The Resource Generator:

Social capital quantification with concrete items *

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Abstract

In research on the social capital of individuals, there has been little standardisation of measurement instruments, and more emphasis on measuring social relationships than on social resources. In this paper we propose two innovations. First, a new measurement method: the Resource Generator; an instrument with concretely worded items covering 'general' social capital in a population, which combines advantages of earlier techniques. Construction, use, and first empirical findings are discussed for a representative sample (N=1,004) of the Dutch population in 1999-2000. Second, we propose to investigate social capital by latent trait analysis, and we identify four separately accessed portions of social capital: prestige and education related social capital, political and financial skills social capital, personal skills social capital, and personal support social capital. This underlines that social capital measurement needs multiple measures, and cannot be reduced to one total measure of indirectly 'owned' resources. Constructing a theory-based Resource Generator is a challenge for different contexts of use, but also retrieve meaningful information for investigating the productivity and goal specificity of social capital.

Keywords: Social capital; measurement; latent trait; scale construction.

1 Introduction

Many scholars have come to a definition of individual social capital that regards it as the collection of resources owned by the members of an individual's personal social network, which may become available to the individual as a result of the history of these relationships (Van der Gaag & Snijders, 2004). However, one of the problems that has been hampering research and theory development in the field of individual social capital research is the lack of comparable measurements (see Flap, 1999; Lin, 2001a/b). Many measures seem to have been constructed from data that happened to be available, but were not specifically designed for the purpose of making comparisons between populations or sociodemographic subgroups. Furthermore, only some dimensions of social capital have been measured thoroughly. Much emphasis has been put on social networks and their sizes, but much less on the resources that could be accessed through the network ties, and how these may become available to the individual (Flap, 1999). Finally, measures mostly have been designed for a specific life domain only, and not with an aim to investigate the 'general' social capital of a general population. In summary, the information we have on the distribution and productivity of social capital is quite fragmented (Van Der Gaag & Snijders, 2004).

Progress in the field of social capital requires valid, reliable, and preferably parsimonious measurement instruments that can be applied in the investigation of three main issues. First, to give a good overview of the *distribution* of social capital over the general population, which is as yet still lacking (Flap, 1999). Second, for use in –preferably prospective– studies of the basic idea behind social capital, namely its *productivity*: how it helps individuals to attain their goals in addition to personal resource collections. Third, to investigate to what extent social capital is goal- and context-specific in the production of individual returns (see Flap, 1999; Lin, 2001a): which part of the social capital is responsible for which effects, and under which conditions?

By trying to capture social capital in a single measure we may lose a lot of information, and make it nearly impossible to investigate its goal specificity (Van Der Gaag & Snijders, 2004). In this paper, we will develop multiple individual social capital measures, each referring to separate parts of social capital, for use in cross-sectional, prospective research. Within this perspective, we propose a new measurement instrument, and a new method of analysing questionnaire items that can lead to the construction of such measures.

1.1 Considerations in measurement

When we wish to develop social capital measures that could fulfill the tasks mentioned above, several questions are encountered. First, a decision should be made on what we mean by 'social capital'. Lin (2001a/b) made a distinction between the *access* and the *use* of social capital: 'access' to social capital refers to an individual's collection of potentially mobilisable social resources; the 'use' of social capital refers to actions, and mobilisation of the resources in order to create returns. To develop cross-sectional, 'yardstick'-like measures of social capital for prospective research, it is more useful and more straightforward to focus on measuring the potential 'access' of individuals to social capital. The 'use'-perspective offers good opportunities for the retrospective study of social capital mobilisation and effectivity in specific contexts, but in prospective application involves many additional phenomena that influence measurement, such as personal preferences, the personal need for help, and the availability of institutional solutions to goal attainment (Van Der Gaag & Snijders, 2004). Here, we concentrate on measuring social capital within the 'access' perspective, and define social capital as the collection of all potentially available network members' resources. How to quantify this is treated later on.

A second measurement development question refers to the composition of social capital. If we wish to measure the access to 'general' social capital in a population, we must first establish which life domains are potentially important for goal

attainment, and which resources should be measured within these domains. In this paper, we use the term 'general' social capital referring to social resources in a wide set of life domains that covers the needs of an 'average person in modern, industrial society'. This comprises a potentially enormous, varied collection of possibly useful resources: access to advice, love, practical assistance, attention, influence, physical strength, knowledge, expertise, status, money, food, health care, etc. Therefore, the construction of measures for 'general' social capital should begin with clear theoretical classifications; we return to this issue in a later section.

A third issue is that the social capital available to individuals is not only a function of alters who own various kinds of resources – but also of these alters' willingness to give access to their resources (Flap, 1999). If we assume that every measured social resource is equally available, this could lead to over-estimation of social capital. Therefore, indicators for the availability of resources should be included in social capital measurements.

The measurement of social capital with a focus on individuals' 'access' to social capital, considering a diversity of measured resources, and including resource availability indicators, has as yet been pursued following two methodological paths. The oldest method is the 'name generator/interpreter' approach (McCallister and Fischer, 1978). This method maps the ego-centered social network as a starting point for a subsequent social resource inventory, which –dependent on the inclusion of name interpretation questions– can result in very detailed and informative social capital descriptions. The single 'core'-network identifying name generator "With whom do you talk about personal matters?" stems from this approach, and has been widely used ever since (e.g. in the American General Social Survey, see Marsden, 1987). Nevertheless, as a social capital measurement the name generator method can be considered unsatisfactory. Most important is that the collection of such data is a heavy burden on both interviewer and interviewee; especially when larger networks are found. Furthermore,

because of differences in focus, the grounds for inclusion of name generating and name interpreting social resource questions have led to many different studies with incomparable findings (Lin, 2001b:16). Third, much of the data collected with the name generator/interpreter is theoretically redundant for the expression into social capital measures: many alters will give access to the same resources, and although similar resources available from several alters could be seen as a form of help 'insurance', usually one alter suffices to solve a certain problem. For cases where multiple alters are useful in providing resources, diminishing marginal returns can be expected from additional alters. It is therefore more critical to assess whether at least one alter is available to provide some given form of resources, than the total amount of alters doing so (Snijders, 1999; Van Der Gaag & Snijders, 2004). Fourth, there has been no consistency in the way name generator data have been aggregated into social capital measures. Various indicators have been designed as network size and network range indicator (see e.g. Campbell & Lee, 1991), but these have not led to standardised measures for social capital. Finally, most of these measures have referred to (structures of) social relationships only, and not to the resources that may become available through them, which makes them doubtful as indicators of access to resources.

A second measurement instrument that has been used to collect access-type social capital data is the 'position generator' (Lin and Dumin, 1986; Lin et al, 2001); this method measures access through network members to occupations, seen as representing social resource collections based on job prestige in an hierarchically modelled society, following Lin's theories of social capital (Lin, 1982; 2001a). The administration of this instrument is easy and economical, and the questionnaire can be systematically adjusted for different populations. Its data is also straightforwardly modelled into social capital measures that have a clear theoretical basis (range of accessed prestige, highest accessed prestige, and number of different positions accessed). However, these measures also have their disadvantages. They contain little specific information about social resources and the diversity of this collection. Also, their

interpretation hinges on the theoretical importance of job prestige or other position-related dimensions, which may not be dominant for all social capital issues. For the investigation of the goal- and context-specificity of social capital, multiple measures are needed that each refer to separate portion of accessible social resources (Van Der Gaag & Snijders, 2004); for this purpose Position Generator measures have limited use.

1.2 The Resource Generator

To overcome these disadvantages Snijders (1999) proposed to combine the positive aspects of the position generator (economy, internal validity) and name generator/interpreter (detailed resource information) by more clear referral to specific resources, and omitting name identification from name generator questions. The resulting instrument, the 'Resource Generator', asks about access to a fixed list of resources, each representing a vivid, concrete subcollection of social capital, together covering several domains of life. It has the same basic questionnaire structure as the position generator: the availability of each of these resources is checked by measuring the tie strength through which the resources are accessed, indicated by the role of these ties (family members, friends, or acquaintances). This instrument can be administered quickly, and can result in valid and easily interpretable representations of social capital, with possibilities for use in goal specificity research of social capital.

Incomparability problems can occur with this measurement instrument also, because the list of specific resource items to be included may vary over populations. The composition of the Resource Generator should therefore result from systematical, theoretical considerations about which social resources represent the 'general' social capital of individuals. Several theoretical classifications can be considered useful.

At a very basic level, we can argue that social capital measurements should refer to all different *personal resource collections* of network members that are generally distinguished within sociology: human, cultural, financial, political, and physical

capital. More in accordance with social resources and social capital theory, we can argue that the *universally valued resources* power, wealth, and status should be referred to (Lin, 1982, 2001a/b). Some more concrete guidance is offered by Social Production Function theory (SPF) (Lindenberg, 1986, 1990; Ormel et al, 1997), that orders *goals* universally pursued by individuals. An empirical reconstruction of SPF for the contemporary Netherlands showed that individuals generally distinguish six cognitive domains in goal attainment: 1) private productive activities, 2) personal relationships, 3) private discretional or recreational activities, 4) public productive activities, 5) public relationships, and 6) public non-institutionalised interactions, involving everyday contacts with unknown individuals (Van Bruggen, 2001). The last of these domains does not refer to individual social capital, because by definition there is no shared past with unknown people.[1] Together, the other five domains can be used to inspire measurement items that represent potentially productive social resources. On the basis of considerations of personal resource collections, universally valued resources, and domains in individual goals, a set of Resource Generator items was constructed that comes close to measuring 'general' social capital (see methods section).

