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Testing a Procedure for Measuring Personal Networks

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Chapter I

A Mixed Methods Survey Program on Personal Networks

This paper[1] presents an empirical comparison between two different tools for identifying personal networks starting from the names of tied nodes, namely the single or "free" name generator (FNG) — by and large comparable to a not–structured questionnaire — and the multiple or "guided" name generator (GNG) — comparable to a structured questionnaire —, both cases gathering information by a professional interviewer. FNG and GNG are inserted into a unique questionnaire, also in order to test a preferred sequence (namely, the FNG followed by the GNG name generator)[2].

In the FNG each interviewee (*ego*) is asked to list freely the (perceived) members of his/her personal network (the so called *alters*); in the GNG, the interviewee lists relevant *alters* according to a standard set of concerns — social relations, supports, economic activities, and so on (see Appendix A)[3]. For each interviewee the interviewer completes a short questionnaire, designed for gathering basic and structural information. Further, for each *alter* elicited in the FNG and GNG a list of basic information is being gathered (structural, relational, support data and the perceived emotional proximity, from the *ego*'s viewpoint); it is the "name interpreter". Finally, for both the

1. This paper is part of a general "mixed methods" research program on personal networks, started in 2009 at "Sapienza" University, after a "mixed method" reshaping of the methodology of applied social research (Cannavò and Frudà (eds.), 2007a–b) and a theoretical reappraisal of the relations between sociology of groups and social network analysis (Vergati, 2008). About mixed–methods social research on networks, see Dominguez and Hollstein (eds., 2014), in which particularly Hollstein (2014).

2. See Appendix A for a thorough analysis of the questionnaire and name generators.

3. Marsden (1990) conceives a sort of alternative between measuring perceived and actual social relations. In this paper Marsden's dichotomy is overcome starting from the viewpoint that each relation or *alter* elicited is an *ego*'s perceptual statement (hence, for both FNG and GNG, in our case), as Wellman puts it (2007a).

FNG and the GNG the interviewer asks the respondent to declare in a triangular matrix the dyadic relation between each *alter* elicited and the other ones, as perceived by the interviewee.

The paper examines the state–of–the–art in the personal network research — as a typical micro–level analysis (Vergati, 2012) —, surveys and analyzes a set of 78 university students, distributed in a simple typology, and compares through a data analysis FNG and GNG tools. Specifically, the different morphology of identified networks is dealt with, and their size, density and composition as well, while the feasibility and usefulness of integrating the two different methods (FNG and GNG) are being discussed.

Three hypotheses are being tested: about network size and density gathered by the two name generators; about the emotional or functional choice driven by FNG and GNG; finally about gender homophily. Finally, the papers suggests a procedural protocol for name generators and interpreters surveys (Appendix A) and gives some hints about the personal network visualization (Appendix B).

It must be added that a survey on personal networks could make no sense if separate from a good acquaintance of real and personal relations, studied through traditional qualitative tools, such as direct focused interview on cases typologically chosen[4].

4. In this sense, the research done on the migratory personal networks of Romanian women was a good reference point (Vergati *et al.*, 2013).

Chapter II

Personal Networks: a State of the Art

Personal Networks: As Research Results and Research Tools

A personal network is a particular kind of egonetwork. Whilst an egonetwork is the network (the set of nodes and ties) referred to a generic node, we speak about "personal networks" when we refer the network to an individual actor. This *ego* is being interviewed; on the ground of nodes and ties he/she elicits we are able to set up his/her personal network. The study of personal networks is not less rich than that of egonetworks[1], and it allows to observe in detail the personal mix of kin & kith in the individual relations (Wellman, 1990 and 2007a–b).

The central goal of this paper is essentially methodological: how to individuate personal networks through "free" and/or "guided" name generators, how to individuate the "core network" and how to represent it. However, such an only structural approach should not disregard that a personal network can be considered from two compatible viewpoints: as the outcome of social–cultural–individual factors, which select the number and quality of personal ties (hence a dependent complex factor)[2], deriving partly from performative actor's actions, and partly from actor's ascriptive variables;[3] but it can be even considered as an influencing and independent complex factor, which foresees and influences the social life and representations of social actors.

1. We shall define "egonetworks" or "*ego*–networks" or "*ego*–nets" a set of "nodes" (in the social sciences, individual or collective actors) reciprocally linked through ties. An egonetwork of individual social actors (*alters*) defined by an *ego* is better defined as "personal network". For a thorough appraisal, see Marin (2004), esp. § 1.

2. In this regard, see van Duijn *et al.* (1999). Interestingly enough, the forming of personal networks as a result of performative actions is directly influenced by the cultural tastes (Lizardo, 2006).

3. It is always valid the question: «What variables influence the forming of networks?» (Van Duijn *et al.*, 1999).

Personal networks, further, are of particular interest in a society characterized by an increasing inter–individual isolation ("social isolation", as Putnam, 1995, put it), repeatedly pointed out by US federal surveys 1985 to 2005, which state that the number of people with whom "important topics" (defined as such by the same interviewees) are being discussed collapsed 3 to 2 people, though the Internet social network only in part compensates that number.

The study of personal networks allows, with specific reference to our work:

a) to re–conceptualize communities as networks instead of neighborhoods;
b) to give operational support to useful dichotomies, such as *strong/weak* (ties), *kin/friend* (*alters*); large/small (networks); *clustered/integrated* (networks);
c) to give empirical evidence to the general concept of "social capital" (see Bourdieu, 1980; Coleman, 1988; Putnam, 1995 and 2000), at least as a proxy.

More specifically, the personal network can be conceived as the source of the individual social capital, coming from *ascriptive* and *performative ties* (see Van der Gaag and Snijders, 2005; also Van Emmerick, 2006). We should add that the personal social capital is formed by a core of ever–active strong ties (relatives and/or friends), and a more extended set of weak ties, which *ego* is always able to activate or reactivate in case of need.

In methodological terms, a personal networks is the operationalization of the (personal) social capital (Campbell *et al.*, 1986). In this regard, we can state three social capital dimensions, and for each of them a specific indicator: *1)* the *network size* (number of *alters*); *2)* the *personal advantage* (supports offered by the *alters* to *ego*); *3)* the *network convenience* (the probability of an immediate easiness of the supports to *ego*).

Ego is not always perfectly conscious of the exact number and quality of his/her ties; so a first question such as «Please, list the people with whom you have contact (direct, telephone and Internet) regularly or frequently enough» will produce a list of people different from the lists elicited after a question such as «Please, for every support (items: study, leisure, get a loan, etc.) list a maximum number of 5 names». The two lists will overlap, but they will not coincide. The eliciting method is determinant (Marin, 2004).

Ego could obviously rely on unexpected partners, that is on people he/she did not list in his/her personal network, and possibly could forget to list the so called "structural holes" (people – *alters* elicited – isolated, ready to be activated, unexpectedly entering your life, solving a specific and fundamental problem, though not elicited as linked with other *alters*)[4].

Further, if we consider the personal network forming as a part of an adaptive strategy of individual social actors, then the study of personal networks allows to deepen in detail particular processes, such as migrations (in this case, we prefer the use of the concept of "migratory networks"; Vergati, 2013). Finally, we should not skip the intertwining of personal and family factors in the making of young personal networks, where socializing and segregating reasons can be stressed (Wellman, 1990).

Fundamental Tools: Name Generators and Name Interpreters

The simplest and most specific way for identifying a personal network is asking our interviewee (*Ego*) to give (*elicit*) a list of names (*alters*) with whom he/she has got relations and stronger ties, and/or *alters* highly connected, and/or *alters* with whom *ego* interacts in more action settings. The second step is to specify the kind and intimacy of single relations, their frequency, their media (phone, Internet, face–to–face), etc. The interviewee gives, further, specific information for each *node* of his/her personal network (node's traits defined as *informants*).

