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A snowball sample of personal networks

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The influence of social contacts on leisure travel: A snowball sample of personal networks

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Abstract In a joint project the Institute for Transport Planning and Systems (IVT) of ETH Zurich and the Institute for Land and Sea Transport (ILS) of TU Berlin collect information on personal networks to investigate the influence of these networks on leisure travel. The project will model the influence and implement the results in advanced agent based travel simulations. The survey methodology follows the egocentric network approach, by asking respondents for information on a specific part of their social network: Leisure contacts. Unlike most studies using this method to survey isolated network components this project combines it with an ascending sampling strategy, called snowball approach, to survey connected egocentric network components to obtain information on the topology of the (total) network. As the survey is still in the field the paper aims to present the survey methodology and –instrument and give an overview on the data collected so far. The main focus of this descriptive summary lies on the size and structure of the personal networks, their spatial distribution and the question how people stay in contact with respect to the geographical distance between them. By giving a brief introduction to similar studies in transport planning, their results, and some basic concepts from social network analysis the potentials of the present project will be highlighted.

1. Introduction

Explaining leisure travel is challenging transport planning. In recent years there has been increasing interest to use the methods of social network analysis as a new approach to help explain leisure travel. In this context the Institute for Transport Planning and Systems (IVT) of ETH Zurich and the Institute for Sea- and Land-Transport (ILS) of TU Berlin collect information on personal net-
works and their influence on the individual leisure travel behavior in a joint project.

Whilst there have been earlier studies focusing on the link between leisure travel and social contacts, these projects were starting points. Using the methods of social network analysis in transport planning is still at an early stage and many questions still remain open.

The present project aims especially to collect data on two topics: The precise structure of personal networks, their geographical spread, the contexts in which persons get known to each other, and the modes they use to stay in contact. Topic number two focuses on joint activities: Their planning backgrounds and the locations where they are performed.

Surveying these two kinds of information for at least 500 respondents means to generate a large database to investigate the link between leisure travel and the influences of an actors‘ social environment on the individual leisure travel behavior.

The paper first gives a brief overview on earlier studies in transport planning which used the methods of social network analysis and general findings from these investigations. This introduction is followed by a presentation of the survey methodology and of the instrument used here. As the survey is still ongoing, part three of the paper shows first empirical results while focusing on the structure of the network surveyed, its geographical spread and the contact modes and frequencies used by the respondents and their acquaintances.

2. **Focusing on leisure travel: Recent work**

Recent empirical work has shown leisure travel to be the dominant segment of travel. In the Swiss Microcensus (BFS and ARE 2007), this result is obvious with a leisure share of 51.5%. Besides, empirical support for a generalisability of this result can be found at least for Western Europe and North-America in various travel surveys. Table 1 gives an overview of results from different national surveys.
Table 1. Share of trips by trip purpose [%]

<table>
<thead>
<tr>
<th>Trip purpose</th>
<th>Switzerland</th>
<th>Germany</th>
<th>UK</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leisure</td>
<td>51.5</td>
<td>35.0</td>
<td>26.1</td>
<td>42.9</td>
</tr>
<tr>
<td>Work/School</td>
<td>28.9</td>
<td>18.2</td>
<td>24.8</td>
<td>22.6</td>
</tr>
<tr>
<td>Shopping/Private business</td>
<td>13.3</td>
<td>34.8</td>
<td>31.2</td>
<td>22.6</td>
</tr>
<tr>
<td>Escorting others</td>
<td>1.0</td>
<td>6.4</td>
<td>13.6</td>
<td>10.1</td>
</tr>
<tr>
<td>Others</td>
<td>5.4</td>
<td>5.6</td>
<td>4.3</td>
<td>1.7</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

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

Often leisure travel is described as primarily driven by social motivations, e.g. to visit friends or relatives or to join them in activities. Leisure travel can be described as social travel (see Larson et al., 2006). Explanations for leisure travel need to take into account the social contacts of an actor as “the distribution of these friends, relatives, acquaintances and contacts across space, or better space-time becomes crucial to an understanding of leisure travel and its potential for further growth (Axhausen 2005: 90).

To investigate the link between leisure travel and social contacts, transport planning tries to use the methods of social network analysis as these methods allow a focus on the actor and his or her social environment at the same time. In recent years first studies using these methods were conducted. To give a brief overview some illustrative examples are discussed below.

Combining two quantitative questionnaires and a qualitative guided interview, data on communication practices, geographies of travel, and friendship as well as family networks were collected by Larson et al. (2006). By implementing data on travel, communication and meetings into an analysis of the social network of 24 respondents from Liverpool, Manchester and Lancaster the geographical spread of social networks and the consequences for either social live and travel pattern were analysed. In addition the efforts, strategy and technology used to arrange physical meetings were investigated with the help of this dataset (Larson et al., 2008). By establishing the link between social networks, locations and travel the main conclusions of this project are the necessity to understand the biographies and mobilities of most people as embedded in social networks and therefore being connected to other persons rather than being individualized. As most respondents live their social
live in a nationwide or even international rather than in a local frame leisure travel can, especially in comparison to business travel, not be seen as unnecessary and avoidable. Resulting from that conclusion it is suggested to use not only the traditional approach of transport planning, focussing on travellers as economic agents interacting in market situations but in addition to understand them as network-based actors enabling and constraining each other in their individual actions (also see Axhausen, 2008).

The dissertation of Carrasco (2006) at the University of Toronto focuses on the social dimension of activity-travel by using an ego-centric social network approach. The main questions of the project are how data on personal interactions help to explain the generation of joint activities and how these interactions are spatially distributed (also see Carrasco et al., 2008a). By assuming social activities as emerging from the spatial network of persons, 350 participants in the East York area of Toronto were asked about contacts of high emotional importance to them. The data were collected with a questionnaire. In addition, personal interviews were conducted with a 25% subsample of the original survey population. In the centre of these interviews stood a survey instrument asking the respondent not only to mention social acquaintances but also to structure them in the way they are known to and interacting with each other visually (Hogan et al., 2007). The data analysis of the respondents’ personal and their ties’ relational characteristics showed those factors that are influencing the generation of social activities. Also they reported on the spatial spread of living and meeting points and, in connection with the geographical distance between persons, the mode used to stay in contact (Carrasco et al., 2008b). Besides, surveying a larger sample than Larson et al. the study is very local. Both teams, Carrasco et al. and Larson et al., highlight the relevance of the social influence on the individual travel behaviour and point out the need of further research.