1.3 Empirical measures from social capital

Once answers to a list of questionnaire items on social capital are available, a next question is how to aggregate these into a measure that indicates access to social capital. Earlier researchers have suggested several principles to construct measures. First, an emphasis on *volume*, suggesting simply that access to bigger, larger, or more

[1]The role of others who know ego, but are unknown by ego has also been considered regarding social capital (Burt & Celotto, 1992). Even without ego knowing about this, these 'contacts' can be helpful, by e.g. putting in a good word for ego. These 'alters' are not included in our social capital definition, as such contacts can also not be measured in an ego-centered network study. Their role could be investigated however in e.g studies of complete networks.

social resources is beneficial (Bourdieu, 1980; Flap & De Graaf, 1986; Burt, 1992); this could be expressed as a measure of the total of social resources present in the network. Second, *diversity*, indicating that the more differentiation is present in social resources, the better social capital it represents (Lin & Dumin, 1986; Erickson, 1996; Lin, 2001a). Third, a *high upward reach* in social resources, indicated by hierarchical evaluation of accessed resources (Lin & Dumin, 1986; Lin, 2001a) – this principle, implying a beneficial effect of the best resources available, can only be applied to data that include some ordinal characteristic (such as job prestige). The most straightforward way to operationalise social capital is to calculate one single volume or diversity measure, counted as the total number of different items that is accessed. However, such a measure leaves a lot of interesting information unused, because it will yield the same numerical values for very different collections of social capital.

To compose multiple measures for social capital, we need an argued basis to aggregate information; which subcollections of items should lead to separate measures? One method is to start from a theoretical basis, and group items by the *effects* they could have within a certain life domain: social resources that are additive in helping to attain the same goal (Snijders, 1999). In this way, we could for example construct a measure for each of the domains distinguished by Van Bruggen (2001) mentioned earlier. However, the knowledge we have on the productivity and goal specificity of social capital is currently too fragmented and incomplete for this purpose. Therefore, we group items not based on their effects on the attainment oof specific goals, but based on their correlational structure on a population level (Snijders, 1999). To explain how such empirically independent social capital domains can be distinguished, we must reconsider the basis of social capital creation: the relationship.

In explaining relationship formation and maintenance, three determinants are generally discussed. First, an 'opportunity structure' is needed to get into contact with persons and keep the contact going, defined by e.g. locations of the home and the work place, and other people who figure in these surroundings (Van De Bunt,

1999). Second, the choice of others within this opportunity structure. An important explanation here is homophily: investment in relationships with persons who are similar with respect to demography, education, and lifestyle (Homans, 1950; Lazarsfeld & Merton; 1954; Lin, 2001a:38-40; review in McPherson, Smith-Lovin and Cook, 2001). In relation to social capital, we could argue more specifically that relationships are formed with those others from whom greater returns are expected, who may or may not be similar to ego (Flap, personal communication). Third, personality characteristics have recently begun to be considered as determinants in relationship formation, suggesting that some of the generally distinguished components of personality –the 'Big Five' extraversion, agreeableness, conscientiousness, emotional stability, and intellect (Digman, 1990)– have considerable impact on personal network formation (e.g. Vodosek, 2003; Negrón & McCarty, 2003). In addition, relationship formation is constrained by time and resource budgets. Social capital is created and maintained given these and perhaps other determinants and constraints, and may result from deliberate, goal-oriented investments in relationships, and as a by-product from on-going activities and relationships.

For each individual this process results in access to a unique, personal collection of social capital. Because not all individuals will access the same subcollections of social capital, observation on the population level of access patterns may lead to the distinction of meaningful social capital domains. Positive correlations between resource items in some group of items indicate that individuals who access one of these items also have a higher probability of accessing other items from that group. Such a group of items can thus be considered to represent a social capital domain, in which no specialisation takes place in terms of concentrating on some of the resources at the expense of others. Items from each group can therefore be aggregated into a domain-specific social capital measure. Thus identified domains for social capital are population-specific, and we expect that for most populations there are several of these roughly independent, empirically distinct domains of social capital.

2 General methodology

To investigate the correlational structure of social capital items, we propose to model social capital as a collection of *latent traits*: variables in a population that describe individual attributes with values that may change over time, but can be measured only with error (earlier applications of the concept of latent traits within sociology go back to Lazarsfeld and Henry's work on latent structure analysis (1968)). Although in the strict sense social capital is *owned* by ego's network members, when its effect on an individual's goal attainment is considered it becomes a quality of this individual, and is also conceptualised as such: individuals have 'more' or 'less' access to social resources, which possibly enables them to attain certain goals in life.

2.1 IRT models

The methodology with which latent traits can be investigated in sets of items can either come from a class of traditional statistical tools such as factor analysis, which assume an interval level of measurement, or models developed for variables measured on an ordinal, or even dichotomous level, such as those developed in Item Response Theory (IRT) (e.g. Van Der Linden & Hambleton, 1997; Boomsma, Van Duijn & Snijders, 2000). We focus on these latter models, because typically data retrieved with social capital questionnaires is of a dichotomous or ordinal level, referring to discrete strengths of relationships through which resources may flow.

IRT models provide the most elaborate and complete approach to revealing scales in ordinal data, and are based on three ideas. First, it is assumed that responses to questionnaire items are determined stochastically by the latent traits that are being modelled, and that can only be observed with error through questionnaire item responses. Second, IRT starts from the assumption that questionnaire items have only a small number of answer categories (usually 2 to 5) and define ordinal, discrete variables rather than continuous ones. The results of IRT will especially be

more appropriate, and yield a better representation than those of factor analyses if some item distributions are dichotomous or very skewed – for such items the correlation coefficients on which factor analysis is based are inadequate indicators of their associations (Bartholomew et al, 2002). Third and last, in most IRT models it is assumed that the included items are locally independent: the responses to the items are independent given the latent trait value, which means that they are not influenced by other systematic variations between respondents. Ideally, this also means that the relations between the items are invariant across externally defined subpopulations, even if one subpopulation on average has higher latent trait values than the other. This assumption is not always tested, however, and it even is impossible to test it completely.

There are two stages of development in the construction of a measurement instrument using an IRT model. First, the choice a priori for a certain set of items from a content-oriented viewpoint, such as discussed in section 1.2. Second, the testing of this set on the basis of empirical data, which may imply adjustments such as splitting a set of items into several subsets each representing one scale, or omission of some items.

2.2 Model selection and explanation

We can make a distinction between unfolding and cumulative IRT models. *Unfolding* scale models are used to investigate bipolar latent traits in sets of items: opposite ends of scales identified with these models refer to opposite qualities (for example: political affiliation in terms of 'left' vs. 'right') (Coombs, 1964; Van Schuur & Kiers, 1994). *Cumulative* scale models are used to investigate unidirectional latent traits in sets of items, for example intelligence (Mokken, 1996), and are stochastic generalisations of the Guttman scale (Sijtsma & Molenaar, 2000). When we think of accessed social capital, this is mostly in terms of *more* vs. *less* (see section 1.3); a unidirectional characterisation that renders cumulative scale models the most appropriate for its

measurement.

A cumulative model that should measure the latent trait 'social resources' can be imagined as follows. Minimal levels of the trait will be measured more reliably with items that are commonly available, and to which many respondents will give a positive answer (e.g. they indicate to know someone who can do shopping when ill, or to know people owning a car), high levels of the trait are measured more reliably with less common items, to which fewer respondents will give a positive answer (e.g. knowing persons who own a holiday bungalow abroad). This implies that for a generally useful measurement scale, it is advisable to include items that show a considerable diversity in their *popularity*, defined as the frequency in the population with which they are accessed. In the cumulative scale model, the measured items are ordered empirically by the relative numbers of individuals who give positive answers to each item.

The main and name-giving characteristic of the cumulative scale model is however the assumption that the represented latent trait has a cumulative character. Respondents who indicate to access rare items are thus expected to also access more common resources, with exceptions that are purely random. For some social resources this seems plausible, but not for all: it is not very likely that only a *single* cumulative latent trait will be hidden in a heterogeneous collection of Resource Generator items. For example, in Dutch society there does not seem to be a higher probability that when we know someone who owns a holiday bungalow abroad (a rare social resource related to economic prosperity and leisure activities), we also know someone who can do shopping for us when we are ill (a more common social resource in the domain of daily help). It is more plausible that we will need multiple cumulative scales to measure latent traits in social resources: if we know someone who owns a holiday bungalow abroad, then there may indeed be a high probability that we also know someone who owns shares, or has a high income; if we know someone who can do shopping for us when we are ill, we may also know someone who can babysit for the children. The exact *number* of different cumulative dimensions in sets of ordinary

social capital items, and their content, is of course an empirical question.