Generally speaking, such a list of questions is a kind of questionnaire, more or less structured and standardized. The short name for the roster of people is "name generator"; the short name for the list of information for each node is better called "name interpreter". The third survey tool is the "ties detector", a triangular matrix where are put the ties amongst his/her *alters* elicited by the interviewee.

More specifically, we should add that both name generators and name interpreters register perceptive information, and not structural data; on the other hand, the ties detector probably registers actual

4. Pustejovsky and Spillane (2009) analyze the multidimensional networks and connected measures, in the general frame of the studies of personal networks as personal social capital, differentiating between emotional and material support.

ties more than interviewee's perceptions. This is a point always underrated in social network analysis, the constructionist character of which is not enough stressed[5].

Since surveying and representing methods reach different personal networks, then the choice of the name gathering procedure is a central topic. The standard methods used to enumerate *alters* belonging to a personal network are two: the single name generator and the multiple name generator. Each of them presents costs and benefits (in this regard, for an empirical comparison, see Marin and Hampton, 2007)[6].

Name interpreters however give us a reply to some important questions (Wellman, 2007a):

a) which types of people are to be found in such networks: are they relatives or friends?
b) what kind of relations (strong/weak; frequent/infrequent)?
c) what kinds of resources characterize the different types of network?
d) what kind of reciprocal relations characterize the name roster identified?

Many researchers agree on the importance of choosing name generators, as fundamental for the quality of data and the entire analysis as well (e.g., Bernard *et al.*,1990; Van Tilburg, 1998; Marsden, 2003; Marin, 2004; Marin and Hampton, 2007; Wellman, 2007a). In fact, there is a "measurement effect" deriving from the kind of name generator as for data gathering (Bernard *et al.*,1990, p. 180), the kind of network (*ibidem*), and the network size (see for a review Bidart and Charbonneau, 2011). On the other hand, some disagreement is to be stressed about the relation between the quality of data and the name generator employed (Straits, 2000), besides the interviewer's effect (Van Tilburg, 1998; Marsden, 2003).

As Brewer e Webster (1999) show, on a sample of 217 university students, living in a residence hall, a technique of free elicitation of

5. Another critical aspect is the possibility of forgetting to elicit friends — even good friends — while using a name generator. This way the reconstruction of the personal network remains highly hypothetical. See Brewer and Webster (1999), Brewer (2000) and Marin (2004). Interestingly enough, Marin considers name generators as tools for the reproduction of cognitive structures.

6. Nevertheless, some researchers suggest alternative procedures, such as the participant–aided network diagram, an extension of traditional name generators (Hogan *et al.*, 2007).

people (*alters*) was employed. The question was actually an invitation to freely recall their friends, and after to list them on a white sheet of paper. Meaningfully, 20% of the total friends — whose complete list was reconstructed after — were not listed out. Above all, the recollecting effectiveness was influenced by the network size (r = 0,44), by its density, by the number of subsets ("cliques"), by the centrality of *alters*.

On the other hand, in an extended review of different samples, studied by different methods and in different moments, Brewer (2000) stressed the overall reliability of the ties listing, after checking that people had listed only true ties as ties. Further, the recall–based elicitation of personal and social networks (for instance, what we call here GNG) did not seem more effective than FNG, as for the percentage of forgotten friends. Significantly, though obviously, people seem to forget more weak than strong ties[7].

In this article, however, we shall define the single name generator as *Free Name Generator* (FNG), in order to stress that respondents freely list the names of people with whom they more often interact[8], and the multiple name generator as *guided name generator* (GNG), since respondents in this case are expected to declare the names of specifically supporting people, according to a specific list of supporting contexts (see Vergati, 2011).

According to some scholars, FNG presents some advantages: first, it minimizes the interview administration time in comparison with GNG; secondly, it should reduce the respondent's replying routine (something like the well–known "response set" effect). Some disadvantages of FNG, however, are related to satisfying the requirements of validity and reliability. We suggest that while FNG highlights *routine and emotional contacts*, GNG registers ties that respondents evaluate as the most relevant *rescuing and supporting contacts*. Therefore, for the same set of respondents, between FNG and GNG *alters* only a partial overlapping is to be found (Marsden and Campbell, 1984; also Vergati, 2011).

Normally, the size of a GNG eliciting list does not correspond to the size of a FNG eliciting roster for the same responding *egos*, and

7. A typical FNG question is: «Many people have some good friends they feel close to. Who are your good friends (other than your spouse)? Just tell me their first name» (Van Tilburg, 1998).

8. For an example of free–list elicitation, cf. Gravlee *et al.*, 2012.

alters elicited are to some extent different. Choosing the FNG or the GNG strategy is hence meaningful, and raises the double question of the lists completeness, or in other terms of the fidelity and reliability of the recalled list of *alters*.

Further, the use of FNG presents some methodological limits, inasmuch as it does not fully represent a social network and it is too much dependent on the specific scope conditions of the survey (see Straits, 2000; Hogan *et al.*, 2007). Thus, generalizing from the limited domain of a FNG — assuming that it elicits *alters* who are representative of the full personal network — is somewhat problematic (Marin and Hampton, 2007, p. 168). Even for these reasons, GNG is considered the best tool for investigating multiple support dimensions, though the GNG questionnaire administration lasts so much, that the respondents' motivation is likely to be reduced (Marin and Hampton, 2007, p. 167).

Scientific literature about social network analysis shows deep interest for the problem of comparing results obtained by different tools. Bernard compared four different methods for measuring personal social networks incorporating them as *modules* into a single computer assisted test, named network suit (Bernard *et al.*, 1990). Straits explored the effects on reported network size and composition varying the defining label for the single name generator ("significant people" and "important matters"; Straits, 2000). Bidart and Charbonneau (2011, p. 270 ff.) discussed pros and cons of three categories of name generator (interaction generator, evaluative generator, exchange generator) .

Marin and Hampton tested the results obtained comparing data gathering by a multiple name generator, and data gathering by a single name generator (though that single name generator was an item part of the multiple name generator set), and proposed alternative methods (Marin and Hampton, 2007)[9]. Bidart and Charbonneau suggest a research design which differentiates between the global contexts–based networks from the specific resource–based networks (2011, p. 266).

9. Marin and Hampton (2007, p. 182) proposed MMG (a "modified multiple generator", including a sort of "general question" about people with whom the respondent discusses and socializes) and MGRI (multiple generator random interpreter), in which the name interpreter is applied only to a random sample of *alters*. The rationale of the second method is to be found in sparing data gathering and processing time.

The common trend, however, is to use multiple or guided name generators (GNG). Though both cases behavioral concerns or supportive exchanges are involved, GNG gives direct information for specific areas of interest, so that it can be considered as resource generator, whilst FNG provides information about relations even when they are not necessarily supportive (Wellman, 2007b; Marsden and Campbell, 1984).

Some Concepts and Measures

The double goal of synthesizing and comparing different personal networks gathered by different tools imposes a particular attention on the technical concepts and measures we apply to personal networks as social networks. We should not forget that — after specifying the ties among the *alters* elicited — personal networks can be conceived as social network. A list of 10 conceptual and technical tools commonly in use shall be useful for presenting our survey, though we choose as more appropriate to employ only a short list of them.

a) *Size (N)*: without forgetting that *Ego* is part of his/her personal network, we define "size" as the number of *alters* elicited, of whom *Ego* specifies information and ties.
b) *Number of ties (L)*: number of person–to–person relations declared by *Ego*, between each *alter* elicited and other *alters* elicited.
c) *Density (D)*: density is defined as $D = 2L / n(n-1)$; where L in the number of actual ties, and n the number of *alters* elicited.
d) *Clustering coefficient*: clustering coefficient is a measure of a network node; in our survey, this measure is referred to 78 *egos*. For each of them, it gives a raw value of the connection level of the node (*ego*) neighborhood. If the clustering coefficient is 1, the neighborhood is fully connected; if it is 0, the neighborhood has no internal connections.
e) *Degree Centrality*: degree centrality identifies the most important nodes within a personal network, those who ensure the network resilience. An alter is central to the extent that he or she is directly connected to many other *alters*. For instance, a star network, where one alter is the intermediary for all other *alters*, would be 100% centralized, while a network where

all *alters* manage the same number of ties would get 0 centrality. Different measure of centrality can be used, though the network centrality is more evaluated than measured (see Marsden, 1988 and 2002; Louch, 2000).