To collect data on social interactions and travel behaviour simultaneously a three-day interaction diary was used by Silvis et al. (2006). The respondents were asked to write down all trips and social interactions in terms of purpose, mode, and participants. In addition some questions, mostly on socio-demographics, were asked for each participant. Whilst the study did not use a questionnaire but a diary, this was not the only special feature. Another characteristic was the sampling strategy. By collecting data on social interactions the team tried to use face-to-face meetings as the base
for recruitment. Starting with three participants these persons were asked to give a postcard to each person they interacted with face-to-face. On the postcards was a text asking for voluntary participation being easily possible by contacting the researchers. Within a two-month timeframe 24 participants were recruited on three levels reporting 505 trips and 972 social interactions. Besides problems with the sampling strategy and the survey instrument, a high item-non-response, a low response rate, there are hints of selection bias, that is selectivity with regards to persons the respondents handed the postcard to. A first result from the study was that the recorded trips made for social purposes were on average longer than those for other purposes. Second the number of social interactions was correlated with the number of social trips. Third the number of reported trips was positively correlated to the number of reported repetitive social contacts. In general two kinds of activity travelling behaviour were differentiated: One group of respondents undertaking a large number of short trips to meet a large number of people individually and another group making few long trips to meet many people at one place simultaneously. As the sample size was small the study has an exploratory character. To improve the generalisability of results a larger database and additional research is needed.

307 respondents of a random sample participated in an interview aided network questionnaire focussing on individual mobility biographies and the geographical distribution of emotionally important acquaintances by Frei and Axhausen (2007). In addition the study retrieved the communication modes used by the respondents and their acquaintances to stay in contact (Axhausen and Frei, 2007). In conclusion the analysis shows nearly two thirds of the acquaintances living within a 25 kilometre radius from the respondents’ home locations. The findings are very similar to those of Larson et al.: People mix local ties with those they have in a nationwide or even international frame. To focus on the link between mobility biography and the geographical spread of spatial networks a structural equation model was estimated (Ohnmacht et al., 2008). The analysis of the mode used to stay in contact showed a correlation between the share of these modes and the geographical distance between the respondents and their acquaintances. Similar to the study of Carrasco et al. the project was very local in terms of the survey population. Besides, it did not collect data on the acquaintances’ characteristics and the structure of the network in terms of
relationships between the social contacts. Those data would be useful to draw a more detailed picture of the link between individual travel decisions and influences coming from the personal network.

These studies are starting points as their character is either exploratory because of small survey populations or local due to the limited geographical area of recruitment. Further research is needed especially in terms of the precise structure and geographical spread of personal networks. To estimate long-term models and implement these data in an agent based transport simulation it would be helpful to know where, when and in which context two acquaintances have met the first time and how they stay in contact nowadays. Also information about the evolution of joint activities and their planning backgrounds are needed. To be able to do inferential analysis and generalize the results a large and representative database must be build, both in terms of respondents and the geographical frame of the study.

3. Collecting data on personal networks and joint activities

Corresponding to the data needed the present survey study harnesses two sources of information together: Data on the structure of personal networks and data on daily and joint activities. For this reason the survey instrument is split into two parts. The first part is a questionnaire focusing on information about personal networks, while the second part is a diary collecting data on daily activities. The entire survey population is asked to participate in the questionnaire. All respondents are asked to also participate in the diary afterwards. A similar project, using a diary as the first part of the survey instrument and a questionnaire as the second, only for a subsample of respondents, can be found in Van den Berg et al., (2008).

3.1 The survey methodology

Like in the cases of most studies mentioned above, the present survey uses the egocentric network approach to collect information
on the respondents’ social contacts. This is done by using the name generator technique, asking the participants, called egos, to report their social contacts, the alters (Wolf, 2004). The name generator implies questions providing one or several stimuli. There are name generators trying to collect information on the entire social network of a person (see McCarty et al., 1997) the name generator technique is more often used to focus ego on that specific part of his or her contact network that is of interest for the study. The second aim in providing stimuli is to help ego to remember these contacts at all. It is a well documented phenomenon that the human brain remembers concrete facts much better when receiving a specific stimulus, an unsupported collection of social contacts is not recommendable (see Pool and Kochen, 1978).

In the early years of the name generator technique it was common to give a certain context and therefore to design name generators asking for ‘friendship’-, ‘work’-, or ‘family’-related alters. The main problem of this role-relation approach is the context-stimulus being interpretable in different ways, e.g. friendship is not a homogenous concept between different cultures or even within one culture between different social milieus. Besides, this concept of a global name generator can lead to difficulties in the data analysis as a person can be a friend as well as a co-worker or family member (Hill, 1988). Most of today’s name generators deal with concrete stimuli to avoid these difficulties (for an overview on different kinds of stimuli see Marin and Hampton, 2007). Another recommendation in designing a name generator is to use more than one question to give ego the chance of mentioning alters he has forgotten when answering the first question. As those forgotten alters result in bias it must be the aim of the name generator to survey the egos’ contacts as completely as possible (Marin, 2004).

The advantage of the egocentric network approach is the possibility to collect data on personal networks and limit the network to those contacts that are of interest for the study. The disadvantage is that the egos do not mention their contacts randomly or completely but selectively at least in two ways: First the egos have to remember their contacts and second they have to mention them. Besides using several questions and concrete stimuli there is, in terms of the name generator, not much that could be done to change an egos mind if he or she does for some reason not want to name a certain alter.
Most studies applying the egocentric network approach focus on isolated network components. These personal networks do not overlap in terms of shared contacts and if they do it happens by chance. To get a better view on the geographical spread and topology of egocentric networks the current study samples iteratively connected personal networks by taking a snowball sample. In extension to the aim of data collection the alters mentioned in the name generator are in the case of a snowball sample also used as the basis for the further recruitments.

