

2 Measurement of Individual Social Capital Questions, Instruments, and Measures

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The idea that social relationships can be conceptualized as potentially productive, “social” additions to personally owned resources has been welcomed as an attractive, explanatory mechanism in many areas of social and economical research. The assessment of resources embedded in social networks, potentially available to individuals or the larger community as a whole, has gradually become an established extension to conceptual models which may provide useful, additional explanations for many research questions with socio-demographic aspects. Although still enmeshed in debates about the meaning of “social capital”, health researchers are also gradually realizing the explanatory potential of this concept to health outcomes. However, the translation of this idea into valid and reliable quantification has proven to be cumbersome, as the number of leads that can be followed in matters of operationalisation and measurement have proved labyrinthine; this has resulted in many incomparable measures and instruments (Flap, 1999, 2004).

Conceptualized in its individual form, social capital refers to all possible kinds of resources potentially owned by social network members, which may become available to a focal individual as a result of mutual investments in a shared past, of which the social relationships with these network members form evidence (Van der Gaag & Snijders, 2004). A definition of social capital at this individual level remains quite close to its original analogy with more traditional notions of financial and material “capital”, which have been developed and accepted in the academic world for more than 200 years (see e.g. beginnings by Quesnay, 1766) – the idea that relationships can be invested in and form “capital” that may harvest returns in the future is, similar to human and cultural capital, directly derived from economy. Perhaps this is the reason that when defined at the individual level by leading scholars (Bourdieu, 1980; Burt, 1992; Flap, 1999, 2004; Lin, 2001), social capital shows much less variation in the number and nature of dimensions specified than collective level social capital, where large differences between various conceptualizations are prevalent (Coleman, 1988; Putnam, 1993).

For the development of systematic, comparable social capital measurement instruments, the perspective of individual level social capital offers the most simple and clearly defined units of measurement – a focus on the individual avoids the common interpretation problems in analyses that stem from the use of

01 aggregated data, in which ecological fallacies may be encountered. The method-
02 ology of individual social capital research is essentially based on social network
03 research, a well-established research area within which many insights for opera-
04 tionalization, and tools for data collection have been readily developed.

05 In this chapter, we aim to provide an overview of current methods and instru-
06 ments for the measurement of individual social capital, and to the various
07 methodological concerns that shape these methods. A first section introduces
08 research questions and theoretical issues that shape the desired characteristics of
09 social capital measurement. A second section discusses ways to construct social
10 capital indicators from available data. A final and third section discusses the three
11 main measurement instruments for individual social capital currently available:
12 the name generator, the position generator, and the resource generator. As an
13 illustration of advanced measurement in individual social capital research, we
14 conclude the chapter with an example from a recent study using the resource
15 generator instrument for a UK sample.

16 17 18 2.1. Questions that Shape Measurement 19

20 The use, design, and quality of social capital measurement can only be judged when
21 its eventual applications are made explicit. Disregarding any specific, topical
22 domains such as the job market, status attainment, personal well-being, health issues,
23 etc., social capital research questions can be categorized into three main issues.

24 The first and most important of these is that individual social capital research
25 considers an inequality question, based on the presumption that people equipped
26 with “better” social capital will succeed better in attaining their goals (Flap, 2004;
27 in the section “measures” we will further specify which characteristics of social
28 capital could be considered “better” social capital). Generally, four explanatory
29 mechanisms for this hypothesis are specified. Social network members and their
30 resources are expected to be helpful in goal attainment because they 1) signifi-
31 cantly add to an individual’s collections of personal resources, such as his cul-
32 tural, human, material, and political capital (e.g. the social network may provide
33 more useful information about jobs than can be gathered by an individual on the
34 market), 2) provide unique resources that cannot be produced or purchased to sat-
35 isfaction individually (e.g. love, friendship, emotional support, and opportunities
36 for reproduction are poorly available on the market), 3) may actively provide help
37 without asking (e.g. by means of recommendations), and 4) form the identity of
38 one’s social network to the “outside world”, which may work as an advertisement
39 for an individual (Lin, 1999a, 2001; Van der Gaag, 2005:40).¹ Summarized, the
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43 ¹ Each of these mechanisms also provides unique forms of *social liability* – a term
44 proposed by Leenders and Gabbay (1999) to identify negative experiences specifically
45 caused by social network members. This chapter does not explicitly discuss such negative
sides to social capital.