f) *Betweenness centrality*: it is a measure of *ego*'s centrality in a personal network. It is equal to the number of shortest paths from all nodes (*alters*) to all others that pass through that *alter*. A node with high betweenness centrality — registered by low index values (low number of steps) — has a high communicational power[10].

g) *Structural holes*: "structural holes" (Burt, 1992) refer to the absence of ties between *alters*, which defines situations of possible disadvantage of nodes — who are isolated or poorly embedded in the (personal) network —, but even identify the nodes potentially more useful for *Ego* as weak ties.

h) *Core members*: the small set of *alters* who are important to *Ego*, given the relation intensity or the effective influence on *Ego* (Straits, 2000, p. 124).

i) *Homophily*: the tendency of *Ego* to set up ties and to associate with similar *alters*, according to explicit or implicit dimensions (values, gender, status, age, ethnicity, etc.; see among others Marsden, 1988).

j) *Personal Network Overlapping (PNO)*: it seems useful to design a coefficient for measuring the degree of overlapping between the *alters* recalled by two different name generators used in the same survey by the same *ego* (with reference to our survey, FNG — Free Name Generator and GNG — Guided Name Generator).

$$PNO = \frac{A}{F + G - A}$$

where

— A = number of overlapping *alters* comparing FNG and GNG;
— F = total number of *alters* elicited in FNG;
— G = total number of *alters* elicited in GNG;

10. It is worth noticing that high values register low communicational power, and vice versa. The index adopts a geodesic approach. See for a technical deepening Everett and Borgatti (2005).

> Such a coefficient varies between 0 and 1. When *PNO* = 1, it means that the FNG *alters* correspond to the GNG *alters*, so that FNG and GNG are overlapped and composed by the same *alters*. When *PNO* = 0, it means that the FNG *alters* elicited and the GNG *alters* elicited do not correspond at all (so showing the absolute diversity of the emotional and supporting networks). It is worth to recall that *alters* can or cannot know each other, according to the interviewee's answers.

Further, a certain debate about the network size with reference to gathering data methods should be examined. Some Authors stress the importance of network objective characteristics (closeness, density and average duration of relationships; Marin, 2004), while others emphasize the role of name generators (such as Hogan *et al.*, 2007). Besides, collecting information about *all* personal ties is very difficult, so that usually both the interviewer's attention and the interviewee's choices are focused on a subset of *alters* (Wellman, 2007b; Marin and Hampton, 2007), as functions of the research aims.

Chapter III

Exploratory Hypotheses and again on Survey Methods

This survey moves from 3 exploratory hypotheses, the first two regarding the research tools, and the third one the choice of nodes (hence, the quality of ties).

a) The first hypothesis is that FNG bounds a social network smaller than the social network defined through GNG; as a consequence, networks so elicited should be different, though the core members of the real personal network (cases of overlapping between FNG and GNG) could be the same[1].
b) The second hypothesis is that the two tools (FNG and GNG) record ties differently; namely, personal networks defined through FNG and GNG — more or less overlapped — differ as for the emotional/functional roles (FNG reveals more personal ties than GNG, which better isolates functional ties).
c) The third hypothesis is that gender homophily prevails regardless the tool used, whether FNG or GNG[2].

Data analysis will be run following these three hypotheses.

As explained above, in this survey both a FNG, and a GNG were used. They were structured according to the general methodological hints given by Wellman (2007a). The first tool (FNG) was simply a single question «Please, list people with whom you have usual or enough frequent contacts (face–to–face, phone, Internet)», which set

1. Different approaches to social network studies — such as realist, or exchange approach — use different questions to define and to identify core network (Straits, 2000; for core–periphery model, see Berg, 2009).

2. In Vergati (2011) trends for men and women were not clear–cut, and this result was hypothetically ascribed to the interviewed set asymmetries, definitely overcome in this new research (p. 79).

up a list of people. Only after, for each of them the interviewee registers on a separate form what concerns are related to; nevertheless, the nomination procedure seems to follow the logic of emotional closeness, since the interviewee is not acquainted, while listing his contacts, that after he/she will be required to elicit the supports received. The emotional closeness was measured through a semi–self–anchored scale[3]; the respondent had to declare how he/she felt about him/her (as shown below):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
Very distant				Indifferent						Very close

The second name generator, GNG, is overtly a tool for registering people related to specific functional supports. Therefore, GNG consists of one prompt question («List at maximum 5 names for each interaction concern, in descending order of importance») and of 20 interaction concerns. Consequently, free generators can apparently be considered as stimulating a "concern mining", while guided generators a "people mining". The choice of using two name generators comes out from the consciousness of different opportunities offered by different instruments, and also from the fact that social support is considered a multidimensional concept (van der Poel, 1993; Agneessens *et al.*, 2006)[4].

The different effectiveness of FNG and GNG while registering *alters*, put as a hypothesis, allows us to avoid the category of "forgetfulness", frequently referred to in this research sector. Some early surveys by Brewer and Webster (1999) and Brewer (2000) show that the number of *alters* "forgotten" does not depend on demographic characteristics, such as age and gender, but on the strength of ties as well (weak ties are forgotten more than the strong ones; Brewer, 2000).

Of course, the reply to the question «How much the set of *alters* elicited is complete?» can be only an approximate estimate, based

3. A synthetic analysis of the "rating centered" approach to scaling, especially of the self–anchored scales, can be found in Cannavò (2003), Chap. 2, § 1.

4. Pros & cons of employing FNG and GNG as name generators for measuring personal networks were compared (Vergati, 2011), stressing that their joint administration (following the sequence FNG → GNG) seems to reduce the missing cases and increases the effectiveness in defining the real core network, represented by the overlapping of FNG and GNG contacts.

upon cases of direct and independent knowledge about the network size ("comparisons between recall data and objective record of interaction"; Brewer, 2000, p. 31), so that the researcher can compare the network elicited with the real one[5].

Our approach to the theme of "forgetfulness" is that the two name generators — free and guided — refer to different reference frames: FNG is based on *emotional interaction*, while GNG is based on *functional exchange* (see, for the different name generators categories, Bidart and Charbonneau 2011, p. 270). More specifically, the first aim of this "one group–two methods" survey is to test the operational differences between FNG and GNG: «Which method gathers the higher number of *alters*? What are the *alters'* differences identified by the two methods? Which method is more invariant and steady while control variables vary (i.e. how and how much structural variables shape the working of FNG and GNG)?». Such a research design allows to make «comparisons between recall and recognition data» (Brewer, *ibidem*), since FNG and GNG can be respectively conceived the first as a recall, and the second one as a recognition technique.

The interviewed set was structured according to a factorial design, in order to cancel any possible effect coming from structural data upon the name generators performance (which could have hindered their comparability). The interviewees were 78, men and women, aged between 21 and 40 years: specifically between 21 and 30 the 82% and between 31 and 40 the 18%. Data gathering was designed according to a typology of respondents; remembering they are university students, the typological framing of the survey panel is in the following table (see Table 3.1)[6].

The questionnaires were administered through direct interviewing by three interviewers, all PhD students[7]; each interview lasted 50 to 60 minutes. Nevertheless, it should be noticed that in both

5. A slight correlation between forgotten *alters* and elicited *alters* is reported by Brewer (2000). So, we can conceive the forgotten *alters* as an approximately standard share, a "quasi–constant", hence almost negligible from the empirical research viewpoint.

6. All respondents were students of the tracks BA–MA in Sociology and Social Work – "Sapienza" University of Rome. Interviewed students were chosen excluding those who had attended, or were attending, the classes of «Sociology of groups and social networks», in order to limit the possible halo effect coming from the specific knowledge of concepts and tools.