3 Data and procession

3.1 Sample and collection

We investigate data of the "Survey on the Social Networks of the Dutch" (SSND), collected for this purpose in 1999-2000 (see also Völker & Flap, 2004). Specially trained interviewers administered questionnaires in the respondents' homes, which lasted one hour and fify minutes on average (questions of other research projects were also included). The sample (N=1,004), collected in 40 randomly selected municipalities across the country, consists of two subsamples of the adult population (aged 18-65) for the Netherlands. In the initial sample, only wage-earning individuals were selected (N=500); in an additional sample of the general population, all agreeing to an interview were included. This results in an over-representation of wage-earners in the sample. The response rate for the combined, final sample is 40%. The demographic characteristics of the sample are shown in Table 1. In order to reduce missing values, respondents were phoned back and asked again to answer questions when systematic missings were found in returned questionnaires.

Table 1 about here

Education was measured on an 8-point scale; this is recoded into 3 dummy variables denoting primary (having finished elementary school), secondary (having finished high school), and tertiary education levels (higher vocational training, or university). *Labour market position* was measured in twelve categories (not shown), which are recoded into four dummy variables, representing those still in education, 'home makers' performing mainly domestic labour, those having left the labour market (retired or unfit for work), and those receiving social security (unemployed and/or looking for

a job). *Income* is measured on an 18-point scale in Dfl.500 classes;[2] for analyses, midpoint values of these classes are used. *Occupational prestige* was coded with the standard 1992 classification of the Dutch Central Bureau of Statistics (CBS). *Partner* is a dummy variable denoting having or not having a married or unmarried partner, irrespective of the fact if this partner was living in the same household. *Household size* indicates the number of household members including the respondent. To enable small regression coefficients to show up in Table 6, values for occupational prestige and *age* were divided by 10 (this does not affect the other coefficients).

The SSND questionnaire included three *social capital* measurement instruments: a name generator/interpreter, a position generator, and the Resource Generator. The Resource Generator was the last instrument in the questionnaire to be administered, so that most respondents already had a relatively vivid cognitive picture of their social network resulting from answering previous questions. The resource generator consists of 33 social resource items, for each of which it was both expected that members of the general population of the Netherlands would consider its contents useful social resources, as well as find it acceptable to exchange or ask for these resources with people they knew. Its composition resulted from an an iterative process, in which arguments from three theoretical classifications (see section "Empirical measures from social capital") produced the set of items (see Table 2). The starting point of item composition was daily life experience. The resulting initial list was checked with Lin's (1982) theoretical resource classification whether wealth, power, and resources were represented. Subsequently, the classification by Van Bruggen (2001), which refers to readily imaginable situations was taken, and the constructed set of items was checked with each of the five domains suitable for the consideration of social capital (if applicable), until a list of items was composed that was thought to cover most domains of life in which social capital in the Netherlands could play an acceptable

[2] A Dutch guilder was equivalent to 0.45 euro.

role (these checks are described further in Van Der Gaag & Snijders, 2004). The general question of the Resource Generator was whether the respondent knew anyone giving access to the item. As a minimum criterion of 'knowing' a person, it was required to be imaginable that when accidentally met on the street, the name of that person would be known, and a conversation could be started. The interpretation of the distinction between the categories 'family member', 'friend' and 'acquaintance' to label the relationship was left up to the respondent. When a respondent could not imagine needing a certain resource, or thought the resource was not at all applicable to his or her situation (e.g. item 33 when the respondent had no children), the answer was coded '0'. To economise on interview time, only the strongest relationship mentioned in answer to each resource item was coded by the interviewer; it was assumed that the order acquaintance - friend - kin represented increasing tie strength and availability of resource items (see also Van Der Gaag & Snijders, 2004). To investigate as many different items as possible, all suitable name generator items[3] included in the SSND were also recoded into categories, and added to the data (items 34–37; Table 2).[4] However, coding access to resource items with relationship strength information implies a positive effect of accessing social capital through stronger ties. This can be at odds with some basic ideas in social capital theory, as some items may only constitute useful social capital when they are accessed through weak ties rather than strong ties. To minimise the effect of this assumption, for the exploratory latent trait analyses all answers to Resource Generator items were therefore dichotomised,

[3]The SSND set of name generators included some items that apply to wage-earners only, that refer to used or sour social capital on the job, or personal resources. These were not suitable to be included as positive, 'accessed' social capital.

[4]To recode name generator answers into Resource Generator items, the following key was used: partners, children, parents, parents-in-law, siblings, and other family members were coded as 'family members'; the category 'friends' only included relationships originally also listed as 'friends'; bosses, colleagues, employees, neighbours and other people from the neighbourhood, people known from clubs, and acquaintances were recoded as 'acquaintances'.

indicating access to either 'at least one person, in any relationship' (1) or 'no person at all' (0). To compare access to social resources with the availability of *personal resources*, the respondent was also asked whether the resources indicated by items 1–20 were owned by him- or herself; for items 21–33, these questions were considered too much subject to speculation or social desirability, and left out of the questionnaire.

Because strictly taken, not all Resource Generator items apply to all respondents (e.g. some subgroups cannot answers questions regarding children, or work situations), formally only analyses of subgroups restricted to the subgroup-appropriate items are suitable. This would lead to several sets of partly comparable findings, however, diminishing the overall cohesion of the results. Especially with an aim to give a good overview of social capital of the *general* population we include all items for all subgroups (when inappropriate items were left out of the analyses, the results were not substantially different).

3.2 Operation of the cumulative scaling procedure

To investigate cumulative dimensions in the Resource Generator data an exploratory non-parametric IRT model is used for finding cumulative scales: the so-called 'Mokken scaling method' (Mokken, 1996; Molenaar & Sijtsma, 2000; Sijtsma & Molenaar, 2002). This method aims to find robust and unidimensional scales in sets of items, in a search procedure initialised by taking the highest associated pairs of items, and continuing by subsequent gradual inclusion of well-fitting items until a scale has been formed that does not improve further when other items are added.

The method used to judge a provisional, or the final scale, is based on Loevinger's H-coefficient (Loevinger, 1947). This coefficient is defined as the observed between-item correlation compared to the maximum correlation between items defined by the marginal distribution of the answer pattern: $H = r/r_{max}$. This parameter is interpreted as a homogeneity measure; it has a maximum of 1 (perfect homogeneity) but can also reach negative values (indicating inhomogeneity). Lo-

evinger's homogeneity indices can be calculated per item pair, (H_{ij}), item (H_i), or for whole scales (H). The definitions of H_i and H are obtained by working with sums of correlation in the numerator and the denominator. It is convention to regard scales with $H \geq 0.30$ as useful scales, $H \geq 0.40$ as medium strong scales, and those with $H \geq 0.50$ as strong scales (Mokken, 1996).

The search technique is constructed so that every item can occur in one scale only. It is possible that some ill-fitting items are not included in any scale during the procedure. The item homogeneity H_i can be used to identify strongest and weakest items in each scale. For each scale also a reliability coefficient *rho* is calculated; values above 0.60 are usually taken as indications of sufficient reliability (Molenaar & Sijtsma, 2000).

Cumulative scale analyses are performed with MSP for Windows 5.0 (Molenaar & Sijtsma, 2000). With this programme, not only can scales be identified in sets of items, but also the cumulative character of a scale can be tested with several diagnostic tests to investigate model fits. Also, theoretically argued sets of items can be tested as scales.

Unreliability of measurement leads to lower (attenuated) correlation coefficients between the observed scale values of different scales, than between the corresponding latent trait values. In our results, adjusted correlation coefficients are calculated as $r_{xy}/\sqrt{r_{xx}r_{yy}}$, where r_{xy} is the correlation between two scale values x and y, and r_{xx} and r_{yy} are the respective reliabilities of these scales (Ghiselli, Campbell, and Zedeck, 1981).

4 Results

4.1 Distribution of the Resource Generator

Averaged over the 37 specified resources, the percentage of respondents who say to know anyone who can give access to a resource item is high (76%). Almost all

items are accessed by 50% of the respondents or more. However, the items show a clear variation in *popularity*, defined as the average access to a given resource item, through any relationship. The most popular items refer to resources that we can indeed observe as being common in everyday Dutch life: owning a car (item 2), having personal computer skills (5), a higher education (8 and 9), and help in times of illness (28) or when we are moving house (23). Almost all respondents (85% and more) say they know somebody giving access to such resources (Table 2).

Table 2 about here

Lower popularities are found for resource items referring to more demanding kinds of exchanges: discussing politics (item 30), giving advice on personal issues (22, 26, and 29), and resources connected to finance and administrative, official matters (17, 20, 27, and 31). Still, roughly half of the respondents indicate they can access these. The least popular items refer to goal attainment in the wider, 'outside world'. These include the ability to assist in finding jobs (items 16 and 32), and connections to the political and public arena (11, 13, and 18).

On average, the total number of missing values on the whole set of items is low (0.90 item per respondent). The MSP programme treats missing values with listwise deletion; the analyses are therefore performed on 83% of the cases. All items with some missing values refer to expressive actions with social capital; especially, these occur with the three resource items that clearly appeal differently to specific groups of respondents. Non-wage-earners (those receiving unemployment benefits, home makers, pensioners and those unfit for work) reported lower popularities for item 22 ('knowing someone who can give you advice in case of conflicts at work'; 84% for wage-earners, 47% for others); those who are not directly likely to be looking for a job (home makers, those being retired or unfit for work) reported less often to know persons 'that can give you good references when looking for a job' (item 32): 48% vs. 73%. Logically, item 33 ('knowing someone who can look after your children') was

more often accessed in the group of respondents who had children (71% vs. 32%). The distribution of missing values is largely unsystematic: logistic regression (not shown separately) indicates that none of the sociodemographic background variables reported in Table 6 are significant predictors for the occurrence of at least one missing value ($\alpha = 0.05$).[5]

For most items, family members were specified most frequently as the strongest relationship through which a particular resource can be accessed. This is partly the result of the interview technique: accessing family members overruled the access through other relationships. Only a few resource items are more often accessed through weaker relationships: knowing people working at the town hall (item 13), and good references for jobs (32). Resources that may be accessed more equally from family, friends, or acquaintances concern non-material help, such as advice on important matters (items 21, 22, 26, and 31), and contact resources referring to further, influential network connections (items 11, 13, and 18).