The snowball technique belongs to the family of ascending sampling strategies. Few respondents, called ego-seeds, are used as starting points for the snowball chain and asked to report their contacts. The strategy aims to continue the data collection with these contacts again asking them to report their social contacts and so on. By definition a snowball sample is “A technique for finding research subjects. One subject gives the researcher the name of another subject, who in turn provides the name of a third and so on” (Vogt 2005: 300; also see Goodman, 1961; Gabler, 1992). Whilst snowball samples are most often used to collect information on hidden populations, e.g. drug users and other special populations (see Salentin, 1999; Atkinson and Flint, 2001; also see Heckathorn, 1997), they can also be applied to sample large connected egocentric networks (Coleman, 1958). Unlike the studies of Carrasco (2006) and Frei and Axhausen (2007) sampling unconnected egocentric networks in a local frame, the present survey is started with 60 ego-seeds in a regional frame, the canton of Zurich, and continues with the alters mentioned in the name generator. These alters, the Iteration 1 survey population, become part of the recruitment process and, in the case of participation, Egos themselves. The project aims to recruit at least 500 participants wherever they are located in two iterations. Using only so few ego-seeds implies the risk of random error in a random sample in terms of representativity. To represent the heterogeneity of the canton’s population a stratified random sample in terms of age, sex and living location, whether being a city, town or rural area is used to recruit the starting points for the snowball chain. Figure 1 shows the ascending strategy exemplarily.
Fig. 1. Scheme of a snowball chain

Taking a snowball sample has the advantage of drawing a more detailed picture of personal networks within large populations and geographical frames in terms of topology and spatial distribution. But there are also disadvantages. The snowball technique does not generate random samples. It is known to have several sources of data bias. All persons from the iteration levels are selectively given by the egos arbitrarily, intentionally or unintentionally. The structure of the network is therefore biased by the egos’ choice. “Of all possible paths, the ones actually traced by a sample of respondents depend in part on their decisions about sending chains onward – for example, their decisions to pass rumors to certain acquaintances but not to others” (Erickson 1979: 277). To be able to compare the participants on the iteration levels with the random seeds and check if there are systematically differences, the random sample is of high importance (for further information on bias in snowball samples see Kowald et al., 2008). To decrease the influence of this bias it is recommended to limit the iterations of the snowball and keep control over the chain as far as possible in researchers’ hands. A method to estimate the amount of bias coming from the snowball chain is developed by the team of TU Berlin (see Illenberger et al., 2008).
There is another risk of non-representativeness resulting from the combination of egocentric networks in a snowball approach. In network studies the phenomenon of homophily is well documented (see McPherson et al., 2001). It describes an increasing likelihood of a relationship between two actors the more similar these actors are in certain characteristics. Starting the snowball process with non-representative seeds therefore implies the risk of taking a biased overall sample as the snowball could be captured in a very homogeneous cluster. For this reason three snowball sub-samples will be started consecutively. Each sub-sample will use 20 ego-seeds. As soon as these 20 seeds have replied, the snowball chain is run to the end of Iteration 2. Then the recruitment process for the next 20 seeds is started. By constantly comparing the data against nationally representative figures it will be checked if the snowball is captured in a specific cluster and corrective measures will be taken, if needed.

3.2 The survey instrument

The survey instrument is divided into a network questionnaire focusing on personal networks and an activity diary collecting data on daily activities and their planning backgrounds. To enable participation for as many persons as possible, which is necessary to keep the snowball running and to avoid bias resulting from a selective mechanism like a language barrier, both survey instruments are designed as a paper and an electronic version and both versions are available in both German and English.

The first part of the survey instrument is a questionnaire addressing the personal network of the respondents. The questionnaire has four parts. Part one contains questions on ego’s characteristics. Part two is the name generator. It aims to collect the names of ego’s contacts. Part three is a name interpreter and contains questions on the characteristics of each of ego’s contacts mentioned in the name generator. Part four is a sociogram, asking ego to report the structure of his or her personal network. Most questions, especially from parts one and three are comparable to the earlier study on social networks by Frei and Axhausen (2007).
answer categories were adopted to be able to compare the survey populations. For some questions categories were added.

Besides socio-demographics part one of the questionnaire collects data especially on the egos’ mobility biography, the places they have lived in the course of their lives, and their education and work biography.

The name generator was developed for the present study. It focuses on leisure contacts, and, to give an additional stimulus, on contacts being of emotional importance for ego. The wording of the name generator is:

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

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

The space for writing down names is limited to 29 names in case of the first question and 11 names in case of the second question. Ego is asked to use household objects and photo albums to jog their memories and to remember contacts.

The name interpreter asks for some basic socio-demographics of the alters. In addition it asks Ego to report the year, context and location he or she has met a specific alter the first time and the contact mode and frequencies used to maintain their relationship. Of course Ego is also asked to write down the postal address of each Alter, to be able to continue with the snowball chain.

The fourth and last part of the questionnaire is a sociogram. Originally a sociogram is a graphical form of representing the network structure. Carrasco et al. (2006) designed a sociogram as an extension to the traditional name generator technique to survey information on egocentric networks in the East York area of Toronto city (also see Hogan et al., 2007). Whilst they made very good experiences with the instrument in terms of data quality and reliability, the instrument caused a high amount of response burden and needed a large number of props, such as colored pens, stickers and a large sheet of paper. The complexity of the sociogram made it necessary to provide respondents the help of an interviewer that had to be trained first. This is not feasible for a snowball sample and a large number of respondents. In trying to decrease the response burden as far as possible, keep the instrument simple, standardize it, and survey many respondents without additional help, a
new version of a sociogram has been developed. It asks ego to structure his contacts by naming those cliques of persons making plans to spend their time with one another and are therefore in close personal contact. Ego can do this by giving a name to the clique, e.g. ‘hiking group’ or just ‘family’ and write down a shortcut from the name generator to join persons. Using this design the sociogram is much simpler than the one used by Carrasco et al. (2006) and more intuitive than a simple sociomatrix.

The second part of the survey instrument is a travel diary. The design of the paper version is taken from a former study of the IVT (see Axhausen et al., 2001; Schlich et al., 2002). Only few questions were changed or added. The electronic version was originally designed by Dr. Sean T. Doherty and his team as a part of a larger survey project (see Doherty, 2009). The diary aims to collect data on daily activities and the planning processes of these activities.