7. S. Affuso, P. Angelini, S. Lettieri – PhD School of Applied Research in the Social Sciences (RASS) – "Sapienza" University of Rome.

Table 3.1. Interviewed students by gender and residence.

Residence ↓	Gender		
	Men	Women	*Total*
Permanent resident students*	13	13	26
Transient resident students**	13	13	26
Commuting students***	13	13	26
Total	39	39	78

* They usually live and study in site, in Rome, together with their family.

** They usually study in Rome, where they live alone; though, their family does not live in Rome.

*** They usually study in Rome, though living with their family outside Rome; so they are commuting each day from the hinterland or even farther.

FNG, and GNG, no questionnaire replying time was fixed up, so that respondents could perceive no real limit to the number of *alters* and therefore increase their accuracy (Campbell and Lee, 1991, p. 205). Direct interview was chosen not only in order to avoid some administering cons — such as the huge fall of mail and web–based self–administered questionnaires —, but also given the complexity of the overall questionnaire.

The questionnaire includes: a set of control (or basic, or structural) questions regarding respondent's variables (gender, age, residence, household, if single or not, associations); the FNG registration matrix, with a Free Name Generator on the rows, and its *name interpreter* on the columns; the GNG registration matrix (one prompt question for 20 interaction concerns): the GNG *name interpreter* (with its filling rules), quite akin to the FNG *name interpreter*[8]. Finally, two triangular matrixes, namely *Person x Person* adjacency matrix for FNG and GNG as well.

The starting question of FNG «Please, list people with whom you have usual or enough frequent contacts (face–to–face, phone, Internet» had no specific time reference frame (just like the GNG ones), and was designed to gather many interaction modalities, according to the usual trend of daily common interactions, felt as emotionally important. The list of people so elicited, without limits, is written

8. A good name interpreter is based upon a good list of "discovering items". One of the earliest analyses of the item quality for name interpreters — and of the information quality and reliability in *SNA* — is to be found in Marsden (1990), pp. 450–451.

vertically down along the name interpreter left margin (rows). The name interpreter gives information about *alters* elicited: gender, age, origin, residence, relation, education, activity, time length, contact frequency, modality of contacts, supports exchanged, and emotional closeness are being specified on the columns.

Further, in the name informer connected to FNG, there is also a *k–support question*: «What do you expect from this people?». This question asks respondents to specify which type of support they expect from people so elicited. Finally, in the triangular adjacency matrix (*Person x Person*), the degree of each other acquaintance of every *alter* elicited was registered (scores 0 to 2, from "no knowledge" to "close knowledge").

GNG consists of many questions asking respondents to list people with whom they have specific kinds of support ties[9]. GNG presents items referable to dimensions such as *economic*, *social*, and *emotional support*, or even into *getting*, *giving*, and *swapping* items. Thus, each respondent was asked many questions concerning many supports in order to generate the names of his/her network members[10].

Some items can be regarded as representing a multidimensional view of social support, more or less important regarding exchange of objects or money, or help for everyday reproduction activities; other items regard emotional, companionship, and practical support; finally, some items point out people with whom interaction is probably superficial, limited to talking of this and that. For each item, respondents could elicit up to five people, but this limit was rarely reached, though it was never explicitly declared to respondents[11].

We preferred to develop a single set research design, "one interview – obliged sequence *FNG → GNG*", for three reasons:

9. As usual, we adopted the common distinction between emotional support, material aid or instrumental support (money, goods, and services), information and companionship (see Walker, Wasserman, and Wellman, 1994, p. 56; Agneessens *et al.*, 2006).

10. Comparable examples can be found in the study on social support of a multiethnic community in South California (Schweizer *et al.*, 1998), and in a recent study on the personal networks in Tehran as well (Bastani, 2007).

11. A simple and often used measure of social support defined through GNG is the number of support providers who are available to a person, though the size of a social support network is only a raw image of a complex social support network (Vaux, 1988; Agneessens *et al.*, 2006). Further, different types of social support can be provided by different *alters* (Wellman and Wortley, 1990).

a) it is hard to prepare "comparable or equivalent sets", according to a quasi–experimental design, since no warranty is given that the so few variables are really controlled and that not controlled errors be introduced just by those variables;
b) the small number of interviews (as for social actors involved, not as for the number of elicited *alters*) advised against a quasi–experimental design (say, 50% *GNG* → *FNG* and 50% *FNG* → *GNG*);
c) beyond the quasi experimental option, it is hard, and possibly not reliable, to convince respondents to reply twice at a fixed time distance[12].

12. Finally, a counterfactual approach to the feasibility of the sequence "one interview – obliged sequence *FNG*→ *GNG*" was intentionally avoided, given its character of insufficient evidence and its incomplete methodological legitimacy.

Chapter IV

Data Analysis and Hypotheses Testing*

The interviewees (78) elicited 854 *alters* through FNG, and 957 through GNG. Nevertheless, a certain amount of *alters* was elicited only by a unique name generator (231 through FNG, and 334 through GNG). Over 1,188 *alters* elicited, 623 were declared through both FNG and GNG. It is worth to be noticed that no difference regarding the total number of *alters* elicited is to be found between men (597) and women (591). A further general datum useful to describe and compare personal networks is density *D*, which was computed upon the FNG and GNG triangular matrixes, built upon the *alters* already elicited through the name generators starting questions. The average density of the FNG network and the GNG one is by and large the same (respectively .65 and .66), though with remarkable standard deviations (FNG *s. dev.* = .19731; GNG *s. dev.* = .18473).

As it is shown in Table 4.1, while for both name generators no significant effect is ascribable to the Internet social networks fruition, meaningful asymmetries are noticed for GNG, by interviewees' gender (η = .209) and activity (η = .213), for both name generators by residence (FNG η = .227, GNG η = .290). In particular, women's GNG networks are denser (D = .70) than men's (D = .63), so confirming a commonly stated gender difference in everyday life and sociability.

Again, also regarding the activity, no meaningful density variation is ascribable to FNG, which seems definitely work as an "emotional generator" (names emerge as such, without giving any reference system), whilst remarkable differences are being gathered by GNG as "functional generator" (names are explicitly referred to interaction and support framing), where the double identity of "working

* For the EDP, the package SPSS was employed. We have introduced in the data analysis η instead of η^2 as a consequence of the small number of the sample. Like *r*, the coefficient η varies from –1 up to +1, while η^2 ranges 0 to +1. Both η and η^2 can be conceived as measures of effect size. We can put at |.20| a threshold of significance.

Table 4.1. Density: a comparison between FNG and GNG, by gender, activity, residence and ISN fruition.

	FNG	GNG
Gender	η = .012	η = .209
Men	.65	.63
Women	.64	.70
Activity	η = .092	η = .213
Only Student	.66	.67
Working student	.64	.70
Student worker	.61	.58
Residence	η = .227	η = .290
Permanent resident students	.66	.69
Transient resident students	.59	.59
Commuting students	.70	.72
Internet Social Network users	η = .150	η = .046
Yes	.66	.67
No	.59	.65

students", jointly with their young age, cause the highest value (D = .70), in comparison with the younger "only students" (D = .67) and the more elderly "student workers" (D = .58). Some differences related to the residence are to be found using booth tools: the commuter's ties are denser than the "dweller"'s ones, and especially than the newcomer's ties.

Hypothesis no. 1

As for Hypothesis no. 1, the use of different tools changes the number of *alters* elicited *per capita*. The interviewees elicited 11.6 *alters per capita* through FNG and 12.9 through GNG. FNG elicits less people *per capita* for women (10.5) than for men (11.4), while GNG elicits a comparable *per capita* number (12.4 for women and 12.1 for men). Hence, the first hypothesis is at least supported. A further corroboration of Hypothesis no. 1 can be found in Table 4.2. As an overall result, the GNG number of *alters* is steadily higher than that of FNG, though η values are not fully satisfactory.