4.2 Correlation structure

For analyses with non-parametric models, there must be sufficiently many items with a reasonably high popularity; also, the items to be analysed should have enough variability in popularity to be suitable for scaling analyses (Post, Van Duijn, and Van Baarsen 2001). Both requirements are met in our set of 37 items.

The full set of 37 Resource Generator items does not form a single cumulative scale: it has a poor scale homogeneity value ($H = 0.21$). An exploratory cumulative scaling procedure performed with MSP resulted in 4 final measurement scales[6], each defining a distinct domain of social capital. The composites of the scales appear remarkably meaningful in content, and they are labelled 'I prestige and education

[5]The exception is tertiary education; on average, the most highly educated respondents miss responses to 3.2 items, vs. 2.2 items for respondents with lower education.

[6]A detailed account of the full scaling procedure can be requested from the authors.

related social capital', 'II political and financial skills social capital', 'III personal skills social capital', and 'IV personal support social capital' (Table 3).

Table 3 about here

Table 3 lists the items in order of their popularity and cumulative properties: e.g., scale I shows that people who know someone who has good contacts with the media are most rare, but when that resource is accessed, it is likely one also knows someone who owns a holiday bungalow abroad, has knowledge of literature, and all other items included in the scale. Likewise, access to alters active in a political party (Table 3, scale II) tends to imply access to other social resources in the domain of political and financial skills; access to alters reading a professional journal opens up access to personal skills social capital (scale III), and being able to find a good reference (scale IV) is the most rare item in personal support social capital.

The fact that more than one scale is identified illustrates clearly that social capital is multidimensional. The internal correlation pattern of the scales shows that most items are positively associated (Table 3). Items within the same scale show the highest mutual correlations, but also between some items from different scales there are positive, significant correlations; most notably those from scale I with scales II and IV. This indicates that although these four scales do identify different latent traits in the data, these traits are positively correlated on a population level.

4.3 Social capital measures and their distribution

The scale characteristics indicate good scale homogeneity values H, and sufficient reliability (Table 4). The overall distributions of the scale values on the four domain-specific social capital scales show that especially scales III and IV are highly skewed; the individual scale scores are calculated as the number of items that is accessed within the scale, and because the included items are very popular (accessed by 85% and more), many respondents have maximum scale values. For comparison purposes,

a simple 'total' social capital measure was also calculated as the total number of the 37 resource generator items that was accessed through any relationship. This measure is sufficiently reliable due to the large number of items, and also negatively skewed. Its degree of homogeneity is low, however, as mentioned above.

Table 4 about here

When corrected for attenuation, prestige and education related social capital (I) is substantially correlated with political and financial skills social capital (II) (Table 5). The values of personal skills social capital (III) show the lowest correlations with the other scales. The single social capital measure is highly positively correlated with all domain-specific measures.

Table 5 about here

To investigate how the social capital measures are distributed over the population, OLS regressions on basic demographic characteristics were performed with all measures (Table 6). These show low fractions of explained variance (ranging from 1 to 11%), and the few significant effects are all education or prestige effects of small magnitudes. These results indicate that scores on these social capital measures cannot be explained by sociodemographic group membership, and are therefore indicators that tell a different story than demographic variables.

Table 6 about here

Finally, we investigate the correlation of all social capital scales with measures of personal resource collections. For this purpose, analogs to social capital scales I, II, and III were constructed from their *personal* resource item equivalents (as was mentioned in the methods section, the items in scale IV had no equivalents in personal resource items): 'I prestige and education related personal resources' included items indicating whether the respondent him/herself had good contacts with the media, a

holiday home abroad, etc. Scales 'II political and financial skills', and 'III personal skills resources' were constructed similarly. In addition, a single 'total' personal resource scale was constructed counting the total number of 20 personal resource items that was accessed. The homogeneity of these personal resource scales, their mutual correlations, and their distribution over the population form an interesting field of study themselves, which we must regrettably forego to remain within the scope of this paper (Table 7, upper part; the fact that correlations, corrected for attenuation, between total personal resources and the subscales for personal resources are so high, is presumably a consequence of the rough nature of the attenuation correction, and the underestimated reliability coefficients, especially of the total scale due to its lack of homogeneity).

Table 7 about here

The overall access to social capital is positively correlated with access to all personal resources. Overall, the correlations between personal and social resource scales (Table 7, lower part) are weaker than between social capital scales (Table 5). In the pattern of correlations it is evident that prestige and education related social capital (I), and political and financial skills social capital (II) are most related to personal resource collections (Table 7, lower part). Furthermore, personal political and financial skills show lower correlations with social capital collections than other personal resource collections.

5 Discussion

In this paper, we proposed and tested two innovations in the development of social capital measurement. First, a new social capital measurement instrument, the Resource Generator. Second, a new method to aggregate social capital items into a set of multiple measures.

5.1 The Resource Generator instrument

The overall popularities of the social capital items included in the Resource Generator are very high. Not much empirical material is available for comparison, however. In the Netherlands, social capital studies have focused on special subpopulations (Boxman et al, 1991, managers; Van Busschbach, 1996, pensioned and divorced respondents; Thomese, 1998, elderly), special domains of social capital (Tijhuis, 1994, health), featured position generator measures (Boxman, 1992; Flap & Boxman, 2001; Moerbeek & Need, 2003), used name generators, or other operationalisations that proceeded from a *mobilisation*, not an *access* perspective on social capital (Flap & De Graaf, 1986). The only study that, like ours, considered *expected* help in the future in the general population is the PRESOS study (Felling et al, 1991; Van Der Poel, 1993; Lubbers, 1998), which showed similarly high responses.[7] Although these popularities are very likely to be overestimations of social capital access, it is clear that the respondents perceive a generally helpful social environment.

More interesting for the investigation of productivity and goal specificity of social capital than absolute item distributions is the *relative* access to several kinds of resources. There is enough variability in the responses to show a plausible pattern of more or less popular items. For an interpretation of this pattern, we follow Lin's (2001a) distinction between *instrumental* and *expressive* individual actions. Instrumental actions aim at an increase in the control of individual resources, and have separate means and ends. Returns to instrumental actions can be grouped into wealth, power, and reputation. Expressive actions have the intention to maintain one's resources and share sentiments with other actors – for such actions, means and ends are the same. Expressive actions have physical health, mental health, and life

[7]The PRESOS ('Primary Relationships and SOcial Support') study (Felling et al, 1991) included nine name generating questions that, when recalculated over ego-networks, were comparable to Resource Generator items. Most of the these items showed popularities of 70% and higher (Lubbers, 1998).

satisfaction as returns (Lin, 2001a:48–9). Many items in the Resource Generator can be associated with one of these classes of actions, although some refer to exchanges that have both an instrumental as well as an expressive component. In our results, resources that are clearly associated with instrumental actions (e.g. connections to the media, the political arena, arranging jobs) are more rarely accessed than resources associated with expressive actions (such as visiting and talking about personal matters). This confirms the typical situation that stabilises inequality: resources that confirm positions are abundant, and the truly instrumental resources, that may lead to upward mobility, are more rare.

Although we did not investigate any direct returns to social capital, an overview of the relationships through which the various resources were accessed lends support to two propositions of Lin's theory of social capital (2001a). Our measurement technique more easily detects family relationships, but access to resources associated with expressive actions (practical daily support, as well as emotional support that requires trust relationships) is clearly dominated by strong ties, and kin in particular; advice on various personal matters is accessed more often from friends. This is an illustration of the 'strength of strong tie proposition' (Flap, 1976; Lin, 2001a:65–7). Resources associated with instrumental actions, especially links to further networks, and resources that refer to finding jobs are accessed more often through weaker ties (although not necessarily used more frequently). This is in line with the 'strength of weak tie proposition' (Lin, 2001a:67–9), based upon the original idea that instrumental resources dissimilar to one's personal resources, and therefore relatively useful ones, are likely to be accessed through more socially distant contacts, in different social circles (Granovetter, 1973; 1974).

To understand the distributions of our 'access to resources' measures we should distinguish three mechanisms that affect the response distributions. First, we must consider that some resources are more *prevalent*, and therefore more available than others. In almost any population, it is easier to know someone being able to help

when moving house, than someone who can hire people for a job: the simple reason is that fewer people can offer the latter. This aspect makes 'access'-type social capital items represent the overall frequency of resources even before they can become social capital. Similarly, since the number of acquaintances in the social network is greater than the number of friends, relatively many acquaintances give access to rare social resources. Second, social resources also differ in their *visibility*, and therefore the ease with which individuals may be able to identify them in their social network. Car ownership, levels of education, and practical skills are resources of network members which show more easily in social interaction than income, political party membership, or share ownership. Third, social capital is strongly embedded in an institutional context dictating which topics can be talked about, what is considered an appropriate, exchangeable resource, and when it is acceptable to get which help from others (e.g. in many societies personal items such as financial matters, sexual and political preferences are not openly talked about (e.g. Ferrand & Mounier, 1998 (sexual activity); Völker & Flap, 1997, 2001 (politics)), and the exchange of associated help is considered inappropriate or even potentially dangerous. These three mechanisms all imply a social and cultural determination of the distribution of the scales.

