Effects of Limitation of Number of Alters and Time Frame in the Burt Name Generator

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Abstract

Social networks can be operationalized as potential and actual sources of social support. Comparing cross-sectional data sets from various points in time allows us to compare overall characteristics of social support networks and their changes over time in the population. However, the measurement instruments should be identical or at least very similar. The Burt name generator (1984) for assessing discussion networks of Slovenians was applied in the 1987 and 2002 surveys. Data were collected on representative samples of adult residents of Slovenia. Owing to the complexity of the personal network questionnaire, the number of alters was limited to 5 in the 1987 survey, whereas there was no upper limit in the 2002 survey. There was also a difference in question wording. In the paper these two surveys are compared with regard to network composition and structure. Special attention is given to the effects of limiting the number of alters, question wording and network size on statistical estimates of network composition and structure.

1   Introduction

In measuring ego-centered social networks, several steps have to be taken. Apart from a list of egos, i.e., respondents, existing ties have to be identified - all alters with whom the focal ego has some sort of relationship. When all ties have been identified, the contents of ties have to be evaluated, such as type of support exchange. Secondly, the characteristics of ties such as strength, reciprocity and multiplexity have to be assessed. In most cases the characteristics of the alters are also measured. Identification of the alters is done by network (name) generators. A network generator is a question for eliciting the names of the alters of an ego's support network. Generally, four distinctive criteria for inclusion of alters - i.e.,

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support providers - can be used in network generators (van der Poel, 1993). Interaction, role-relation, and the affective, and exchange approaches are used to identify support providers.

The affective approach uses the subjective value that a given relationship holds for a respondent, such as closeness, intimacy, or importance (van der Poel, 1993). The affective approach was proposed by Kahn and Antonucci (1980) where the criterion of closeness is used to distinguish three social support convoys. Along the dimension of closeness, the characteristics of social support providers change with respect to closeness, composition, and duration. The closest are spouse, close family, and friends. Ties with these people are not likely to be short term. The second convoy represents role-related ties such as those with the extended family and other relatives, friends, co-workers, and neighbors. The importance of these ties is more likely to change over time. The broadest circle represents the most distant ties with neighbors, co-workers, distant family, professionals, and supervisors. The connections with these people are most likely to be role-dependent and short term. A similar network generator was proposed by Burt (1984), one which elicits the names of persons with whom respondents discussed important personal matters over the previous 6 months. Although the primary criterion is interaction, the subjective decision to select important personal discussion topics actually makes this network generator affective in terms of the characteristics of elicited network members.

The network affective generator that elicits people with whom respondents discuss important matters was first used in American General Social Surveys (GSS) and focuses on emotionally close and important ties (Burt, 1984). The persons who are discussion partners are most likely friends, relatives, and co-workers who are especially close to respondents. Discussion partners show a high degree of homogeneity with regard to sex, age, religion, and ethnicity (Burt, 1984; Marsden, 1988). The network range[3] is the most diverse among young, highly educated respondents with metropolitan residence. Women tend to report more kin than men do (Marsden, 1987). The connection between respondents and their cited alters is strongest for the first cited persons, followed by the second and the third. After the third cited person there is a turning point (Burt, 1986). The first cited person is most likely to be the spouse. Among other cited persons, alters of the same sex tend to be cited before opposite-sex discussion partners. In general cited alters follow decreasing order with regard to closeness and frequency of contact, except for co-workers, who are contacted on a daily basis (Burt, 1986). Composition of these discussion networks tends to change over a life-span (Burt, 1991).

The aim of the larger study, of which this paper forms a part, is to evaluate the changes in structure and composition of social support networks of residents of

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[3] Network range refers to characteristics of networks such as size and complexity, density and diversity (Campbell et al., 1986).

Slovenia over time and to establish whether and to what extent the change in the social, political and economic systems has played a part in those changes. One part of the study is to analyze the existing secondary data on social networks, collected in 1987 and 2002, that is, before and after the change of the system at the beginning of the 90s. However, those data were collected with different substantive purposes and with a different methodology. In the 1987 study, the original Burt name generator was used (6 month time frame; actual discussion partners; information about alters was collected only for the first five reported alters), but in the 2002 survey the Burt name generator was somewhat changed (no time frame; the usual discussion partners; data about alters was collected for all named alters).