Table 4.2. *Alters* elicited: a comparison between FNG and GNG, by activity, residence, and ISN fruition.*

	FNG: average n. of *alters* per respondent	GNG: average n. of *alters* per respondent
Activity		
Only student (44)	11.1	12.4
Working student (22)	10.1	11.8
Studying worker (12)	11.9	12.5
Residence		
Permanent resident students	11.2	12.2
Transient resident students	12.6	13.9
Commuting students	9.0	11.8
Internet Social Network users		
yes (62)	11.2	12.4
no (16)	10.1	11.7
Total (78)	11.6	12.9

* η coefficient values < .20 (*not significant*).

Hypothesis no. 2

Regarding to Hypothesis no. 2, people listed through the two name generators are only partially the same (see Table 4.3): the overlapping of *alters* is 52.4%, with no significant statistical difference between men (53.6%) and women (51.3%). The same Table 4.3 shows remarkable gender differences while comparing FNG and GNG replies. For women the differences between FNG and GNG are stronger than for men. Specifically, the women percentage of *alters* elicited only through FNG is 17.9%, vs. 30.8% through GNG; on the contrary, the corresponding values for men are considerably closer (20.9% vs. 25.5%). Data could possibly mean a better women's perception of the difference between emotional and functional ties.

The *alters*' role elicited can help us interpreting the choices made. As suggested by many Authors, the one best way is to divide the *alters* elicited between relatives and not relatives (Wellman and Wortley, 1990; Bastani, 2007; Plickert *et al.*, 2007). As shown in Table 4.4, meaningful and statistically significant differences between men and women come out, through both FNG and GNG. Relatives elicited by FNG are 23.4% of the total *alters*, while those elicited by GNG

Table 4.3. Comparison between FNG and GNG by gender: *alters'* overlapping.

	% of *alters* only in FNG questionnaire	% of *alters* in both questionnaires (overlapping)	% of *alters* only in GNG questionnaires	*Alters' totals*
Men	20.9	53.6	25.5	597
Women	17.9	51.3	30.8	591
Total	19.4	52.4	28.2	1,188
Chi square =		4.691; $p < .10$		

Table 4.4. *Alters* elicited: relatives–not relatives, by respondents' gender and name generator.

	GNG *Alters* elicited			FNG *Alters* elicited		
Respondents' Gender ↓	Relatives	Not relatives	*Total*	Relatives	Not relatives	*Total*
Men	130	342	472	84	361	445
Women	167	318	485	116	293	409
Total	297	660	957	200	654	854
Chi square =	10.692; $p < .005$			5.307; $p < .025$		

are 31%; the first survey trend is confirmed and also more stressed, because the Chi square values are statistically significant (FNG: 10.7 – $p < .005$; GNG: 5.3 – $p < .025$; $df = 1$).

There are some differences in the network composition related to the specific field of reference: GNG elicits a higher number of relatives than FNG, because relatives are the most disposable supporting actors (above all the parents, who are 44% of relatives elicited through GNG, and 39.5% through FNG). Some differences between interviewees are found by gender: through FNG, women elicit 28% of relatives, and men only 19%; through GNG, lighter though remarkable differences stand out: women 34% of relatives, and men 28%.

There are no statistically meaningful differences regarding the *alters'* role between "dwellers" (= *permanent resident students*), "new-

Table 4.5. Kind of ties (relatives–not relatives) by residence and by name generator.

	FNG			GNG		
	Rel.	Not rel.	*Total*	Rel.	Not rel.	*Total*
Permanent resident students	80	211	291	98	218	316
Transient resident students	68	260	328	103	257	360
Commuting students	52	183	235	96	185	281
Total	200	654	854	297	660	957
Chi square =	4.23; $p < .15$			*not significant*		

comers" (= *transient resident students*) and "commuters". Nevertheless, some differences related to the residence, both using FNG and GNG, can be stressed. FNG elicits more relatives for "dwellers" (28%), supposedly because most of "dwellers" live with their family. Using GNG, the higher percentage of relatives are elicited by "newcomers" 40% (average = 31%), followed by "commuters" (34%) and "dwellers" (31%). Choice differences could be related to different cultural backgrounds and related socialization models: the metropolis for "dwellers", the small–town for others, and specifically Southern Italy traits for "newcomers" (see Table 4.5).

Focusing the *alters'* average number elicited by the interviewees, GNG gathers on the whole more relatives than FNG (3.8 vs. 2.6). Women, however, elicit more relatives than the average through both GNG and FNG (4.3 vs. 3.0), always more than men (respectively 3.3 and 2.2). On the contrary, the opposite is to be found for not relatives: total respondents elicit the same average number of *alters* (FNG 8.4; GNG 8.5), but men elicit a number of not relatives greater than women (FNG 9.3 vs. 7.5 and GNG 8.8 vs. 8.2; see Table 4.6).

Data analysis backs up two statements about name generators. The first instrument (FNG) – pointing out sociability — is likely to elicit a higher number of not relative *alters*, while GNG — registering supports — is more sensitive to relatives, and above all to parents. Women, and young women as well, are more oriented to family ties then men, for both support and sociability (see, for gender differences while searching for social support, Liebler and Sanderfur, 2002).

Table 4.6. Average number of elicited *alters* (relatives and not–relatives) per respondent, by gender and name generator.

	Relatives		Not–relatives	
	FNG	GNG	FNG	GNG
Men	2.2	3.3	9.3	8.8
Women	3.0	4.3	7.5	8.2
Total	2.6	3.8	8.4	8.5

Table 4.7. Comparison between FNG and GNG by use of Internet social networks: *alters'* overlapping.

	% of *alters* only in FNG questionnaire	% of *alters* in both questionnaires (overlapping)	% of *alters* only in GNG questionnaire	*Alters' totals*
yes (62)	18.9	54.2	26.9	949
no (16)	21.8	45.6	32.6	239
Total (78)	19.4	52.4	28.2	1,188
Chi square =		5.664; $p < .10$		

Young interviewees are split into ISN (Internet Social Networks) users (86.1%) and non–users (13.9%); some significant differences are related to the use of the two different tools between the two categories. The overlapping between FNG and GNG is higher for users (54.2%) than for non–users (45.6%). *Alters* elicited only by FNG are less of those elicited only by GNG, both for users (18.9% vs. 27%) and non–users (21.8% vs. 32.6%; see Table 4.7).

No significant differences between FNG and GNG are to be found by activity (only student, working student and studying workers). Also in this case, the number of *alters* elicited by FNG is smaller than by GNG; the overlapping between FNG and GNG is similar for the three groups; studying workers (aged more than the other categories) elicit a higher percentage of *alters* in FNG than others groups, while the percentage of overlapping between *alters* elicited by the two tools is smaller. A possible interpretation is that their particular mix of age and work is explicative of their trend. Finally, it

Table 4.8. Gender homophily in the total personal network (overall *alters* elicitations; FNG and GNG summed; in %.

	FNG + GNG		
Respondents ↓	Men	Women	*Alters' Totals*
Men (39)	59.5	40.5	597
Women (39)	38.2	61.8	591
Respondents' *Total*	48.9	51.1	1,188
Chi square =	53.537; p « .001		

is worth noticing that data filtered by residence are not statistically significant.

Hypothesis no. 3

An important characteristic of networks is homophily between interviewed and *alters* elicited: starting from the principle «birds of feather flock together», confirmed by sociological studies about friendship (Lazarsfeld and Merton, 1954) and stressed by the social network studies, relevance of homophily (of age, gender, race and education) for social networking is impressive (see, for a review, McPherson *et al.*, 2001, pp. 418–419). In this research gender homophily between interviewees and *alters* elicited was tested for both tools (FNG and GNG).

In order to test the respondents–*alters* homophily within the network considered, and above all the independence of homophily from the kind of name generators, we followed a double path: first, an overall analysis of all *alters* elicitations, regardless to the type of questionnaire (indifferently FNG or GNG), so measuring the overall homophily in the total personal network; second, a comparison between FNG and GNG elicitations separately considered, aimed at testing Hypothesis no. 3. Table 4.8 presents the overall results, which show no behavioral difference between men and women.