There are several explanations for the apparent overestimations of social capital access. First, some Resource Generator questions may still be too diffuse, which can cause respondents to overestimate the *presence* of the resources: they may count very different kinds of social resources as valid positive answers to specific items. For example, various degrees of skill of alters can be identified as 'knowing someone who can work with a personal computer'. With the name generator method, respondents have to mention a specific alter giving access to the resource. Although this might prevent too diffuse contacts to be listed, the reported popularities of name-generated PRESOS items (Lubbers, 1998) similar to ours are even higher, so this is not likely. Second, the high popularities may be caused by social desirability in the interview situation. Although respondents might wish to avoid an image of relying too much on

others (e.g. Völker & Flap, 1999), a norm of universalism tempts to show one 'knows the way' in society, and can cause overoptimistic reports on the *availability* of social resources. Even when the identification of network members with specific resources is correct, the estimation whether the resources could also be accessed when ego asks for it may not be.

In contrast to an interview situation, where resources are located from memory and without any incentive, in everyday life individuals may show more resourcefulness to locate the desired help when the need arises. Therefore, Lin (2001a:43, footnote 3) argued that alter reports about resources embedded in social networks are likely to be a conservative estimate. From name generator studies it is known that often the most frequently encountered part of the network is better remembered (Marsden, 1990) and that weak ties tend to be forgotten more easily (Tijhuis, 1994). Because they are associated with weaker ties, we can therefore expect underestimations in social capital accessed through acquaintances and other infrequently contacted relationships. The general idea that social capital that is less well remembered is also less likely to be useful (see Lin, 2001a:44 footnote 3) does not hold, however, when we extend social capital beyond its use for instrumental actions: other reports suggest that partner relationships –specifically useful in expressive actions– tend to be forgotten in prospective social capital questions (Völker, 2001). Ultimately, only investigations of the *use* of social capital can answer these questions.

5.2 Latent traits in social capital

We also presented a new way of defining multiple social capital measures based on an analysis of latent traits.

The items show enough variability to enable more sophisticated analyses than overall counts, although the construction of measurement scales is hampered somewhat by the high popularities of many items. The results of cumulative scaling analyses clearly indicate four larger subcollections of independently accessed, domain-

specific items of social capital. The content of these measurement scales clearly indicate separate, and meaningfully distinct subcollections in social capital. Although the used questionnaire items were only partly comparable to ours (items indicating *given* help were also included) Lubbers (1998) also found three cumulative scales of similar homogeneity in the PRESOS data: 1) intimate, personal matters (relationship problems, depression, and advice concerning big changes), 2) intimate, personal matters combined with more instrumental items, 3) instrumental help.

A first domain, 'prestige and education related social capital', includes resources that have often been associated with the 'strength of weak ties' (Granovetter, 1973; Lin, 2001a:67–9): resources of high status persons, the use of which is mainly considered for instrumental actions. As these resource items are often accessed through both acquaintances and friends, they may not singularly refer to weak ties. However, because of its content this scale could be an important predictor for social mobility and job success. We also found some evidence for the 'strength of position proposition' that persons with higher positions in society have access to better social capital (Lin, 2001a:64–5): scores on this scale are positively, but not strongly, correlated with education, prestige, and other indicators of personal resources. It is noteworthy however that not all items referring to further network connectivity and influence are included in this scale. This domain may therefore identify merely the material resources of high status persons, and much less their influence and power.

The potentially more influential social capital seems to be located in a second domain, 'political and financial skills'. This contains items referring to network members' political party membership, and their knowledge about governmental regulations, and financial matters. These are all invaluable skills for 'men and women of the world': individuals who want to arrange their activities independently, but with the help of network members. Accessing these resources is rather highly correlated with access to the first domain, and also often done via both acquaintances and friends.

A third domain, 'personal skills social capital', mainly consists of communication related activities: reading journals, speaking languages, and working with a personal computer – with car ownership of network members being a remarkable outsider in this domain. This domain is characterised by the highest proportion of kin ties. The high popularities of these items lead to low variability, and therefore poor usefulness of the scale. However, in comparison with the other scales it could be useful for the identification of groups that are deprived of access to very common social resources.

The fourth and final domain, 'personal support social capital', is clearly about maintaining continuity in one's personal life. The included resources can be associated with actions that involve both instrumental and expressive components, but involve trust: giving advice or references, and help in moving house is generally accessed through stronger ties. Although the item 'talking about intimate matters' itself was not included in the measurement scale for this domain, it appears as similar to the kind of social capital that has generally been measured with this often-used GSS item (see e.g. Marsden, 1987). Similar to the 'personal skills social capital' scale, the included items were also very popular, reducing the usefulness of this measurement scale.

The identified social capital domains are accessed independently, but many individuals can get access to many domains, as is reflected in the considerable correlations between scale scores. The most independently accessed social capital domain is personal skills social capital. It is clear however that both in terms of content and methodology, the distinction of a set of domain-specific social capital measures has something to add over one single social capital indicator, which oversimplifies the operationalisation of social capital: in the Dutch population, such a single indicator covers much of the access to social resources associated with instrumental action, but less access to resources accessed through strong ties, associated with expressive actions.

The usefulness of the set of domain-specific social capital measures was underscored by their weak relationships with sociodemographic subgroup membership. Although we do not yet know which subcollections of social capital are productive in which particular domains of individual goal attainment, it is also clear that social capital can indeed be understood as a useful addition to personal resources: the moderate correlations between personal and social resource scales showed that specific collections of personal resources do not have to be reflected in access to analogous domain-specific social capital. Social capital thus adds something to one's own resources. Because the highest correlation was found between prestige and education related social capital and personal prestige and education related resources (associated with instrumental actions), a reproduction of financial inequality through personal and social resources (Flap, 1991; Lin, 1999, 2001a) could be present in the Netherlands to some extent.

The multidimensionality in social capital found in this paper suggests that inequalities that result from social capital are much more subtle than a unidimensional contrast between the 'haves' and the 'have nots'. A pessimistic view is that it may be difficult to get access to *all* different domains of social capital; an optimistic view is that it is also difficult to be deprived of all access to social capital, in any domain. We cannot identify any sociodemographic subgroups with remarkably different social capital in our results, even though there is substantial variability in the domain specific social capital scales. As there is no effect of age on the scale scores, there is also no apparent accumulation of better social capital over the lifecourse. The cumulative character of the domain-specific scales could therefore be understood in another way, namely that access to a rare resource can lead to access to other resources because of inherent qualities of alters, resources, or ego. The rarest items of the four scales were access to contacts with the media (prestige and education related social capital), access to persons active in a political party (political and financial skills social capital), access to persons reading a professional journal (personal skills social capital), and

persons who can give good references when applying for a job (personal support social capital). These items all concern alters who are well-informed, well-connected, or both. Such rare items may therefore be understood as 'key resources', that open up further opportunities to access social capital because of specific alter qualities. However, to further specify this mechanism, we would need to know more information about network members' multiplexity and ego's personality: accessing rich domain-specific social capital can be caused by accessing the right multiplex relationships (one right alter helps accessing many resources), having the right personality characteristics (making effort to invest in the right relationships, and applying the right social skills at the right time), or some interaction of both.

5.3 Measurement improvements

A methodological problem in this study is that average item responses were too high. In order to make responses to 'access'-type social capital items more suitable for measuring latent traits, a wider variation in popularity and item content would have been useful. More useful single item information, and better scale construction and interpretation is possible when items with lower popularities are also included. This could be achieved in several ways. First, by aiming for more precision in the questioning method, which improves the quality of the resource *availability* information. We could raise the questionnaire threshold defining when to 'know' people by adding a certain time frame to the questions – including the requirement in the general question that people must also be able to access the resource, or locate it within a certain time period, such as one week.[8] Second, we should aim for the development of more specific social resource items, that improve the quality of the resource *presence* information. More items are needed that represent a domain-specific, meaningful part of social

[8]Additional requirements that ask for 'proof' of past resource access, such as 'at least once having discussed use of the resource' would move measurement towards the social capital 'use' or mobilisation perspective, and are not suitable.

capital useful for anyone in the population, but which is not accessed by everyone; for example 'knowing someone involved in national politics', or 'knowing someone who can help you financially when your bank or credit card is lost/stolen'.

Also, the way the response categories of the items were used is subject to improvements. Coding only the strongest relation through which resources are accessed is a design flaw which hampers the interpretation of results: it limits the researcher in options for analyses. It is better to offer the respondent the option to indicate whether they know anyone in *each* of the categories family, friends, or acquaintances—the researcher can then later decide how to code this information for subsequent studies: whether any network member is accessed at all, whether mainly weak or or strong ties are accessed, and whether there is diversity in access to the various social resources. In addition, Webber (personal communication)[9] suggested to include two extra response categories to Resource Generator items (which are also useful for the Position Generator): 1) a response category indicating one could only access the particular resource through a professional. This response option makes the respondent consider more whether the contact that gives access to the resources is social capital, and not an institutional option for goal attainment. 2) a response category indicating that neither network members nor professionals can be accessed giving access to the resource. Respondents choosing this category indicate to be truly deprived of the specific help worded in the questionnaire item.