All participants from the network questionnaire are asked to fill out the diary, too. Used as the second part of the survey instrument the diary asks for the willingness of the respondents to take on a further response burden. Therefore only a subsample of the questionnaire population is expected to participate in the diary, too.

Respondents are asked to report all trips and activities for eight days consecutively. This time frame was chosen for two reasons. On the one hand every day reported in a diary is equal to a specific amount of response burden. As the diary is the second part of the survey instrument this amount should not increase too much. On the other hand the time frame was chosen to survey at least one week given that many trips and activities follow weekly routines. Besides, asking which kind the reported activities were, the questions especially ask for the geographical locations and persons joining the respondents in these activities.

So respondents are, unlike in the name generator, asked to report their actual social interactions for eight days. With the diary the respondents receive a list of all names they mentioned in the name generator. For each name a shortcut is offered in the list. By using this shortcut in the diary respondents can easily report contacts they already mentioned in the name generator but also report not yet mentioned contacts joining them. This allows to compare the network interpreter questions of the contact frequency for at least this one eight day period. Also an analysis of the amount of bias from the egocentric network approach will be possible because
“Compared with one shot surveys or interviews, contact diaries enable researchers to minimize distortion caused by bias in recollecting, selecting, and summarizing across many events. Diaries can be more reliable than questionnaires, and they can be used as a yardstick to evaluate the validity of other techniques” (Fu, 2009).

In addition three questions survey information about the planning background of the reported activities: How often Ego has participated in such activities before, how long the activity had been pre-planned and who, of all participants, has planned it.

3.3 Arrangements to increase response rates and data quality

Surveying information on personal networks implies asking for confidential information. This information, most of all the questions of the name interpreter asking Ego to report various characteristics of the alters, are even more confidential in the case of a snowball sample. To calculate the geographical distance between the social contacts and to achieve the possibility of continuing the ascending sample the egos are asked to report the postal addresses of their contacts. One aim of a snowball sample is to recruit as many of the persons mentioned by a respondent as possible. Besides, a snowball chain is always influenced by the contacts an Ego selectively mentions, another source for bias would be to not take into account all alters mentioned. To reach this aim several additional arrangements were developed and employed in the survey project described here.

The first element is an Internet page providing detailed information about the background of the project, the persons involved and giving a brief introduction to the survey instrument. Also all publications resulting from the project can be downloaded. The page aims to increase the transparency of the project and, by doing so, establishing trust between the surveying institution, ETH Zurich, and all possible respondents.

The second element tries to use an effect resulting from the snowball chain to establish trust and increase the response rate. In giving an Ego the chance to send a greeting postcard to the alters, alert them about having mentioned their names and ETH coming and asking for participation in a research project, these persons
would recognize that one of their contacts already trusted and participated in this project. Therefore they are more likely to also fill out the questionnaire. “Knowing that other persons like themselves have completed a similar action can strongly influence peoples’ willingness to comply with a request” (Dillman, 2000: 17). The postcard is again designed in German and English. Figure 7 shows the front- and backside of the greeting card. An Ego not providing greeting cards for the Alters stays anonymous in the process of recruitment. The Alters are only told that ‘an acquaintance’ mentioned them as social contacts.

All participants receive a 20 CHF incentive for their efforts. Giving money or tokens to persons filling out a questionnaire again implies the risk of data bias. To check whether the money is influencing persons with particular characteristics, all participants on the level of the Ego-seeds do not know about the incentive until having filled out the questionnaire. All other respondents, found on the iteration levels of the snowball, receive the incentive together with the questionnaire. Sending the money with the questionnaire aims to show trust in the potential respondents from researcher’s side. “Much research has shown that ‘token’ incentives given with the request to complete a questionnaire, a form of social exchange, consistently improve rates. (...) However, a promise to pay people for completing a questionnaire by sending them a payment afterwards (economic exchange) does not” (Dillman, 2000: 14f.). The potential participants could easily adduce their part of this social exchange by answering the questions and returning the questionnaire. Respondents not living in Switzerland get the incentive in the currency of the country they are living in.

To establish and achieve contact with the respondents a multi contact strategy is used. This includes an announcement letter, a recruitment call, a thank you letter and, if needed, a reminder letter. The reminder letter is sent when a potential respondent did not react within three weeks after sending the questionnaire. The thank you letter for participating in the questionnaire is at the same time the announcement letter for the activity diary and is again followed by a recruitment call and the other contacts. Persons only participating in the questionnaire had at least four to five contacts with the IVT, persons participating also in the diary eight to ten contacts. The most important steps of the contact strategy are summarized in Table 2.
Table 2. Survey protocol

<table>
<thead>
<tr>
<th>Step</th>
<th>Ego-Seeds</th>
<th>Iteration-levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Announcement letter</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Recruitment call</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Post card of Ego</td>
<td>-</td>
<td>if permitted</td>
</tr>
<tr>
<td>Interview</td>
<td>only</td>
<td>-</td>
</tr>
<tr>
<td>(+ incentive afterwards)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written instrument (+ incentive)</td>
<td>if requested</td>
<td>only</td>
</tr>
<tr>
<td>Diary survey</td>
<td>only participants</td>
<td>only participants</td>
</tr>
</tbody>
</table>

All Ego-seeds are asked to fill out the questionnaire with the help of an interviewer. This aims to increase data quality on the level of the seeds to have a basis for comparisons with data from the following iteration levels. The interviewer mainly has two duties: Clarifying the questions of the respondents in cases of misunderstandings or ambiguities resulting from the survey instrument and secondly digging deeper in the case of the name generator. Again this is recommended in literature to make the egos think about their personal networks again and again and therefore mention the contacts of interest as completely as possible (see Wolf, 2004). In the case the help of an interviewer is not wanted, the seeds are asked to fill out the questionnaire on their own.

Summarizing the costs for these arrangements and the salaries for the student assistants, undertaking the recruitment process as well as the personal interviews with the ego-seeds, the marginal survey costs are around 130 CHF for each respondent. More details on the survey methodology, the design of the survey instruments, the arrangements employed to establish trust and the survey costs are given in Kowald et al., (2009). Also the entire survey instrument is attached to this paper.