Again, Table 4.9 shows for men and women a high gender homophily, through both FNG and GNG; the Chi–square values are very high (51.2 for FNG, 53.3 for GNG; $df = 1$). So, the ambivalent

Table 4.9. Network gender homophily: comparison between FNG and GNG by gender of respondents and gender of *alters* (%).

	FNG		GNG		
Respondents ↓	Men	Women	Men	Women	*Alters' Totals*
Men (39)	59.5	40.5	60.7	39.3	597
Women (39)	35.0	65.0	37.1	62.9	591
Chi square =	51.206; p « .001		53.306; p « .001		

results of the pre–testing survey (Vergati, 2011) were definitely overcome using a factorial design. The gender homophily is to be considered a standard behavior, and not a tool artifact. So, Hypothesis no. 3 was definitely corroborated. Gender homophily is impressive using both FNG, and GNG, more marked for women than for men, and more revealed by FNG than by GNG (see Table 4.9).

Conclusion

As data analysis has shown, actually Hypothesis no. 1 (i.e. that FNG bound a smaller network than GNG) was confirmed. The overlapping between FNG and GNG networks is partial, though noticeable (no less than 50% of "core members"); which means that, a part from "core members", the two name generators gather different tie categories: mainly emotional ties FNG, and functional ones GNG. So, relatives are better selected by GNG, while friends by FNG (so, even Hypothesis no. 2 was confirmed). Finally, Hypothesis no. 3 was confirmed: gender homophily prevails through both FNG, and GNG.

Further, the data analysis allowed to give a reply, or otherwise a grounded choice, to two operational questions:

a) Is the use of a single name generator, like FNG, better or worse if compared to a multiple name generator, like GNG?
b) Can the procedural sequence "one interview – *FNG* → *GNG*" work as an "overall tool", in which FNG identifies people who form networks rooted in the emotional context of everyday life, while GNG specifies people who set up supporting social networks?

The overlapping of *alters* proves that there is an impressive, though partial, overlapping between sociability network — gathered by FNG – and support network — gathered by GNG. As a consequence, there are no elements to conclude that a tool is better than the other one, but they are not interchangeable either.

Data analysis shows remarkable differences and asymmetries between FNG and GNG, regarding the number of *alters* elicited, the quality of *alters* (as for their roles, closeness, gender differences, activity) and their social network involvement. Nevertheless, density is .65 by FNG and .66 by GNG (in this regard, no meaningful difference by gender, activity, and social network use is to be found). The operational reply to Questions A and B is to fix a procedural protocol, which uses the two tools together, according to a sequenced administration, "one interview – *FNG* → *GNG*", as done in this survey.

APPENDICES

Appendix A

Name Generators, Name Interpreters and Other Survey Tools

Using a Free Name Generator without any specification of functional concerns gives us the communicational structure of a network. In this case, no information about the behavioral concerns of the single ties is requested. This method treats a network simply as a network, independently from its concerns or "areas of interest"[1] and possible effects, and is akin to the structural bent of SNA (Freeman, for instance). The Guided Name Generator stems a socio–anthropological interpretation of the social action and of its networking. In this paper we have tried to combine the two approaches.

According to Marin (2004) the use of only one name generator may increase the measurement error: «Using network level measure based only on *alters* elicited by a single name generator results in measurement error» (Marin, 2004, p. 303). So that the A. suggests to use more than one name generator: «The list of *alters* collected using the combination of the name generator [which we call in this paper FNG; N. of A's] and prompts are a better representation of a respondent's network».

Between FNG and GNG we can state a stimulus difference. While FNG suggests no frame inside which the respondent is expected to elicit names, GNG gives respondent a precise set of concerns; so that in the first case the respondent recollects from his/her memory names according a bent presumably emotional, while in the second case name recollecting is admittedly functional.

The two sets may coincide or not. Their sum is the "extended network"; their overlapping can be conceived as the "core network". So, using a 2–name generator tool is a device for enhancing the reliability of the survey, and for distinguishing the "core

1. Wellman (2007a, p. 352), gives a brief sketch of name generators, though does not distinguish appropriately between name generators and name interpreters.

network" from the "extended" network (be it emotional or functional)[2].

Since social relations are evolutionary, repeating the same survey in two different moments could probably elicit different *alters* lists. That's why we preferred to employ two different eliciting tools in a single surveying phase[3]. Something of the kind was done for the US GSS (General Social Survey, 1985, 1987, and 1998), where the so called "important matters" name generator to elicit "good friends" (Burt, 1984 and 1985; Marsden, 1987) was used. It was also employed a probe after a first opening question (free)[4].

Brewer (2000) allows us to evaluate the effectiveness of a double FNG–GNG strategy.

a) Forgetfulness: the number of elicited *alters* is slightly related to the number of forgotten *alters*.
b) Strong ties (relatives, friends) prevail: it easier to forget weak ties (functional acquaintances).

So, a single elicitation question is unable to ensure a (possibly) complete list of elicited *alters*, while the multiple elicitation is the best performing strategy, whereas Brewer reminds us that every network "image" is not complete and that, as a consequence, every network measure is necessarily biased. The role of the interviewer is of course pivotal; a not well trained interviewer could influence the interviewee during the elicitation process and during the recollection of ties in different behavioral concerns (Marsden, 2003).

In case a single strategy (FNG or GNG) be devised for a personal network survey, it could be possible to design it as a self–administered questionnaire survey, both in the case of paper questionnaires, and of web–based questionnaires. The second ones are no doubt more efficient, insofar as they are designed through a specific software which prevents interviewees from going back to previous questions. In the case — no doubt more complex — of a mixed FNG–GNG strategy,

2. A good suggestion for using contemporary different name generator tools comes out from Van Tilburg (1998), who employed up to 7 different name generators.

3. Marin (2004) used what we define a 2–step free generator: in the first phase, respondents are invited to elicit their *alters*, and in the second phase to elicit *other* relevant *alters*, not yet listed. Which according to us can stimulate a casual elicitation.

4. McCarty, Killworth *et al.* (2007), and after Golinelli, Ryan *et al.* (2010), cope with reducing respondent burden on personal network structural measures.

direct interviewing if far more reliable, provided interviewers are attentively chosen and trained[5].

In the following pages it is reported the complex questionnaire employed for our survey. It is a highly structured and standardized questionnaire, so designed for allowing a direct uploading of data for statistical purposes. Its thematic structure is as follows.

a) *Basic Structural and Relational Info*: from D01 to D10.
b) *Free Name Generator and Interpreter*: matrix of 25 rows *x* 12 columns (usable codes in a following list).
c) *Triangular Adjacency Matrix for the Free Name Generator*: where is registered the level of acquaintance between *alters'* dyads.
d) *Guided Name Generator*: composed by 20 questions regarding interaction and support concerns (for each of them, the interviewee can list up to 5 names in order of decreasing importance).
e) *Guided Name Interpreter*: matrix of 25 rows *x* 12 columns (usable codes in a following list).
f) *Triangular Adjacency Matrix for the Guided Name Generator*: where is registered the level of acquaintance between *alters'* dyads.

Comparative Survey on Personal Network Detection Tools – Questionnaire no. |_|_|

D01. Gender: 1. M □ 2. F □
D02. Department: _____
D03. Year of Birth: |_|_|
D04. Residence:

1) Permanent resident student (in site student) |_|
2) Transient resident student (off site student) |_|
3) Commuters (off site commuting student) |_|

5. We only cite the proposal of Eagle and Proeschold–Bell (2015), of doing a one generator survey through phone interviewing, which cuts–off the interviewee from any possible control over the registering procedure.