Bailey and Marsden (1999) used qualitative methods to study the effect of the context of the questionnaire on response patterns to the Burt name generator. They found that varying the content of the preceding questions (politics and family) significantly affects the interpretation of "important matters", but not the network composition. This possible effect cannot be tested with our data. However, despite the fact that in the 1987 study the Burt network generator followed a series of questions on political participation, while it followed a material support network generator in the 2002 study, we believe that context may have had some effect on the interpretation of "important matters", but not on the network composition.

Studies have shown (e.g. Sudman and Bradburn, 1982) that time range can significantly affect respondents' accuracy in reporting events. Usually (except for rare and/or very distinct events) it shows that the greater the time range in the question the more difficult it is for the respondent to provide an accurate response. Since in the Burt name generator the respondent is asked about a frequent activity, the form of the question with the time limit is less appropriate. Also, if the respondent has a relatively uneventful life, the six-month time range is too broad. Such a long time range is appropriate in the case of asking about important, outstanding events. In 2002 a hypothetical version of this name generator was used (usual discussion partners).

Comparisons of survey data about respondents' actual interactions and interactions as reported by the respondents showed that individuals are biased toward reporting long-term, stable interactions – they actually report the usual patterns of behavior (e. g., Killworth and Bernard,

 1976; Freeman et al., 1987). Therefore, it can be expected that even if people are requested to report actual persons with whom they discuss important personal matters, they probably report typical discussion partners. In 2004 a small split ballot study on a convenience sample was made to study this hypothesis. The results are reported in Section 4.1.3.

In the original Burt network measurement instrument, there is also a limitation on collecting additional data on reported persons, that is only for the first five named persons. It is possible that the structure and composition of larger networks would differ if calculated it on the basis of complete information for all alters or

on the basis of data for the first five only. Specific information within the question is an element that can be used by the respondent as a reference frame in coming up with an answer (e.g., Hippler et al., 1987; Sudman et al., 1996). Indeed, studies on social network data have shown this effect as well. Posing an upper limit to the number of named alters causes differences in the size, structure and composition of the network (e.g., Holland and Leinhardt, 1973). In the original Burt measurement instrument, the interviewer writes down all the names. However, if more than five persons are named, the respondent chooses the five most important. If fewer than five persons are named, the interviewer probes for more names. Therefore, respondents who initially name fewer than five persons are systematically treated differently than those with five or more named persons. Therefore, with the additional probe the interviewer imposes a kind of a "pressure" towards naming more persons.

In short, the aim of this paper is to study the methodological aspects of using different measurement instruments – in the case of the Burt name generator - for comparative social network research.

2   Description of the studies

In this section, the 1987 and 2002 studies are described. In 1987 the first data on personal support networks of residents of Slovenia were collected as part of a larger study on stratification and quality of life in Yugoslavia (Boh et al., 1987).[4] It is a cross-sectional study with representative data on the structure and composition of the discussion networks of Yugoslavs (the Burt name generator, 1984) and providers of informal social support networks (ISSP 1986), data for which was collected using the role relation approach.

A comparable study from 2002[5] (Ferligoj et al., 2002) on adult residents of Slovenia includes representative data on social support networks (all data was collected using the name generator approach), including the measurement of discussion networks (Burt, 1984).

In Table 1, the methodological characteristics of both studies are presented. It can be seen that there are differences in the sample size (289 in 1987 and 5013 in 2002). Data in 1987 were collected by face-to-face interviews (partly self-administered), whereas data in 2002 were collected by computer-assisted telephone interviews. Both studies were done on representative samples; however, there were some differences in the demographic structure of the two samples. Therefore some data cleaning and weighting had to be applied for comparability.