4. Recruiting respondents

140 postal addresses and phone numbers of a stratified random sample in terms of age, sex and home location of the population of Canton Zurich were used to start the snowball chain. Calculating
the response rate from all persons with valid postal addresses, 137, 20 participants, 14.6% were recruited of which 17 accepted the help of an interviewer. The 20 Ego-seeds mentioned 250 Alter, the Iteration 1 population. Not all egos were willing to provide the postal addresses of their contacts. All addresses are compared to the telephone directories. Some addresses were wrong and could not be corrected by the survey team. A small share of Alters were under 18 years old or Ego did not allow to contact them, e.g. because of an illness.

179 persons were contacted on the Iteration 1-level. 67 respondents, 37.4%, returned a filled out questionnaire. As mentioned above the help of an interviewer was not offered to these respondents. From the 28 questionnaires sent those Egos for which only a postal address was available but no phone number 7 were filled out and returned. All other 60 respondents got a recruitment call before the questionnaire was sent. The 67 Iteration 1-egos mentioned 998 alters including 105 names that were already part of the sample, whether having been collected on the level of the Ego-seeds or on Iteration 1. The population of iteration level-2 is therefore 893 persons.

The postal address for 542 Alters were available and valid. Calculating with all persons contacted yet, 538, 117 participants, 21.7%, returned the questionnaire. The response rate is expected to increase further as some more questionnaires on iteration level-2 will be returned soon.

Overall 204 participants, 23.9% of all contacted addresses, participated so far. The response rate is expected to reach 30% when all questionnaires are returned. The recruitment process is shown in Table 3.
Table 3. The recruitment of subsample 1 (as of 26 October 2009)

<table>
<thead>
<tr>
<th></th>
<th>Whole Sample</th>
<th>Ego-Seeds</th>
<th>Iteration 1</th>
<th>Iteration 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Abs. [%]</td>
<td>Abs. [%]</td>
<td>Abs. [%]</td>
<td>Abs. [%]</td>
</tr>
<tr>
<td>Sample size</td>
<td>1283</td>
<td>140</td>
<td>250</td>
<td>998</td>
</tr>
<tr>
<td>…reidentified</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrong addresses</td>
<td>424</td>
<td>3</td>
<td>70</td>
<td>351</td>
</tr>
<tr>
<td>Valid addresses</td>
<td>859</td>
<td>137</td>
<td>180</td>
<td>542</td>
</tr>
<tr>
<td>…not contacted yet</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>…already contacted</td>
<td>854</td>
<td>100.0</td>
<td>137</td>
<td>100.0</td>
</tr>
<tr>
<td>…not reached by phone</td>
<td>197</td>
<td>23.1</td>
<td>50</td>
<td>36.5</td>
</tr>
<tr>
<td>Participation denied</td>
<td>267</td>
<td>31.3</td>
<td>61</td>
<td>44.5</td>
</tr>
<tr>
<td>Participation agreed</td>
<td>293</td>
<td>34.3</td>
<td>26</td>
<td>19.0</td>
</tr>
<tr>
<td>Questionnaire sent without recruitment contact</td>
<td>97</td>
<td>11.4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Participation with interview</td>
<td>17</td>
<td>2.0</td>
<td>17</td>
<td>12.4</td>
</tr>
<tr>
<td>Participation without interview</td>
<td>171</td>
<td>20.0</td>
<td>3</td>
<td>2.1</td>
</tr>
<tr>
<td>Participation without recruitment contact</td>
<td>16</td>
<td>1.9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Overall recruitment</td>
<td>204</td>
<td>23.9</td>
<td>20</td>
<td>14.6</td>
</tr>
</tbody>
</table>

Figure 2 summarizes the recruitment of the first subsample graphically. It can be seen that the gap between the overall sample size and the valid addresses as well as the gap between the valid addresses and the respondents get larger on each iteration level. On the other hand it must be said that the present response rate, given the nature of the survey, its methodology and the confidential subject matter of the questions, is substantially higher than expected.
To estimate the expected response rate for a given survey instrument Axhausen and Weis (2009) describe a rating system from commercial survey research. By applying it to earlier surveys conducted at the IVT they found a nearly linear relationship between the response burden of a survey and response rate, which can be seen in figure 3. By calculating the response burden of an instrument this relationship can be used to predict the response rate.

For the present survey instrument the response burden of part one has been calculated as 900 points. This assumes an average of 13 Alters mentioned in the name generator. The diary, part two of the instrument, adds another 580 points, calculated for 18 reported activities on average.

The observed response rate for the questionnaire will approximately, as mentioned above, be 30%. That is significantly higher than predicted by the rating tool. The mixture of multi contact...
strategy, incentive, greeting card and information page used in the recruitment process seems to be successful.

The predicted response rate for the diary is also plotted. With a response rate of 11% of the questionnaire population it is somewhat lower than predicted by the rating system. As expected only a subsample of the questionnaire population participates in this additional survey instrument including additional response burden. It has to be mentioned that the recruitment process of the diary is still in an early stage. The response rate may increase when more persons have been contacted.

On average respondents reported 18.2 daily activities. Compared to other studies, using similar survey instruments this number is low. An often reported phenomenon in the literature on travel diaries is response fatigue, especially in case of long-duration diaries (see Axhausen et al., 2007). Maybe the effect is similar in case of the present study, although not related to the number of days included in the diary but the burden intensive first part on the survey instrument.

The respondents reported to join two persons in their daily activities on average. 0.3 of these persons are from the same households as the egos, the other 1.7 persons do not live in the same households as the egos. On average 0.7 of the 2 persons are already known from the name generator. In the majority of cases data from

Fig. 3. Estimating response burden and –rate (Source: Axhausen and Weis, 2009)
the name interpreter, the alters’ socio-demographics and residential place as well as the contact frequencies with ego, are for these persons available. Due to the fact that the recruitment for the diary is still in an early stage more detailed analysis have not been realized yet.

5. The network attributes

As the survey is still in the field there is a difference between data resulting from the recruitment process and data from the returned questionnaires. Due to the fact that most respondents use the paper version of the questionnaire, and this data have to be captured into an electronic database, there may exist inconsistencies, e.g. in the number of egos, between these two data sources. All inconsistencies are temporal and will fully disappear once the data collection is completed. All data reported here were taken from the electronic database on October 22nd 2009.