D05. Householding:

1) Living with relatives |_|
2) Living with personal friends|_|
3) Living with unrelated people |_|
4) Living with partner |_|
5) Living alone |_|

D06. Region of Origin:

1) The same of the university |_|
2) Other regions |_|

D07. Activity:

1) Full–time student |_|
2) Working student (temporary and casual jobs) |_|
3) Student worker (works full time and also studies) |_|

D08. Classes Attendance Type:

1) Regularly attending |_|
2) Irregularly attending |_|
3) Not attending |_|

D09. Relationship:

1) Are you enrolled or participating in cultural or leisure associations?
   1. Yes |_| 2. No |_|
2) Are you enrolled or participating in sports clubs?
   1. Yes |_| 2. No |_|
3) Are you enrolled or participating in political associations?
   1. Yes |_| 2. No |_|
4) Do you take part in Internet social networks (Facebook, Twitter, etc.)?
   1. Yes |_| 2. No |_|

D10. Affective Relations: during this time you have a steady partner?
1. Yes |_| 2. No |_|

Table 1. Free name generator and interpreter: please, list people with whom you have usual or enough frequent contacts (face–to–face, phone, Internet).

	Name	A. Gender	B. Age	C. Town of Birth	D. Town of Residence	E. Relation	F. Education	G. Activity	H. Duration	I. Frequency	J. Media	K. Support	L. Emotional Closeness
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													

Table 2. Free name generator and interpreter codes.

A. Gender	M = 1; F = 2
B. Age	No. of years
C. Town of Birth	1 – The same origin of the interviewee; 2 – Other origin
D. Town of Residence	1 – Rome; 2 – Other town (the same of the interviewee); 3 – Other town (different from the interviewee)
E. Relation	1 – Father; 2 – Mother; 3 – Brother; 4 – Sister; 5 – Grandparent; 6 – Cousin; 7 – Uncle/Aunt; 8 – Other Relative; 9 – Partner; 10 – Friend; 11 – Roommate; 12 – Neighbor; 13 – Former Schoolmate; 14 – Co–Worker; 15 – Fellow Student; 16 – Professor; 17 – Acquaintance; 18 – Other
F. Education	1 – Middle school diploma; 2 – High school diploma; 3 – University degree
G. Activity	1 – Full time worker (incl. retired); 2 – Full time student; 3 – Working student (study plus temporary and casual jobs); 4 – Student worker (full time or fixed–place job plus study); 5 – Neither study nor job (incl. housewives)
H. Duration	*How long have you known this person?* encode in entire years 1, 2, …; if > 6 months e < 1 year, encode 1; se < 6 months, encode 0
I. Frequency	*On average, how often do you get in touch with this person?* 8 – many times a day; 7 – daily; 6 – more times a week; 5 – once a week; 4 – several times a month; 3 – once a month; 2 – several times a year; 1 – seldom
J. Media	Mainly … 1. Face–to–face; 2. Phone; 3. Email, chat, etc.; 4. Facebook or similar
K. Support	*What do you expect more from these people?* record the total number of entries amongst 15 following: 1 – study together; 2 – a valuable object loaned; 3 – exchange our clothes; 4 – get information; 5 – help for home commissions; 6 – a small loan; 7 – a large sum of money; 8 – talk about emotional problems; 9 – talk about family problems; 10 – talk about my commitments; 11 – spend our free time at home; 12 – spend our free time away from home; 13 – spend a week end out of town; 14 – spend our summer holidays; 15 – spend the holiday season
L. Emotional Closeness	Very far = –5; … –4; … –3; … –2; … – 1; indifferent = 0; … +1; … +2; … +3; … +4; … +5 = Very close

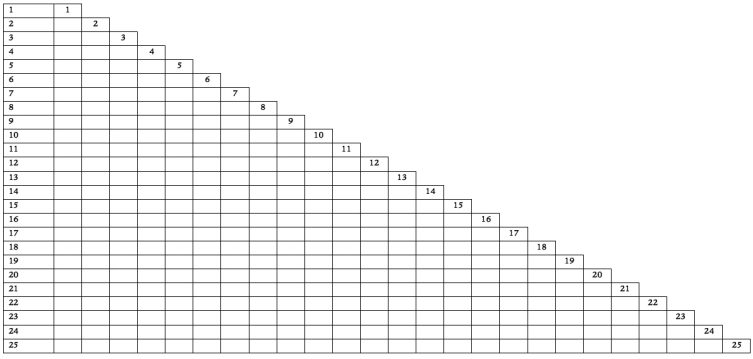

Figure 1. Triangular adjacency matrix for FNG.*

* The interviewee should list in the first column people elicited in the Free Name Generator above, up to maximum of 25. Starting from Person 1, for the other – from Person 2 on – encode: 2, if Person 1 and Person 2 know each other well; 1, if Person 1 and Person 2 are simple acquaintances; 0, if Person 1 and Person 2 do not know at all.

Guided Name Generator (list at maximum 5 names for each interaction concern, in descending order of importance)

a) When you study along with others, who do you prefer to do it with?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

b) Who would you lend a car to, or who would you borrow a car from?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

c) Who would you swap books, music or films with?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

d) Who would you swap a laptop with?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

e) Who would you swap clothes with?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

f) Should you need information for your usual activities, who would you apply to?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

g) Should you need help for home commitments, who would you apply to?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

h) Should you need a small loan, who would you apply to?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

i) Should you need a large money amount, who would you ask for a loan?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

j) If you had emotional problems, who would you prefer to speak with?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

k) If you had family problems, who would you prefer to speak with?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

l) If you were unable to meet your obligations, who would you prefer to speak with?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

m) Who do you prefer to spend your leisure time at home with?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

n) Who do you spend your leisure time away from home with?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

o) Who would you prefer to spend a week end away from home with?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

p) Who did you spend your summer holidays with?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

q) Who do you prefer to spend the season holidays with?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

r) Who do you prefer to have a chat together?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

s) Who do you consult with for a purchase to do?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

t) Who do you prefer to go shopping with?
1. _____ 2. _____ 3. _____ 4. _____ 5. _____

Table 3. Guided Name Generator: list at maximum 25 people, registering among the above mentioned those you have regular or frequent enough contacts with.

	Name	A. Gender	B. Age	C. Town of Birth	D. Town of Residence	E. Relation	F. Education	G. Activity	H. Duration	I. Frequency	J. Media	K. Support	L. Emotional Closeness
1													
2													
3													
4													
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25													

Table 4. Guided Name Generator codes.

A. Gender	M = 1; F = 2
B. Age	No. of years
C. Town of Birth	1 – The same origin of the interviewee; 2 – Other origin
D. Town of Residence	1 – Rome; 2 – Other town (the same of the interviewee); 3 – Other town (different from the interviewee)
E. Relation	1 – Father; 2 – Mother; 3 – Brother; 4 – Sister; 5 – Grandparent; 6 – Cousin; 7 – Uncle/Aunt; 8 – Other Relative; 9 – Partner; 10 – Friend; 11 – Roommate; 12 – Neighbor; 13 – Former Schoolmate; 14 – Co–Worker; 15 – Fellow Student; 16 – Professor; 17 – Acquaintance; 18 – Other
F. Education	1 – Middle school diploma; 2 – High school diploma; 3 – University degree
G. Activity	1 – Full time worker (incl. retired); 2 – Full time student; 3 – Working student (study plus temporary and casual jobs); 4 – Student worker (full time or fixed–place job plus study); 5 – Neither study nor job (incl. housewives)
H. Duration	*How long have you known this person?* encode in entire years 1, 2, …; if > 6 months e < 1 year, encode 1; se < 6 months, encode 0
I. Frequency	*On average, how often do you get in touch with this person?* 8 – many times a day; 7 – daily; 6 – more times a week; 5 – once a week; 4 – several times a month; 3 – once a month; 2 – several times a year; 1 – seldom
J. Media	Mainly … 1. Face–to–face; 2. Phone; 3. Email, chat, etc.; 4. Facebook or similar
K. Support	*What do you expect more from these people?* record the total number of entries amongst 15 following: 1 – study together; 2 – a valuable object loaned; 3 – exchange our clothes; 4 – get information; 5 – help for home commissions; 6 – a small loan; 7 – a large sum of money; 8 – talk about emotional problems; 9 – talk about family problems; 10 – talk about my commitments; 11 – spend our free time at home; 12 – spend our free time away from home; 13 – spend a week end out of town; 14 – spend our summer holidays; 15 – spend the holiday season
L. Emotional Closeness	Very far = –5; … –4; … –3; … –2; … – 1; indifferent = 0; … +1; … +2; … +3; … +4; … +5 = Very close