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[4] Boh, Katja et al. Stratifikacija in kvaliteta življenja v Jugoslaviji 1987 [kodirna knjiga]. Ljubljana.Univerza v Ljubljani. Institut za sociologijo in filozofijo pri Univerzi v Ljubljani, 1987. Ljubljana. Univerza v Ljubljani. Arhiv družboslovnih podatkov [izdelava, distribucija], 2000.

[5] Ferligoj, Anuška et al. Omrežja socialnih opor prebivalstva Slovenije. 2002 [kodirna knjiga]. Ljubljana: Fakulteta za družbene vede in Inštitut Republike Slovenije za socialno varstvo.

In the 1987 data, respondents younger than 18 years of age and in 2002 respondents older than 75 were deleted (in 2002 data were collected only on respondents of age 18 and over; in 1987 the upper age limit was 75).

Table 1: Methodological characteristics of original studies.

	The Stratification and Level of Living Survey in Yugoslavia, 1987	Social Support Networks of Residents of Slovenia, 2002
Survey	The Stratification and Level of Living Survey in Yugoslavia, 1987	Social Support Networks of Residents of Slovenia, 2002
Research institute	Institute of Sociology - Ljubljana, Slovenia	CMI – Centre for methodology and Informatics, Faculty of Social Sciences, University of Ljubljana SPIRS– Social Protection Institute of the Republic of Slovenia
Data	Social Science Data Archive - Ljubljana, Slovenia, July 1999	CMI, SPIRS
Data collection	Market Research Centre, Zagreb ZIT/CEMA	CATI center, Ljubljana
Sample	Multistage probability sample. The sample was representative of the population of Yugoslavia. The sample is proportional according to the number of households in each Yugoslav republic. Random substitute units replace non-responses within clusters. The substitute units are predefined on a sampling list. The interviewers were allowed to employ the substitute unit only after five attempts to obtain an interview.	Random sample of telephone users in Slovenia (fixed telephone coverage in Slovenian households in 2002 was 91%)*
n	289 (Slovenia), 2241 (Yugoslavia)	5013
Age	15 – 75	18 +
Data collection mode	Personal interview, face-to-face (Burt name generator), self-administered questionnaire (informal sources of social support, ISSP86 module)	Computer assisted telephone interview
Data collection	May 1987 – July 1987	February 2002 – April 2002

* Source: Statistical Yearbook of the Republic of Slovenia 2003, Statistical Office of the Republic of Slovenia, Ljubljana, 2003.

3   Results

In this section results are presented. First, results regarding the actual data from 1987 and 2002 are reported (limitation of the number of alters). Second, results are outlined of an experiment designed to test the effects of time frame (six months

versus no time frame, actual versus usual providers of social support) on the Burt name generator. The section ends with a basic substantive analysis of the Burt name generator in the years 1987 and 2002.

3.1   The effect of limitation of the number of alters on network composition

One important issue in comparing data sets from 1987 and 2002 studies is the availability of data on alters. In both studies egos could name as many alters as they wanted, but in 1987, data about alters (e.g., their gender and age, the type of the relationship) were collected only for the first five named alters, whereas in 2002 those data were collected for all named alters. The question is whether the network composition of larger networks (6 or more in this case) differs if we calculate it on the basis of only 5 alters or all alters. This comparison is shown in Table 2, where composition of 6+ networks was calculated for the 2002 data on the basis of the first five or all alters. Since discussion networks are usually small networks,[6] we expect there should be small differences in network composition, based on complete or incomplete data about alters.

Table 2: Comparison of measures of composition in 6+ networks (2002 survey).

	First 5 alters	All alters		First 5 alters	All alters
Female	50.02	50.17	Co-member	0.29	0.26
Partner	6.49	6.46	Neighbor	2.91	3.06
Parents	6.32	7.00	Friends	43.40	42.38
Siblings	11.55	10.69	Close kin	28.07	27.23
Children	10.19	9.55	Knows < 3 yrs.	3.63	4.11
Other kin	11.88	13.36	Knows 3-6 yrs.	12.71	12.21
Co-worker	4.84	5.01	Knows 7+ yrs	82.39	82.44
			Avg. alter age	38.91	38.86

Note: all data in the table are average percentages except average alter age.