Using a snowball approach makes it possible to focus on the network structure on four different levels. The list given below and Figure 4 aim to give a brief introduction to each of these levels:

Level 1: The basic information about the personal network of each respondent result from the answers to the name generator. It can be observed how many contacts a person has. By also considering other data from the questionnaire, e.g. socio-demographics, it can be seen how homogeneous the network, in terms of similarity between an ego and the alters, is. In network theory this degree of similarity is called homophily and describes the phenomenon of an increasing likelihood for connections between two persons the more similar these persons are (McPherson et al., 2001). An example of a network with 36 alters from the present survey can be found in figure 4(a).

Level 2: The structure of the respondents’ personal networks can be extended by taking into account the data from the sociogram. The egocentric network structures get more complex due to this additional information. Each group of persons making plans to spend free time together within an ego’s network is represented as a clique. A clique “is a maximal complete subgraph of three or more nodes. It consists of a subset of nodes, all of which are adjacent to all of the members of the clique” (Wasserman and Faust,
In addition the network can also include persons not joining a group and therefore only known to the ego. They would be isolated if ego was removed from the network. Figure 4(b) shows the egocentric networks from 4(a) extended by the information from the sociogram. It includes 4 cliques and 4 persons only known to ego. Still there are 37 nodes but instead of only 36 edges, one from ego to each alter, it now includes 320 edges.

Level 3: Level 1 and level 2 focus on isolated personal networks. Due to the ascending sampling methodology these networks are, at least in the case of those networks sharing the same ego-seed as their origin, connected to each other. Each of these connected clusters is called a component. By definition a component is “a subgraph in which there is a path between all pairs of nodes in the subgraph (all pairs of nodes in a component are reachable), and (...) there is no path between a node in the component and any node not in the component” (Wasserman and Faust, 2007: 109). An example is given in figure 4(c). The example component shown does, for reasons of a clear representation, only include information from the recruitment process. Connections between the egos result from reidentifications in the sampling process, happening when an ego mentions an alter that is already part of the sample because he or she has been mentioned by another ego before. In the case of this graph information from the sociogram are excluded as the structure quickly gets unclear due to the otherwise high number of links between the actors.

Level 4: In a macro perspective the overall network from the recruitment process can be shown. This is done in figure 4(d). The network includes all components with all egos and alters. Again the graph does, for reasons of a clear representation, not include information from the sociogram but only connections resulting from reidentifications. The component from 4(c) can be found on the upper left side of the graph.
5.1 Size and structure of personal networks

204 persons filled out the questionnaire. On average they reported 15.1 names in the name generator. There is a significant share of persons, 7.4%, that did not mention alters. These persons are excluded from the following analysis of the egocentric networks for two reasons. On the one hand the survey instrument does not allow to differentiate between those persons not having social contacts and those persons that do not want to mention their contacts. On the other hand most respondents, except the ego-seeds were not found by a random mechanism but mentioned by other respondents. As there need to be communication channels for the
snowball sample to reach new respondents, isolated individuals are excluded by definition. Following this argument it can be assumed that these respondents did not want to report their social contacts.

189 respondents mentioned their social contacts. 152 persons, 80.0% of those, reported the structure of their personal network in the sociogram. Unlike those respondents not reporting their social contacts, persons that did not mention cliques in the sociogram were not removed from the analysis as it could be the case that some personal network are very sparse in terms of alters not knowing each other. So, in all the 189 participants reported 449 cliques of persons making plans to spend their free time together. This is equal to 2.4 leisure groups per egocentric network on average. In all these groups include 5647 undirected relations and 3039 members. Figure 5 gives an overview of the relative distribution of the number of persons mentioned in the name generator (a), including those that mentioned 0 contacts and were therefore excluded afterwards, and the numbers of cliques reported by the egos that maintained in the analysis (b).

![Graph](image)

**Fig. 5.** Share of numbers mentioned in name generator and sociogram (as of 22 October 2009)

Some descriptive network statistics can be calculated to get an idea about the distribution of the egocentric network attributes and to make the network structures comparable. Some more concepts used in social network analysis need to be explained:

The density of a network describes the proportion of all possible connections, between the actors of a given graph and all connec-
tions actually present. The degree of density equals 0 if all actors, also called nodes or vertices, are unconnected from each other and 1 if all possible connections, also called edges, are realized. In this case all actors are adjacent and the graph is said to be complete. The density of a graph is related to its size and the type of relations under consideration. The more nodes are included in a graph the lower will, at least usually, the density be. On the other hand can the density of a sibling network expected to be higher than the density of a network of persons knowing each other on a fist name base (see Scott, 2007).

Measuring the degree centralization of a given graph focuses on the question to which extend it is organized around its most central point. To answer this question the variability of the individual node indices has to be quantified. So the first step in calculating the degree centralization is to calculate the degree of centrality for each node. The node centrality expresses the number of connections each node has to each other node in the graph. In other words a node is central if it has a large number of connections to other nodes in the network. The problem with this concept is similar to that of the density measurement. It is related to the number of included nodes and the kind of relationships under investigation. Therefore centrality scores should only be compared when the network size does not differ significantly and the collected relations are similar to each other. To calculate the centralization of the entire graph the differences between the centrality score(s) of the most central node(s) and all other nodes is calculated. The centralization index equals the ratio of the sum of actual differences and the sum of maximal possible differences. A centralization index of 1 equals a star graph like those resulting from the data of the name generator. A central actor is connected to each other actor in the graph and the alters are only connected to the central ego. On the other side a centralization index of 0 results from a graph in which each node is equally connected to each other like in a complete graph. Again the centralization index can only in case of similar kinds of connections be compared to other indices. Density and degree centralization are complementary measurements as the first concept describes the level of cohesion of a graph and the second measures the degree to which this cohesion is focused to a particular node (see Scott, 2007, Wasserman and Faust, 2007).
Like the concept of degree centralization the global measurement of betweenness centralization is based on a quantification of the local indices of node betweenness. If a node lies ‘between’ a path connecting other nodes it might have some control over the interaction of these other actors. In other words the interactions of two actors that are not adjacent but connected by a path might depend to some extent on the behavior of the node(s) lying between them. The node betweenness equals the number of times a particular node lies on the shortest of all possible paths, the geodesics, between two other nodes, divided by the number of geodesics connecting these two nodes. The global index of betweenness centralization allows to compare different networks in terms of the heterogeneity of the local betweenness indices of the included nodes. Following Freeman’s approach (1979) the local betweenness indices are summarized to quantify the overall graph betweenness. In the case of standardized values the global betweenness centralization equals 1 if an actor lies on each possible path between other actors, like ego in the star graph of the name generator and 0 if all actors have the same actor betweenness index (see Wasserman and Faust, 2007). Even though both measurements of centralization seem to be very similar, the “degree-based measure of graph centralization (…) seems to be particularly sensitive to the local dominance of points, while a betweenness-based measure is rather more sensitive to the ‘chaining’ of points” (Scott, 2007:90).