5.4 Conclusion

Both innovations presented here have the purpose to add to more specific and precise social capital measurements, improving the explanatory power of analyses.

Although in future versions of the Resource Generator some adjustments will be needed, for both researcher and respondent it may have an advantage over earlier

[9] Currently, new versions of the Resource Generator are being tested in the UK nationwide SAFIRE study: social factors in recovery from depression (Institute of Psychiatry, Kings College, London).

measurement instruments. It is easier to administer than name generators, and more concrete and directly interpretable than a position generator. However, the theoretical guidance needed for the construction of the Resource Generator is substantial. First, because of the selection of the items that should represent 'general' social capital in itself. Second, because of the cultural dependence of this selection. In terms of included resources the instrument we used in this study is suitable for social capital research in modern industrialised societies, but not necessarily elsewhere. In terms of resource availability and relationship information, careful interpretations must be applied to these instruments, as for instance already the meaning of the word 'friend' varies greatly between Western cultures (Fischer, 1982; Höllinger & Haller, 1990). For comparative social capital research *across* societies, a more general measurement model like the position generator will certainly remain useful.

Earlier used single social capital measures often seem to have referred to different, restricted subdomains of general social capital. The results of our analyses provide an empirical basis to the idea that multiple measures are necessary for the measurement of social capital at the individual level, and that an analysis of latent traits is a useful method to distinguish such measures, enabling detailed investigation of the productivity and goal specificity of social capital.

In this paper we concentrated on an exploration of social capital data of a general population. Although the next step is to make predictions with multiple sets of measures for prospective research, further exploratory work is also needed. First, the exploration of social capital subdomains in meaningful social subgroups: different structures of social capital, with distinctive implications for individual goal attainment, are likely to be present in groups already identified as having different social networks: groups with different education and income levels, groups with different positions on the labour market, and possibly also gender groups. Second, the exploration of social capital domains on the micro level. High levels of social capital as described by the Resource Generator can be supplied by networks with many alters

each giving access to only one or few resources, but also by small networks with each alter giving access to many different resources. Uncovering these 'alter-level-domains' may identify the efficiency of social capital creation and mobilisation, and is also a valuable part of a social capital investigation in a population. Existing, well-collected name-generated data already allow researchers to investigate such domains, and link social capital information to existing research into the multiplexity of network relations.

Finally, a comparison of results from latent trait analyses with social capital measures derived from the position generator model is desirable. When the relationship between different social capital measurement models is known, we will be able to link results of several different studies, and develop a better understanding of social capital.

REFERENCES

Bartholomew, D.J., Steele, F., Moustaki, I., Galbraith, J.I. 2002. The analysis and interpretation of multivariate data for social scientists. Boca Raton, Chapman & Hall/CRC.

Boomsma, A., Van Duijn M.A.J., Snijders T.A.B. 2001. Essays on item response theory. New York, Springer.

Bourdieu, P. 1980. Le capital social. Notes provisoires. Actes de la Recherche en Sciences Sociales 3, 2-3.

Boxman, E.A.W. 1992. Contacten en carriere: Een empirisch-theoretisch onderzoek naar de relatie tussen sociale netwerken en arbeidsmarktposities. [Contacts and careers: an empirical-theoretical investigation of the relationship between social networks and labour market positions.] Amsterdam: Thela Thesis (Ph.D thesis, University of Utrecht).

Boxman, E.A.W., De Graaf, P.M., Flap, H. 1991. The impact of social and human capital on the income attainment of Dutch managers. Social Networks 13, 51-73.

Burt, R.S. 1992. Structural holes: the social structure of competition. Cambridge MA, Harvard University Press.

Burt, R.S., Celotto, N. 1992. The network structure of management roles in a large matrix firm. Evaluation and Program Planning 15, 303-326.

Campbell, K.E.; Lee, B.A. 1991. Name generators in surveys of personal networks. Social Networks, 13, 203-221.

Coombs, C.H. 1964. The unfolding technique in one dimension. In: Coombs C.H. (Ed.), A theory of data. Ann Arbor, Michigan, Mathesis Press, pp.80-121.

Digman, J.M. 1990. Personality structure: an emergence of the five-factor model. Annual Review of Psychology 41, 417-440.

Erickson, B.H. 1996. Culture, class, and connections. American Journal of Sociology 102, 217-251.

Felling, A., Fiselier, A., Van De Poel, M. 1991. Primaire relaties en sociale steun. [Primary relations and social support.] Nijmegen, ITS.

Ferrand, A., Mounier. 1998. L'influence des réseaux de confidence sur les relations sexuelles. [The influence of confidence networks on sexual relationships.] In: Bajos N., Bozon M., Ferrand A., Giami A., Spira A. (Eds.), La sexualité aux temps du Sida. Paris, PUF, pp.255-304.

Fischer, C.S. 1982. What do we mean by 'friend'? An inductive study. Social Networks 3, 287-306.

Flap, H. 1976. De kracht van zwakke bindingen of de zwakte van sterke bindingen. [The strength of weak ties or the weakness of strong ties.] In: Arts, W., Lindenberg, S., Wippler, R. (Eds.), Gedrag en Structuur. De relevantie van microtheorieën voor de verklaring van microverschijnselen. Rotterdam, Universitaire Pers.

Flap, H. 1991. Social capital in the production of inequality. A review. Comparative Sociology of Family, Health, and Education 20, 6179-6202.

Flap, H. 1999. Creation and returns of social capital: a new research program. La Revue Tocqueville 20, 5-26.

Flap, H. 2002. No man is an island. In: Lazega, E., Favereau, O. (Eds.), Conventions and Structures. Oxford, University Press.

Flap, H., Boxman, E. 2001. Getting started. In: Lin, N., Cook, K., Burt, R. (Eds.), Social Capital: Theory and research. Chicago, Aldine de Gruyter.

Flap, H., De Graaf, N.D. 1986. Social capital and attained occupational status. Netherlands Journal of Sociology 22, 145-161.

Ghiselli, E.E., Campbell, J.P., Zedeck, S. 1981. Measurement theory for the behavioral sciences. San Francisco, Freeman and Company.

Granovetter, M. 1973. The strength of weak ties. American Journal of Sociology 78, 1360-1380.

Granovetter, M. 1974. Getting a job. Cambridge, Harvard University Press.

Höllinger, F., Haller, M. 1990. Kinship and social network in modern societies: a cross-cultural comparison among seven nations. European Sociological Review 62, 103-124.

Homans, G.C. 1950. The human group. London, Routledge & Kegan Paul.

Lazarsfeld, P.F., Henry, N.W. 1968. Latent structure analysis. Boston, Houghton Mifflin.

Lazarsfeld, P.F., Merton, R.K. 1954. Friendship as social process: a substantive and methodological analysis. In: Kendall P.L. (Ed.), The varied sociology of Paul F. Lazarsfeld. New York, Columbia University Press.

Lin, N. 1982. Social resources and instrumental action. In: Marsden, P.V and Lin, N. (Eds.), Social structure and network analysis. Beverly Hills, Sage.

Lin, N. 1999. Social networks and status attainment. Annual Review of Sociology 25, 467-487.

Lin, N. 2001a. Social capital: a theory of social structure and action. Cambridge, Cambridge University Press.

Lin, N. 2001b. Building a network theory of social capital. In: Lin, N., Cook, K., Burt, R.S. (Eds.), Social capital: theory and research. New York: Aldine De Gruyter.

Lin, N., Dumin, M. 1986. Access to occupations through social ties. Social Networks 8, 365-385.

Lin, N.; Fu, Y.; Hsung, R. 2001. The Position Generator: measurement techniques for social capital. In: Lin, N.; Cook, K.; Burt, R.S. (Eds.), Social capital: theory and research. New York, Aldine De Gruyter.

Lindenberg, S.M. 1986. The paradox of privatisation in consumption. In: Diekmann, A., Mitter, P. (Eds.), Paradoxical effects of social behavior. Heidelberg / Wien, Physica.

Lindenberg, S.M. 1990. Homo socio-economicus: the emergence of a general model of man in the social sciences. Journal of Institutional and Theoretical Economics 146, 727-748.

Loevinger, J. 1947. A systematic approach to the construction and evaluation of test of ability. Psychological monographs 61(4).

Lubbers, M. 1998. Structuren van samenhang tussen dimensies van sociaal kapitaal. [Structures of association between dimensions of social capital.] Department of Sociology, University of Groningen (MSc thesis).

Marsden, P.V. 1987. Core discussion networks of Americans. American Sociological Review 52, 122-131.

Marsden, P.V. 1990. Network data and measurement. American Review of Sociology 16, 435-63.

McCallister, L., Fischer, C. 1978. A procedure for surveying personal networks. Sociological Methods and Research 7, 131-148.

McPherson, M., Smith-Lovin, L., Cook, J.M. 2001. Birds of a feather: homophily in social networks. Annual Review of Sociology 27, 415-44.

Moerbeek, H.H.S., Need, A. 2003. Enemies at work: can they hinder your career? Social Networks 25, 67-82.