01 general issue regarding social capital is to investigate its *productivity*, and shed
02 light on the question whether social networks are actually helpful in attaining
03 individuals' goals.

04 Social capital is a complex, latent construct with several dimensions: in its
05 individual form it refers to social relationships with alters² with different personal
06 characteristics, various social resource collections, and, in some lines of social
07 capital research, also patterns of relationships between network members (net-
08 work structure). Therefore, a second, main research issue considers the question
09 which configuration, which part, or which resource domain of social capital is
10 productive in a certain context. Empirical findings have shown that e.g. to find a
11 job, or attain higher social status through one's social network, social capital
12 should be specific: it is necessary to know the right people with the right
13 resources in order to climb the social ladder (Flap & Völker, 2001; Lin, 1999b).
14 On the other hand, in order to find a house, or to enjoy company in general, rather
15 unspecific social capital (as indicated by having a large social network) seems to
16 be sufficient: apparently, the resources responsible for such outcomes, which con-
17 cern any member in the population, may successfully be passed on through any
18 network member (Van der Gaag & Snijders, 2003; Van der Gaag, 2005:191–194).
19 Summarized, not all kinds of relationships and resources represented by social
20 capital are important at the same time, and specific configurations of these have
21 distinct roles in its productivity in distinct contexts. These types of questions
22 can therefore be labeled as investigations about social capital's *goal specificity*
23 (Flap, 1999, 2002). As yet, knowledge about which social capital dimensions are
24 responsible for any productivity is still fragmented.

25 If some configuration of social capital is productive for individuals in a certain
26 context, this also implies decreased opportunities for those lacking it, and repro-
27 duction of inequality through the use of social capital (Flap, 1991, 2004; Lin,
28 2001:99–124). Therefore, a third main social capital research issue is the *identifi-*
29 *cation of advantaged and deprived groups*, or the question how social capital
30 is distributed over the general population (Flap, 1991, 2002, 2004). Eventually,
31 studies addressing this issue may provide the translation of social capital research
32 into future policy advice.

33 Making these research questions explicit is necessary because these directly
34 shape social capital measurement at the level of operationalization and indicator
35 construction. As will be discussed in the next section, so far many researchers have
36 operationalized social capital into single, and rather unspecific indicators of
37 "something useful about the social network". Social capital research in exploratory
38 stages, aimed at uncovering *the existence* of a relationship between individual
39 social capital and its productivity, may indeed harvest meaningful, if not very spe-
40 cific, results from using a single indicator. However, the desire to identify *which*
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43 ² In ego-centered social network research, the focal individual of a social network is
44 denoted as "ego", whereas any, unspecified social network member is denoted as an "alter".
45 For reasons of fluidity, we also use these terms throughout this chapter.

01 *part or quality* of social capital is responsible for any effect directly requires the
02 development of multiple social capital indicators, each tuned towards specific sub
03 dimensions; the same is true for almost all questions about the distribution of
04 social capital over the population. Although some researchers have already empha-
05 sized the need to construct multiple measures for social capital at an early stage
06 (e.g. Campbell, Marsden, & Hurlbert, 1986), most of them have not – the need to
07 use multiple measures to measure social capital has not been recognized in full yet.
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09 2.2. Measure Construction