Table 4 gives an overview on the distribution of some networks attributes from the present survey. As ego is asked to report cliques in the sociogram these relationships are reciprocal whilst connections resulting from the name generator are directed from ego to each alter. To balance this disparity all relations between the actors in the personal networks are assumed to be undirected. As usual when focusing on egocentric networks the ego and its connections are excluded from the analysis. This happens due to the fact that the relations between ego and all alters are part of the survey methodology. In case they are not removed ego is, by definition, the center of the graph. The indices would therefore be biased due to egos importance (see Scott, 2007). All indices for density, degree- and betweenness centralization are given standardized with maximum 1 and minimum 0.
Table 4. Network attributes (as of 22 October 2009)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Mode</th>
<th>Std. Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
<th>25-Percentile</th>
<th>50-Percentile</th>
<th>75-Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree centralization</td>
<td>0.17</td>
<td>0</td>
<td>0.14</td>
<td>0.00</td>
<td>1.00</td>
<td>0.06</td>
<td>0.17</td>
<td>0.24</td>
</tr>
<tr>
<td>Betweenness centraliza-</td>
<td>0.02</td>
<td>0</td>
<td>0.06</td>
<td>0.00</td>
<td>0.50</td>
<td>0.00</td>
<td>0.19</td>
<td>0.01</td>
</tr>
<tr>
<td>tion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density (with isolates)</td>
<td>0.20</td>
<td>0</td>
<td>0.21</td>
<td>0.00</td>
<td>1.00</td>
<td>0.03</td>
<td>0.14</td>
<td>0.27</td>
</tr>
<tr>
<td>Density (without isol-</td>
<td>0.51</td>
<td>1</td>
<td>0.29</td>
<td>0.14</td>
<td>1.00</td>
<td>0.29</td>
<td>0.45</td>
<td>0.68</td>
</tr>
<tr>
<td>ates)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of components</td>
<td>8.74</td>
<td>5</td>
<td>7.00</td>
<td>1.00</td>
<td>40.00</td>
<td>4.00</td>
<td>6.50</td>
<td>12.00</td>
</tr>
<tr>
<td>(with isolates)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of components</td>
<td>2.24</td>
<td>1</td>
<td>1.24</td>
<td>1.00</td>
<td>7.00</td>
<td>1.00</td>
<td>2.04</td>
<td>3.00</td>
</tr>
<tr>
<td>(without isolates)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of isolates</td>
<td>6.90</td>
<td>0</td>
<td>7.23</td>
<td>0.00</td>
<td>40.00</td>
<td>2.00</td>
<td>5.00</td>
<td>9.00</td>
</tr>
</tbody>
</table>

With a size of 16.5 the egocentric networks are on average larger than those observed by Frei and Axhausen (2006) in Zurich city. This can result from the use of slightly different name generators. Frei and Axhausen focused on contacts that are of emotional importance for the egos, as well as on leisure contacts.

Compared to the study of Carrasco et al. (2006) in Toronto the personal networks are larger than those having been collected by the Canadians’ written survey instrument. In case of a subset of the survey population Carrasco et al. used personal interviews and a special sociogram as an extension of the usual name generator technique. Participants filling out this instrument reported a network size of 23.76 contacts on average. Again these differences to the present study can be due to the use of different name generators. Also the presence of an interviewer, reminding ego to think about his or her network again, plays an important role (see Wolf, 2004).

The other figures show some similarities. Table 5 shows the distribution of the network attributes from the Canadian study. The figures for all three global graph measurements are close to each other. Noticeable are the differences in the number of isolated vertices being higher in the case of the present study. This results from the significant number of persons reporting contacts in the name generator but not mentioning connections in the sociogram. The effect can clearly be seen when comparing the figures for the density measurements with and without isolates. Whilst the distribution for
networks including isolates is comparable to those from Carrasco et al. the differences get bigger when focusing on the structure by excluding isolates.

Table 5. Egocentric networks in Toronto (2006)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Mode</th>
<th>Std. Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
<th>25-Percentile</th>
<th>50-Percentile</th>
<th>75-Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree centralization</td>
<td>0.19</td>
<td>0.15</td>
<td>0.09</td>
<td>0.00</td>
<td>0.43</td>
<td>0.11</td>
<td>0.17</td>
<td>0.25</td>
</tr>
<tr>
<td>Betweenness centralization</td>
<td>0.07</td>
<td>0.00</td>
<td>0.10</td>
<td>0.00</td>
<td>0.43</td>
<td>0.00</td>
<td>0.02</td>
<td>0.13</td>
</tr>
<tr>
<td>Density (with isolates)</td>
<td>0.17</td>
<td>0.11</td>
<td>0.17</td>
<td>0.02</td>
<td>1.00</td>
<td>0.08</td>
<td>0.11</td>
<td>0.18</td>
</tr>
<tr>
<td>Density (without isolates)</td>
<td>0.30</td>
<td>1.00</td>
<td>0.28</td>
<td>0.05</td>
<td>1.00</td>
<td>0.11</td>
<td>0.18</td>
<td>0.37</td>
</tr>
<tr>
<td>Number of isolates</td>
<td>4.42</td>
<td>1.00</td>
<td>4.40</td>
<td>0.00</td>
<td>23.0</td>
<td>1.00</td>
<td>3.00</td>
<td>6.00</td>
</tr>
</tbody>
</table>

Source: Carrasco et al., (2006: 71)

Focusing on the snowball network in terms of components resulting from the ego-seeds it has to be mentioned that there are no overlaps in the first subsample. In the literature on small worlds most estimates mention a maximal contact chain of length five to eight to connect each person to every other person in the world (see Pool and Kochen, 1978). Although the snowball approach of the present study, using leisure contacts as the basis for recruitment, is different from the small world approach originally designed by Stanley Milgram (1967), asking for persons known to the respondents on a first name base, overlappings are expected in the next subsamples as, on the one hand, the maximal contact length of the present snowball is 6, in three iteration steps egos mention alters beginning with the ego-seeds in each components, and, on the other hand, the survey population is mostly clustered in a very dense geographical area.