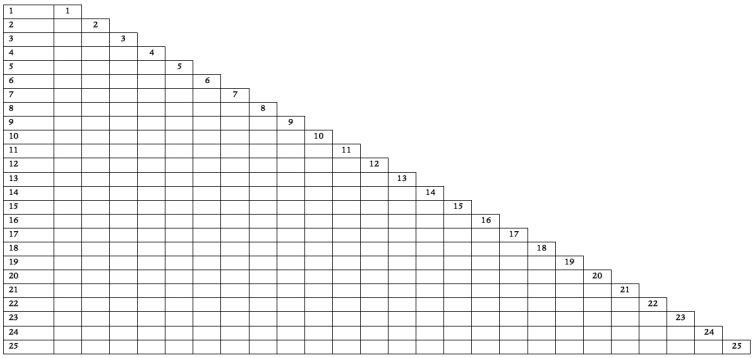

Figure 2. Triangular adjacency matrix for GNG.*

* The interviewee should list in the first column people elicited in the Guided Name Generator above, up to maximum of 25. Starting from Person 1, for the other – from Person 2 on – encode: 2, if Person 1 and Person 2 know each other well; 1, if Person 1 and Person 2 are simple acquaintances; 0, if Person 1 and Person 2 do not know at all.

Appendix B

Visualizing Personal Networks

In principle, visualizing networks is strictly akin to the graphic representation of sociograms. And we can add that from a graphic viewpoint no specific technical difference is to be found between *ego*/personal networks and social networks generally speaking.

An overall look to the literature on network visualization shows that the technical attention is attracted by three main focuses:

a) the ties derived from Internet social networks;
b) the ties linking communication expressions (so that the visualization becomes a part of textual analysis);
c) the visualization of network transformation in time[1].

The network representation does not escape two main points:

a) the graphic transferable in the normal process of scientific communication is anyway bi–dimensional;
b) apart from algorithms (anyhow not clearly explained) of software that turn network values and indices into graphic representations[2], there is no commonly shared syntax of the conventional representations (in other terms, of the morphology), e.g. as for conventional graphic representations of the strength and durability of ties.

That's why it should be always remembered that graphic representations are conventional; so that we could get many graphic representations for the same set of parameters[3]; yet, the different

1. See McGrath *et al.* (2003); Steele and Iliinsky (eds., 2010); in which Krebs (2010) and Perer (2010); also Wu, Pitipornvivat *et al.* (2016). Generally, on graph drawing and network visualization, see Di Giacomo and Lubiw (eds., 2015).

2. The software employed for processing and visualizing networks was UCINET.

3. See Freeman, Webster and Kirke (1998).

graphic representations are evidently based upon a *common structure* of reciprocal ties, derived by those parameters. A graphic representation as such is an insufficient "imagery"[4] to account for a network, though giving a conventional image of it; on the other hand, a set of values, parameters, and indices should rely on a powerful graphic image that facilitates the understanding of numerical values.

As a consequence, a correct analysis of personal network will be based both on network representations and network parameters. As Freeman puts it: «Visual images can be used to examine the patterning of network data, [...] to use images in a exploratory way to learn something about the properties of a network data set» (2005, p. 248).

In Table 1 are reported the values of parameters for the 78 personal networks studied in this research paper. The 78 network visualizations are reported in Figure 1.

Table 1. Some *ego* indexes useful for personal network visualization.

Ego no.	Size	Betweenness centrality	Clustering coefficient
01	8	1.000	.857
02	19	97.975	.386
03	14	11.517	.582
04	10	2.952	.800
05	9	.000	1.000
06	9	32.452	.417
07	24	66.774	.453
08	12	14.019	.606
09	19	55.311	.357
10	11	4.750	.800
11	17	17.226	.610
12	11	3.188	.709
13	11	6.267	.673
14	7	.000	1.000
15	9	5.167	.667
16	8	1.250	.821
17	12	1.542	.864
18	14	9.386	.593
19	14	7.588	.681
20	12	2.167	.833
21	12	2.410	.818

It continues in next page

4. "Imagery" is a concept–term used by Freeman (2013), probably recalling Lazarsfeld.

It continues from previous page

Ego no.	Size	Betweenness centrality	Clustering coefficient
22	16	7.731	.667
23	12	6.000	.621
24	11	28.400	.455
25	15	19.994	.581
26	10	3.000	.756
27	19	62.679	.532
28	20	77.053	.511
29	10	1.493	.822
30	6	.167	.933
31	10	2.700	.733
32	8	7.000	.750
33	7	.167	.952
34	19	27.459	.532
35	11	4.758	.673
36	12	39.333	.303
37	14	4.679	.791
38	11	5.593	.655
39	12	28.967	.409
40	10	4.600	.667
41	15	12.561	.629
42	15	2.410	.543
43	9	2.583	.750
44	12	8.233	.561
45	17	54.385	.368
46	15	2.410	.819
47	9	.843	.861
48	16	46.977	.450
49	5	5.000	.400
50	10	25.333	.378
51	15	39.817	.390
52	11	11.217	.527
53	9	9.667	.639
54	10	11.667	.622
55	5	.000	1.000
56	9	19.000	.417
57	12	23.383	.424
58	9	.500	.917
59	16	44.023	.708
60	11	4.150	.655
61	15	12.721	.562
62	13	21.200	.513
63	10	16.000	.556
64	8	1.867	.750

It continues in next page

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Ego no.	Size	Betweenness centrality	Clustering coefficient
65	14	2.911	.582
66	13	1.600	.897
67	7	1.500	.762
68	10	.000	1.000
69	8	7.650	.643
70	15	1.209	.600
71	6	.000	1.000
72	7	.000	1.000
73	6	.000	1.000
74	8	8.333	.607
75	9	8.143	.750
76	18	21.676	.516
77	10	6.176	.733
78	13	4.000	.487

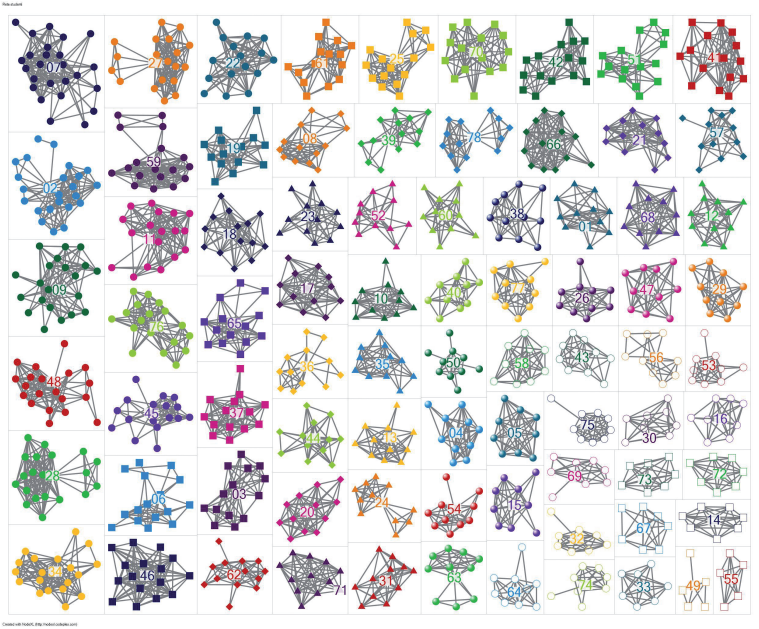

Figure 1. Visualizing 78 personal networks.

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