Mokken, R.J. 1996. Nonparametric models for dichotomous responses. In: Van Der Linden W.J., Hambleton R.K. (Eds.), Handbook of modern item response theory. New York , Springer.

Molenaar, I., Sijtsma, K. 2000. User's manual MSP5 for Windows: a program for Mokken scale analysis for polytomous items. Groningen: ProGAMMA.

Negrón, R., McCarthy, C. 2003. Personality and social network structure. Paper presented at the XXIII Sunbelt International Social Networks Conference, February 12-16, Cancun, Mexico.

Ormel, J., Steverink, N., Von Korff, M., Lindenberg, S.M. 1997. Quality of life and social production functions: a framework for understanding health effects. Social Science and Medicine 45, 1051-1063.

Post, W.J., Van Duijn, M.A.J., Van Baarsen, B. 2001. Single-peaked or monotone tracelines? On the choice of an IRT model for scaling data. In: Boomsma, A., Van Duijn, M.A.J., Snijders, T.A.B. (Eds.), Essays on item response theory. New York, Springer Verlag.

Sijtsma, K., Molenaar, I.W. 2002. Introduction to nonparametric Item Response Theory. Thousand Oaks, Sage.

Snijders, T.A.B. 1999. Prologue to the measurement of social capital. La Revue Tocqueville 20, 27-44.

Thomese, F. 1998. Buurtnetwerken van ouderen. [Neighbourhood networks of the elderly.] University of Amsterdam (Ph.D thesis).

Tijhuis, M. 1994. Social networks and health. Utrecht, NIVEL (Ph.D thesis).

Van Bruggen, A. 2001. Individual production of social well-being: an exploratory study. Amsterdam, Thela Thesis (Ph.D thesis, University of Groningen).

Van Busschbach, J. 1996. Uit het oog, uit het hart: stabiliteit in persoonlijke relaties. [Out of sight, out of mind: stability in personal relationships.] Amsterdam, Thela Thesis (Ph.D thesis, University of Groningen).

Van De Bunt, G. 1999. Friends by choice: an actor-oriented statistical network model for friendship networks through time. Amsterdam : Thela Thesis (Ph.D thesis, University of Groningen).

Van Der Gaag, M.P.J., Snijders, T.A.B. 2004. Proposals for the measurement of individual social capital. In: Flap, H. & Völker B. (Eds.), Creation and returns of Social Capital. London , Routledge, pp.199-218.

Van Der Linden, W.J., Hambleton R.K. (Eds.), 1997. Handbook of modern item response theory. New York, Springer.

Van Der Poel, M. 1993. Personal Networks. A rational choice explanation of their size and composition. Lisse, Swets & Zeitlinger (Ph.D thesis).

Van Schuur, W. H., Kiers, H.A.L. 1994. Why factor analysis often is the incorrect model for analyzing bipolar concepts and what model to use instead. Applied Psychological Measurement 18, 97-110.

Vodosek, M. 2003. The role of personality in the formation of social networks. Paper presented at the XXIII Sunbelt International Social Networks Conference, February 12-16, Cancun, Mexico.

Völker, B. 2001. Buren in Nederland. De rol van buren in persoonlijke netwerken. [Neighbours in the Netherlands. The role of neighbours in personal networks.] Tijdschrift voor Sociologie 4, 337-362.

Völker, B., Flap, H. 1997. The comrade's belief: intended and unintended consequences of communism for neighbourhood relations in the former GDR. European Sociological Review 13, 241-265.

Völker, B., Flap, H. 1999. Getting ahead in the GDR: social capital and status attainment under communism. Acta Sociologica 41, 17-34.

Völker, B., Flap, H. 2001. The liability of weak ties in communist societies: the case of the former GDR. Rationality and Society 13, 401-428.

Völker, B., Flap, H. 2004. Social networks and performance at work: a study of the returns of social capital in doing one's job. In: Flap, H. & Völker B. (Eds.), Creation and returns of Social Capital. London, Routledge, pp.172-196.

Table 1: Basic characteristics of the SSND sample (N=1,004).

variable		*percentage*	*variable*		*percentage*
gender	women	42	education	primary	3
	men	58		lower vocational and trade	14
				high school, lower level	13
age	18-24	2		high school, medium level	5
	25-29	6		high school, higher level	5
	30-34	10		medium level vocational	20
	35-39	14		higher vocational / college	26
	40-44	13		university	15
	45-49	14			
	50-54	15	marital status	single	15
	55-59	15		married	63
	60-66	13		cohabiting	10
	55-59	15		divorced	8
	60-66	13		widowed	3
nationality	Dutch	98	labour market position	in education	3
	other	2		wage-earner	76
				off labour market	8
				domestic labour	8
country of birth	The Netherlands	94		social security	2
	elsewhere in Europe	2		other	3
	elsewhere, outside Europe	4			
			monthly income	less than dfl.1,000	5
household size	1	20		dfl.1,001 to 1,999	12
	2	35		dfl.2,000 to 2,999	26
	3	15		dfl.3,000 to 3,999	27
	4	18		dfl.4,000 to 4,999	14
	5	8		dfl.5,000 to 5,999	6
	6	3		dfl.6,000 to 6,999	5
	7-12	1		dfl.7,000 to 7,999	2
				dfl.8,000 to 9,999	1
				dfl.9,000 and higher	3

Table 2: Responses to resource generator items and access to equivalent personal resources (Survey on the Social Networks of the Dutch (1999-2000); N=1,004).

		% yes	*if yes, access through*			"and yourself?"	%missing
	"Do you know anyone who..."		acquain-tance	friend	family member	% yes	
	original resource generator items						
1	can repair a car, bike, etc.	83	16	18	66	39	0
2	owns a car	87	0	3	97	77	0
3	is handy repairing household equipment	72	12	17	71	34	0
4	can speak and write a foreign language	87	4	11	84	68	0
5	can work with a personal computer	90	2	9	89	65	0
6	can play an instrument	79	10	16	74	25	0
7	has knowledge of literature	70	9	23	67	37	0
8	has senior high school (VWO) education	87	6	14	81	65	0
9	has higher vocational (HBO) education	94	6	13	82	41	0
10	reads a professional journal	78	7	13	81	57	0
11	is active in a political party	34	34	26	39	15	0
12	owns shares for at least Dfl.10,000	54	11	21	67	29	0
13	works at the town hall	42	44	23	34	13	0
14	earns more than Dfl.5,000 monthly	76	10	19	71	21	0
15	owns a holiday home abroad	41	34	26	41	12	0
16	is sometimes in the opportunity to hire people	65	21	23	57	15	0
17	knows a lot about governmental regulations	69	23	25	52	27	0
18	has good contacts with a newspaper, radio- or TV station	32	36	24	41	21	0
19	knows about soccer	80	7	16	77	40	0
20	has knowledge about financial matters (taxes, subsidies)	81	15	22	64	36	0

Table 2: (continued) Responses to resource generator items and access to equivalent personal resources (Survey on the Social Networks of the Dutch (1999-2000); N=1,004).

		% yes	*if yes, access through*			"and yourself?"	%missing
	"Do you know anyone who..."		acquain-tance	friend	family member	% yes	
	original resource generator items						
21	can find a holiday job for a family member	61	29	23	47	-	3
22	can give advice concerning a conflict at work	73	22	32	46	-	4
23	can help when moving house (packing, lifting)	95	4	17	79	-	1
24	can help with small jobs around the house (carpenting, painting)	91	9	20	70	-	1
25	can do your shopping when you (and your household members) are ill	96	11	24	64	-	1
26	can give medical advice when you are dissatisfied with your doctor	56	20	31	48	-	3
27	can borrow you a large sum of money (Dfl.10,000)	60	3	13	84	-	3
28	can provid a place to stay for a week if you have to leave your house temporarily	95	2	15	83	-	2
29	can give advice concerning a conflict with family members	83	3	33	64	-	1
30	can discuss what political party you are going to vote for	65	5	27	68	-	3
31	can give advice on matters of law (problems with landlord, boss, municipality)	64	24	32	44	-	3
32	can give a good reference when you are applying for a job	65	37	37	26	-	4
33	can babysit for your children	57	12	17	71	-	10
	recoded name generator items						
34	you can pay social visits to	93	3	28	68	-	-[1]
35	can discuss intimate matters with you	86	4	24	72	-	-
36	can do small jobs around the house	86	22	15	62	-	-
37	keeps a spare key to your house	80	28	10	62	-	-

As a minimum criterion of 'knowing' a person who could give access to each of the 33 resource items, the respondent was asked to imagine that when accidentally met on the street, he or she would know the name of that person, and both could start a conversation with each other. The name generating questions were open, and relationship information was recoded into resource generator categories (see text). Personal resource equivalents were only checked if not too susceptible to social desirability (see text).

[1] The responses to the Name Generators were recoded from aggregated alter-level data, and therefore do not have missing values in the sense of responses.

Table 3: Four cumulative social capital scales from Resource Generator items, and their inter-item correlations (Survey on the Social Networks of the Dutch (1999-2000); N=1,004).