5.2 Social networks geographies

All home location of the egos and alters are georeferenced and can be used for spatial analysis. By far most persons are located in Switzerland. In addition there are few egos and their personal networks in the US and Germany. Figure 6 gives an overview on the
spatial distribution of the networks. The first image (a) shows the nodes and edges for the level of the ego-seeds focusing on Switzerland. The egos are colored orange, the alters purple. Image (b) shows the Iteration-1 network, image (c) on the bottom left the egos, alters and their relations for Iteration-2.

Differentiating within Switzerland, most persons are located in the German speaking part. But there are also some contacts in the Italian and French part of Switzerland. On a micro-perspective view the area of Canton Zurich and the surrounding environment seems to be very dense, both, in terms of egos and alters. In image (d) the spatial distribution of all persons included in the snowball sample is shown for Europe.

Fig. 6. The geographical spread of the personal network (as of 22 October 2009)

Focusing on the distances between the home locations, the database includes 1648 of these spatial relationships. Like in other studies the geographical spread of the social contacts from the name generator shows an exponential shape. Most contacts live close to egos home location. Besides, as mentioned by Larson et al. (2006) persons mix local, nationwide and international ties in their contact networks. Figure 7 gives a graphical overview on the number of alters living within a 100 km and a 10 km radius around the egos’ home locations.
Compared to the study of Frei and Axhausen (2007) the distribution is a bit different. In their investigation nearly two thirds of the alters lived within a 25 km radius around egos home location. 13% were defined as regional and national relationships located within a radius from 26 to 100 km. Another 15% were international relationships, living in a range from 101 to 1’000 km and a share of 3% were defined as intercontinental ties with over 10’000 km distance between ego and alter.

In the present study 78% of the alters live within a 25 km radius. 16% are regional and national relationships, 5% are international ties and around 1% are intercontinental. Again it has to be mentioned that the name generator used here is different from that one used by Frei and Axhausen. Especially their first stimulus, focusing on emotionally important contacts, may cause a wider geographical distribution than it is the case when focusing on leisure contacts.

5.3 Staying in contact

The information on geographical distances between persons that are in contact can be combined with data on the modes and frequencies these persons use to maintain their contact. There is lots of literature in both sociology and transport planning describing the
effects of communication modes on the individual travel behavior or, more general, the interconnectivity of society, only a first descriptive overview on the survey data will be given here. This aims to show the distribution of contact modes and frequencies and their shares and numbers when focusing on different geographical distances.

The questionnaire collects information on five different contact modes: Face-to-face, telephone, e-mail, sms and instant messaging-contacts. Originally an additional category aimed to collect the number of postal contacts. Two pretests showed this category as only used in very few cases with low frequencies. Due to these results and the anyway high response burden of the instrument this category was removed. Unlike the postal contacts the category ‘instant messaging’ seems to be very important for those using it, in terms of age predominantly younger respondents. The distribution of the cumulative annual contact frequencies by mode is shown in figure 8.

![Cumulative contact frequencies per year (as of 22 October 2009)](image)

**Fig. 8.** Cumulative contact frequencies per year (as of 22 October 2009)

By focusing on different contact modes often the question is asked whether these modes can be seen as a substitution for or a complementarity to physical travel aiming for face-to-face meet-
ings. Figures 9 and 10 gives a first impression on this topic. The first figure shows the contact frequencies in absolute numbers, the second in relative shares. It can be seen that, even though face-to-face meetings look dominant on the first view, especially phone- and e-mail contacts are of increasing importance when the geographical distance gets larger. A turning point seems to be somewhere between 20 and 30 km distance. At this distance face-to-face and phone contacts have nearly the same share. Also somewhere between 20 and 70 km distance contacts per e-mail get more important than face-to-face meetings. Nevertheless face-to-face meetings are of high importance in each distance class. The results shown here are very similar to the findings of Axhausen and Frei (2007).

![Fig. 9. Annual contact frequencies by -modes in absolute numbers (as of 22 October 2009). The x-axis is given on a logarithmic scale. The distances are grouped in deciles for distances larger than 1km. An additional group is given for distances smaller or equal to 1km. The observations are shown at the mean distance of each class.](image-url)
Fig. 10. Annual contact frequencies by -modes in relative shares (as of 22 October 2009). The x-axis is given on a logarithmic scale. The distances are grouped in deciles for distances larger than 1km. An additional group is given for distances smaller or equal to 1km. The observations are shown at the mean distance of each class.

6. Perspective

The paper introduced to the survey methodology and – instrument used in a project aiming to collect data on leisure networks. To get a better view on the geographical distance between persons that are in contact the project uses an ascending sampling strategy called snowball approach. To increase the response rate and the quality of the data several additional arrangements are employed. Data from the ongoing recruitment process showed the
methodology as feasible and reaching an even higher response rate than expected.

With the help of first empirical data from the ongoing survey an overview on the network characteristics was given. In detail the distribution of the number of names mentioned in the name generator and the number of groups from the sociogram were discussed. A descriptive overview on the geographical spread of the egocentric contact networks was given as well as an introduction to the reported contact frequencies and modes, used by the respondents to maintain the contact. Besides, giving an overview on former work in transport planning dealing with the methods of social network analysis, the network characteristics were compared to findings from these studies.

Data from the diary, the second part of the survey instrument, were not presented yet. Also models implying the network characteristics, e.g. which characteristics influence the personal network size, have not been estimated so far. As there is some time left until the beginning of IATBR 2009, some aspects of this work will be addressed in the talk.

Acknowledgments The authors acknowledge the financial support of Volkswagen-Stiftung. Also Dr. Sean Doherty from Wilfrid Laurier University, Ontario, Canada is acknowledged for allocating the electronic form of the activity diary. Last but not least the authors want to thank all student assistants working in this project for their efforts in the process of recruitment.

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