø years/category]	Age	0 - 20	-	14.8	13.3
		21 - 40	32.7	32.5	31.4
		41 - 60	49.7	49.6	49.9
		61 - 80	67.9	68.1	69.4
		81+	82.6	84.4	84.6

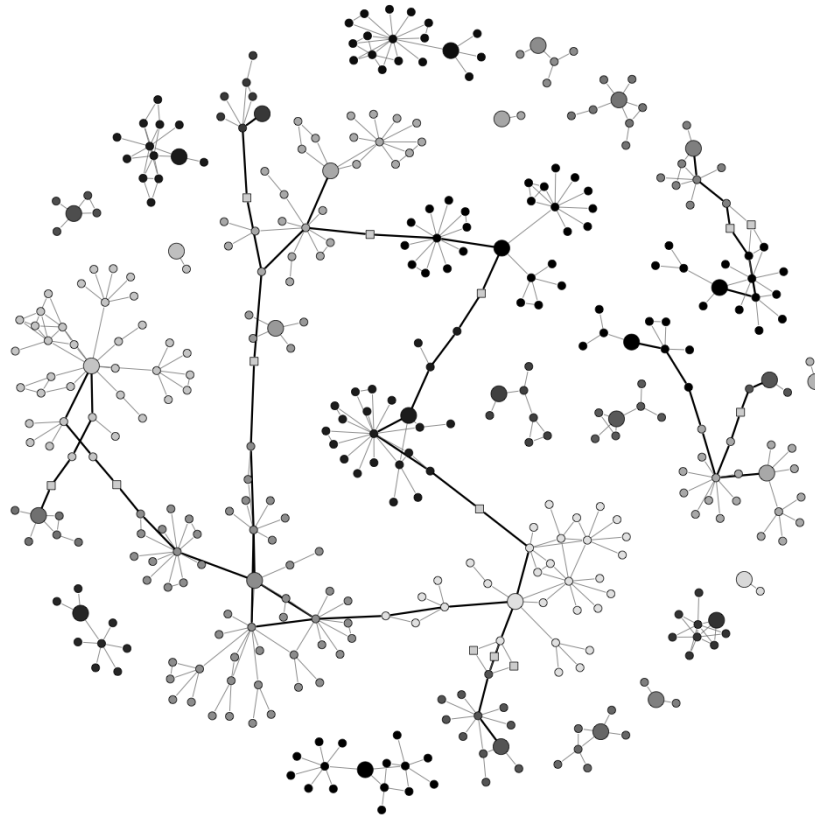
Descriptive statistics: Personal networks



(N = 635)	Mean	Median	St.-Dev.	Range
Number of alters	21.2	20.0	10.4	38.0
Number of relations	38.7	19.0	55.7	378.0
Isolates	8.7	7.0	8.0	40.0
Cliques	3.3	3.0	2.8	20.0
Components (without isolates)	2.6	2.0	1.4	8.0

Descriptive statistics: The connected 'snowball'-graph

- Seed
- Ego
- Bridging alter



	Vertices	Edges	Density	Components	Transitivity
Without sociogram	7342	8242	0.00	26	0.02
With sociogram	7342	39212	0.00	26	0.54