	"Do you know anyone who"	*I prestige / education SC*						*II pol/fin. SC*			*III p. skills SC*				*IV personal support SC*			
item #		18	15	7	14	8	9	11	17	20	10	2	4	5	32	22	29	23
	I prestige and education related social capital																	
18	has good contacts with media	**1**																
15	owns a holiday home abroad	**0.21**	**1**															
7	has knowledge of literature	**0.18**	**0.20**	**1**														
14	earns more than Dfl.5.000 monthly	**0.12**	**0.27**	**0.27**	**1**													
8	has graduated senior high school	**0.10**	**0.18**	**0.32**	**0.31**	**1**												
9	has a higher vocational education	**0.14**	**0.15**	**0.31**	**0.36**	**0.58**	**1**											
	II political and financial skills social capital																	
11	is active in a political party	**0.19**	**0.20**	**0.18**	**0.19**	**0.11**	**0.16**	**1**										
17	knows a lot about governmental regulations	**0.20**	**0.24**	**0.24**	**0.31**	**0.19**	**0.22**	**0.22**	**1**									
20	has knowledge about financial matters	**0.12**	**0.16**	**0.22**	**0.24**	**0.18**	**0.25**	**0.14**	**0.34**	**1**								
	III personal skills social capital																	
10	reads a professional journal	**0.13**	**0.10**	**0.23**	**0.18**	**0.20**	**0.16**	**0.13**	**0.24**	**0.22**	**1**							
2	owns a car	0.02	0.02	**0.14**	0.03	**0.13**	**0.15**	0.00	**0.11**	**0.19**	**0.30**	**1**						
4	can speak and write a foreign language	**0.08**	**0.10**	**0.29**	**0.15**	**0.25**	**0.27**	0.06	**0.14**	**0.23**	**0.34**	**0.38**	**1**					
5	can work with a personal computer	0.06	0.03	**0.15**	0.04	**0.14**	**0.15**	-0.03	**0.15**	**0.15**	**0.32**	**0.55**	**0.49**	**1**				
	IV personal support social capital																	
32	can give a good reference when applying for job	**0.16**	**0.19**	**0.23**	**0.16**	**0.13**	**0.16**	**0.16**	**0.18**	**0.21**	**0.16**	0.03	**0.10**	0.05	**1**			
22	can give advice about conflict at work	**0.12**	**0.14**	**0.25**	**0.18**	**0.16**	**0.18**	**0.14**	**0.23**	**0.23**	**0.18**	0.03	0.07	0.01	**0.40**	**1**		
29	can give advice about conflicts family member	0.06	**0.12**	**0.14**	**0.16**	**0.15**	**0.12**	**0.10**	**0.17**	**0.20**	**0.13**	0.06	**0.16**	**0.08**	**0.21**	**0.24**	**1**	
23	can help when moving house (packing, lifting)	0.03	0.04	**0.08**	**0.08**	**0.08**	**0.10**	0.00	0.06	**0.10**	0.04	0.00	0.03	0.02	**0.16**	**0.15**	**0.22**	**1**

Pearson correlations; bold $p \leq 0.01$.

Table 4: Scale characteristics and distributions of social capital measures from resource generator items (Survey on the Social Networks of the Dutch (1999-2000); N=1,004).

		scale characteristics		scale distributions			
		scale H	*rho*	*range*	*mean*	*st.dev.*	*skewness*
I	prestige and education related social capital	0.48	0.68	0-6	4.01	1.46	-0.79
II	political and financial skills social capital	0.47	0.54	0-3	1.84	0.93	-0.45
III	personal skills social capital	0.48	0.70	0-4	3.44	1.01	-1.96
IV	personal support social capital	0.40	0.61	0-4	3.19	1.00	-1.08
	total social capital (# items accessed)	0.21	0.85	2-37	27.07	5.84	-1.02

Table 5: Correlations between social capital measures from resource generator items (Survey on the Social Networks of the Dutch (1999-2000); N=1,004).

		I	*II*	*III*	*IV*
I	prestige and education related social capital	1			
II	political and financial skills social capital	0.48 (0.79)	1		
III	personal skills social capital	0.29 (0.48)	0.26 (0.48)	1	
IV	personal support social capital	0.37 (0.57)	0.35 (0.61)	0.18 (0.31)	1
	total social capital (# items accessed)	0.73 (0.97)	0.65 (0.97)	0.51 (0.67)	0.67 (0.94)

Pearson correlations (between parentheses corrected for attenuation) all $p \leq 0.01$

Table 6: Regressions on all resource generator social capital measures for social subgroups (Survey on the Social Networks of the Dutch (1999-2000); N=738-754).

		total social capital			*I prestige / ed. SC*			*II pol/fin. SC*		
variable		*B*	*s.e.*	*p*	*B*	*s.e.*	*p*	*B*	*s.e.*	*p*
constant		24.48	4.39	$p \leq 0.001$	3.76	1.11	0.001	1.21	0.77	0.119
sex	1 = female	-0.67	0.44	0.126	-0.10	0.11	0.376	0.02	0.08	0.844
age	in decades	-0.07	1.63	0.968	-0.48	0.41	0.243	0.23	0.29	0.414
	in decades, squared	-0.04	0.19	0.818	0.06	0.05	0.195	-0.03	0.03	0.392
education[1]	primary	-1.25	0.51	0.015	-0.27	0.13	0.042	-0.23	0.09	0.011
	tertiary	1.22	0.47	0.010	0.36	0.12	0.003	0.14	0.08	0.085
labour market position[2]	in education	-0.25	1.40	0.861	-0.80	0.34	0.019	-0.28	0.24	0.237
	home maker	-5.58	2.29	0.015	-1.13	0.58	0.052	-0.88	0.40	0.029
	off labour market[3]	1.45	1.70	0.394	0.21	0.43	0.624	0.60	0.30	0.043
	unemployed	1.31	2.25	0.561	1.32	0.57	0.021	0.28	0.40	0.483
presence of a partner	yes	-0.24	0.49	0.624	-0.09	0.13	0.466	-0.07	0.09	0.444
household size		0.19	0.16	0.218	0.04	0.04	0.301	0.00	0.03	0.877
income (log)		0.77	1.02	0.450	0.14	0.26	0.577	-0.01	0.18	0.963
occupational prestige	in decades	0.34	0.14	0.012	0.14	0.03	$p \leq 0.001$	0.06	0.02	0.013
R^2_{adj}			0.09			0.11			0.06	
d.f.			13 / 752			13 / 752			13 / 753	
F			6.53			8.56			4.74	
p			$p \leq 0.001$			$p \leq 0.001$			$p \leq 0.001$	

Table 6: (continued) Regressions on all resource generator social capital measures for social subgroups.

		III p. skills SC			*IV pers. supp. SC*		
variable		*B*	*s.e.*	*p*	*B*	*s.e.*	*p*
constant		3.89	0.86	$p \leq 0.001$	3.05	0.77	$p \leq 0.001$
sex	1 = female	-0.17	0.09	0.043	-0.02	0.08	0.753
age	in decades	-0.37	0.32	0.244	0.18	0.29	0.523
	in decades, squared	0.04	0.04	0.242	-0.03	0.03	0.375
education[1]	primary	-0.04	0.10	0.693	-0.16	0.09	0.073
	tertiary	0.13	0.09	0.174	0.01	0.08	0.940
labour market position[2]	in education	-0.17	0.27	0.525	-0.08	0.24	0.746
	home maker	-0.50	0.45	0.268	-0.67	0.39	0.089
	off labour market[3]	0.22	0.33	0.503	0.09	0.31	0.763
	unemployed	0.52	0.44	0.242	-0.14	0.39	0.713
presence of a partner	yes	-0.03	0.10	0.782	-0.16	0.09	0.059
household size		-0.01	0.03	0.791	0.01	0.03	0.742
income (log)		0.13	0.20	0.506	0.01	0.18	0.958
occupational prestige	in decades	-0.01	0.03	0.813	0.05	0.02	0.039
R^2_{adj}							
d.f.			13 / 753			13 / 737	
F			1.34			2.73	
p			0.182			0.001	

[1] reference group: secondary education

[2] reference group: wage-earners

[3] pensioned respondents and those unfit for work

Table 7: Correlations between personal and social resource collections (Survey on the Social Networks of the Dutch (1999-2000); N=1,004).

		scale H	*rho*	*correlations*							
	personal resource scales			p.res. I		p.res. II		p.res. III		p.res.# items	
I	prestige and education related resources	0.31	0.63	1							
II	political and financial skills resources	0.55	0.64	0.31	(0.49)	1					
III	personal skills	0.36	0.63	0.30	(0.48)	0.30	(0.47)	1			
	total personal resources (# items accessed)	0.23	0.76	0.67	(0.97)	0.64	(0.92)	0.74	(1.00)	1	
	social capital scales										
I	prestige and education related social capital	0.48	0.68	0.30	(0.46)	0.12	(0.18)	0.26	(0.40)	0.30	(0.43)
II	political and financial skills social capital	0.47	0.54	0.20	(0.34)	0.12	(0.20)	0.23	(0.39)	0.25	(0.39)
III	personal skills social capital	0.48	0.70	0.12	(0.18)	0.08	(0.12)	0.10	(0.15)	0.16	(0.22)
IV	personal support social capital	0.40	0.61	0.10	(0.16)	0.07	(0.11)	0.19	(0.31)	0.17	(0.25)
	total social capital (# items accessed)	0.21	0.85	0.25	(0.34)	0.16	(0.22)	0.29	(0.40)	0.32	(0.40)

Pearson correlations (between parentheses with correction for attenuation).