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[6] For instance, in a study on a random sample of 1033 adult residents of Ljubljana (Kogovšek, 2001), the average discussion network size was 1,8, with median and mode 1. In the 2002 study that is used in this paper, the average discussion network size is 1,7, with median and mode also 1. On 1987 data these statistics cannot be computed since all networks larger than 5 were coded as "6 or more". The frequency distribution of network sizes in 1987 and 2002 is shown in Appendix. In 1987, respondents tend to have somewhat larger networks, but relatively few respondents in both years had discussion network sizes of 6 or larger. However, we should note here that the difference is significant at the 1% level. There are several possible explanations for this difference: additional prompting for more names if the respondent named fewer than 5 people and a different, broader interpretation of "important matters" (the context of the questionnaire as well as the broader social situation in Slovenia at that time; for a more detailed discussion see Hlebec and Kogovšek in this issue) in 1987 and different modes of data collection (since telephone mode is a faster means of communication, respondents may have tended to name fewer persons in 2002). Additionally, cues in the 2002 wording (a quarrel, problems at work, family problems) might have narrowed down the meaning of "important personal matters" and thus potentially reducing the number of discussion partners.

Our expectation is confirmed (Table 2). There seems to be no major bias in the network composition of larger networks if we calculate it on the basis of incomplete data on alters. However, for comparability, all the following analyses in this section are done on the basis of information on only the first 5 alters in 1987 and 2002 data.

Table 3: Differences in network composition with different question wordings of the Burt name generator.

	Burt – 6 month limitation	Burt – usual discussion partners	t
Female	61.9	54.5	1.984*
Partner	15.4	14.7	0.283
Parents	14.3	11.0	1.278
Siblings	7.6	9.5	-0.838
Children	10.0	13.8	-1.150
Other kin	6.4	2.7	2.004*
Co-workers	8.4	4.8	1.438
Co-members	4.6	4.5	0.065
Neighbors	2.3	2.8	-0.350
Friends	30.0	35.4	-1.160
Close kin	31.9	34.4	-0.635
Known < 3 yrs.	8.8	8.3	0.191
Known 3-6 yrs.	15.7	12.5	1.014
Known 7+ yrs.	75.5	79.2	-0.882
Alter age	39.6	36.8	1.569

Note: All values of the network composition measures are average percentages, except average alter age.
* significant at the 0.05 level

3.2 The effect of question wording on network composition

Differences in the two time points may be due to a difference in question wording (time limit in 1987 and a hypothetical question in 2002), which will be tested next. The test was done on data collected by 34 students in the Social Network Analysis course at the Faculty of Social Sciences in Ljubljana. Apart from him/herself, each student interviewed four more persons. A split ballot design was used – half of the students (and their chosen additional respondents) used the time limit version and the other half the hypothetical version of the Burt name generator. Since it is a convenience sample, the findings cannot be generalized to the general population. However, since the age and gender of the respondents were to a certain degree controlled,[7] some tentative conclusions regarding this particular difference in question wording can be reached. The total sample size was 170 respondents, 42% male and 58% female. Most respondents were either married (37%), living as married (24%), or single (29%). The education of respondents was skewed toward

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7 Each student had to choose the other four persons from different age groups and to maintan a 50:50 gender distribution.

higher education (9% elementary school, 69% high school, and 23% college or more). The respondents' age was somewhat skewed toward younger respondents (42% of age 18-29, 28% of age 30-49 and 30% of age 50 and over) if we compare this convenience sample with the 2002 census data.

Results were obtained by Independent Samples T Test in SPSS 12.0. As can be seen from Table 3, there are few statistically significant differences in network composition with regard to different question wordings. The exceptions are the precentages of female alters and of other kin in the network. There is a somewhat larger percentage of women and other kin in the networks with the time limit question wording. Other than that, this question wording produces somewhat larger percentages of parents and co-workers and somewhat lower percentages of siblings, children, friends and close kin.

3.3   The effects of time and network size on network composition

We proceed with an analysis of the differences between two time points (1987, 2002) and two network sizes (1-5, 6+). This section is an examination of substantive changes in networks over time, rather than a methodological investigation, as in the previous sections.

The analysis is done by Multiple Classification Analysis (MCA). MCA (Andrews et al., 1973) is a multivariate method, by which relationships between multiple independent variables (or predictors) and a dependent variable are analyzed. It is similar to multiple regression, with the advantage that nominal measurement level variables do not need to be dichotomized.

Multiple classification analysis gives us the following information:

- the overall mean and group means of the dependent variable for each combination of categories of predictors;
- tests of significance of the effects of single predictors as well as of interactions between them;
- the effect of each predictor is shown by parameter β, which tells us the effect of the predictor if other predictors are held constant; thus the rank order of βs shows us the relative importance of a single predictor in explaining the dependent variable;
- deviations from the total mean of the dependent variable for each category of a predictor (therefore, how much would the total mean of the dependent variable increase or decrease as a result of the effect of a certain predictor),[8] and

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[8] For simplicity of presentation, the deviations are not shown in the tables, but are available from the authors on request. We believe that group means are much more informative for the reader in the context of this paper.

- the percentage of explained variance for all predictors included in the analysis (R^2).

Table 4: The effects of time and network size on the discussion network composition.

Year	1987		2002	
Network size	1 – 5	6+	1 – 5	6+
Female	44.17	33.34	63.35	50.17
	Net. size: β=0.11**	Year: β=0.10**	R^2=0.013	
Partner	18.29	10.34	34.47	6.46
	Net. size: β=0.08**	Year: β=0.07**	R^2=0.014	
Children	6.65	1.92	8.89	9.55
	Net. size: β=0.004	Year: β=0.02	R^2=0.001	
Parents	7.12	3.85	6.70	7.14
	Net. size: β=0.003	Year: β=0.01	R^2=0.000	
Siblings	4.55	6.29	7.69	10.69
	Net. size: β=0.02	Year: β=0.03*	R^2=0.001	
Other kin	6.91	7.02	4.79	13.36
	Net. size: β=0.06**	Year: β=0.01	R^2=0.004	
Co-worker	14.15	12.29	5.09	5.01
	Net. size: β=0.004	Year: β=0.09**	R^2=0.01	
Co-member*	3.91	2.59	0.17	0.26
	Net. size: β=0.01	Year: β=0.16**	R^2=0.03	
Neighbor	12.93	15.69	3.92	3.06
	Net. size: β=0.000	Year: β=0.11**	R^2=0.012	
Friends	24.38	39.13	27.06	42.38
	Net. size: β=0.06**	Year: β=0.01	R^2=.003	
Close kin	17.51	11.10	23.05	27.23
	Net. size: β=0.01	Year: β=0.04**	R^2=0.001	
Knows < 3 years	11.82	7.04	3.90	4.11
	Net. size: β=0.01	Year: β=0.09**	R^2=0.01	
Knows 3-6 years	14.94	8.51	10.58	12.21
	Net. size: β=0.001	Year: β=0.03	R^2=0.001	
Knows 7+ years	66.33	84.15	85.03	82.98
	Net. size: β=0.01	Year: β=0.11**	R^2=0.012	
Avg. alter age	35.69	35.60	42.28	38.86
	Net. size: β=0.03	Year: β=0.09**	R^2=0.01	

Note: all values are average percentages within networks, except average alter age.
* Defined as "co-member of an organization".

From Table 4 it can be seen that there are statistically significant differences over both time and network size, in the average percentage of female alters and the percentage the partner represents within the network. In 1987 there are fewer women in the network than in 2002. In both years there are fewer women in larger networks. The partner is a much more important source of emotional support in 2002 than in 1987. Within a larger network the partner represents a smaller percentage of all ties in the network.

Statistically significant differences regarding network size appear only for the percentage of other kin and friends. There is a somewhat larger percentage of distant kin and a larger percentage of friends in larger networks.

There are statistically significant differences over time in average percentages of siblings, co-workers, co-members, neighbors and close kin as well as the average duration of the relationships and average alter age. In general, it can be seen from the table that weak ties seemed to be more important in 1987 than in 2002 (a higher percentages of co-workers, co-members and neighbors). On the other hand, kin relationships are more important in 2002 (higher percentage of siblings and close kin together) than in 1987. In 1987 strong ties (partner, close kin, friend) represent about 60% of the whole network, whereas in 2002, they represent about 85%. In 2002 there are more alters, whom the ego has known for a longer period of time. A possible reason is in the higher percentage of kin relations in the network, many of whom the ego has probably known all his/her life (e.g., parents, siblings). Alters in 2002 are on average older than in 1987.

4   Discussion and conclusions

In this paper we tested some issues in comparative network research. In the context of preparation of a larger comparative study of personal networks over time, two versions of the Burt name generator, used in the 1987 and 2002 studies on the social networks of the residents of Slovenia, were compared with regard to two methodological factors (the limitation of the number of alters and difference in question wording) that could affect network structure and composition. Basic substantive comparison of network structure and composition in both years was also performed.

The results show that the two methodological factors have no major effect on network structure and composition. Firstly, there are only minor differences in network structure and composition as estimated on the basis of data on all or only the first five alters. There were also relatively small differences (and most of these statistically insignificant) with regard to different question wordings. Comparison of Tables 3 and 4 also shows that the reason for the difference in network structure and composition may indeed be changes over time rather than difference in question wording. Some of the more prominent differences in particular (e.g., percentages for the partner, co-workers, co-members and neighbors) are quite large in comparison over time and relatively small in question wording comparison within the same year.

One reason may be lie the "nature" of such networks. In most cases they are small (90% or more are smaller than 6); therefore limiting the information to only the first five alters does not play a major role in network composition and structure estimates. They are also relatively stable over time and consist of very important, close alters. The time limit of six months in the name generator is also relatively

large, thus increasing the probability that people would name usual instead of actual discussion partners. These characteristics probably ensure that these alters are named regardless of which question wording is used.

Therefore, regardless of some methodological differences, it can be concluded that, with some caution, the measurement instruments are basically comparable and may be used for basic comparisons of discussion networks over time.

It may be added that both versions of the Burt name generator may yield somewhat biased estimates of network characteristics. For instance, there is some evidence (e.g., Hammer, 1984; several studies by D. D. Brewer and colleagues) that respondents tend to forget at least some significant others when the free recall data collection is used. It is possible that failure to name all the relevant alters results in mis-estimation of composite network measures, such as network structure and composition. A recent study of the Burt name generator by Marin (2004) found that respondents were more likely to name alters with whom they shared stronger ties and alters who were more connected within the network. Also, composite network measures (e.g., mean closeness, density, mean years known, network size) calculated for alters elicited by the name generator, and calculated for all alters were not well correlated. It is difficult, if not impossible, to ascertain to what degree those biases were present in our two studies. However, it may be hypothesised that those effects were present to different degrees, since in the 1987 study respondents who named fewer that 5 people, were prompted to name more people, suggesting a more thorough network elicitation, whereas in the 2002 study, there were no prompts.[9]

Basic substantive analyses of network composition and structure show a turn to more kin- and partner-oriented networks over time. In 1987 the networks seemed to be much more diverse, with considerable proportions of strong (partner, close kin, friends) as well as weak ties. In 2002 strong ties are considerably more dominant, while weak ties represent a much lower percentage, some (e.g., co-members) practically disappearing from the network. It certainly seems that important differences in personal network composition and structure happened over time. However, further data collection and analyses are planned to study these phenomena more thoroughly and deeply.

Acknowledgements

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[9] However, it could also be argued that, in the case of prompts, respondents may be "forced" to name people that are not really so important to them (see also Hlebec and Kogovšek, this issue).

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Appendix

Frequency distribution of the network size (Burt name generator) (in %)

Network size	1987	2002
1	13.5	55.7
2	14.2	22.1
3	17.9	12.6
4	15.3	5.4
5	27.1	2.3
6+	12.0	1.9