10 A latent, complex construct with several dimensions offers many opportunities
11 for measurement – in the case of social capital perhaps even too many. Systematic
12 research into its productivity and goal specificity has been slow in development
13 and has seen the construction of many different, incomparable measures; often,
14 these seem to have been developed based on available data rather than valid oper-
15 ationalization. The main cause for this is, however, that for many research
16 domains more specific ideas about the productivity of social capital are difficult
17 to establish firmly. Social capital investigators are often confronted with the fact
18 that they do not really know which indicators could be essential to explain their
19 studied outcomes: will an hypothesized effect stem from the presence of specific
20 alters, types of relationships, social resources, the structure or size of the social
21 network, all of these, or some of these aggregated into some useful combination?
22 In the overview below, we discuss the potential value of several principles as a
23 basis for social capital measures.
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25 **Social network structure** Since individual social capital research gradually
26 evolved from social networks research, it is not surprising that many authors have
27 operationalized social capital from a structural point of view. Assessing the rela-
28 tive advantage of an individual's position in a social network, such social capital
29 measures are calculated from data matrices about relationships in networks with
30 clear boundaries, of which all members participate in research (see e.g. overview
31 by Borgatti, Jones, & Everett, 1998). Many of these studies are investigations to
32 which some form of entrepreneurship is the central topic, locating advantageous
33 positions in environments characterized by competition. Therefore, most meas-
34 ures are based on the expected added value from sparse networks full of "struc-
35 tural holes" (Burt, 1992), containing few relationships between alters, and
36 capitalizing on the idea of accessing diverse information at minimal costs. This
37 preconception is not universally transferable to other research domains, such as
38 personal health, in which social capital functioning within an environment con-
39 ductive to trust and network closure can often seem more beneficial (Coleman,
40 1990). Single measures of network structure could serve as indicators in social
41 capital productivity research, but these only refer to patterns of relationships, not
42 explicitly to social resources, leaving explanations of any productivity effects
43 rather implicit. However, the need for well-defined boundaries to local popula-
44 tions also reduces their usefulness, since research applications in the health
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01 domain usually require data samples of general; in such settings opportunities for
02 the calculation of structural social capital measures are severely limited.³

03 **Presence of specific alters** Other social capital measures are based on data
04 from ego-centered social network research, which results in traditionally struc-
05 tured data sets. Most of these depart from theoretical notions regarding one single
06 dimension of social capital; often, this concerns the existence of specific relation-
07 ships or (groups of) specific alters. For example, Granovetter's (1973) classic
08 argument about the strength of weak ties refers to the theoretical advantage of
09 weaker relationships in the attainment of instrumental goals; subsequently, the
10 proportion of weak ties in a person's social network can be used as a social capi-
11 tal measure. In a health context, where the attainment of expressive goals is often
12 more central, indicators of the presence of strong ties in the social network
13 (e.g. the proportion of strong ties among all relationships) could be considered
14 useful. Such measures do not directly refer to social resources however, and their
15 inclusion in explanatory models only tells us something very general about social
16 network effects. Instead of relationships, another perspective is the identification
17 of specific classes of network members. Since neighbors, friends, family mem-
18 bers, etc. give access to specific sets of social resources (Felling, Fiselier, & Van
19 de Poel, 1991), measures indicating the presence of alters with specific *roles* can
20 serve as indirect social capital indicators. However, for insight into the productiv-
21 ity and nature of these social resources, additional data will be needed. Checking
22 for specific role-players in social networks is also marked by the problem that not
23 all productive roles are easily labeled – while these may indeed be potentially
24 helpful it is, for example, not very productive to ask respondents to list “intrigu-
25 ing, vague acquaintances” in their network. Other specific classes of network
26 members are formed by socio-demographic denominations, such as alters of spe-
27 cific age, gender or ethnicity. The nature of any specific social resources attached
28 to socio-demographic positions also remains very implicit, and their beneficial
29 effects as social capital are also possibly very population-specific. Since the theo-
30 retical meaning of such indicators can therefore be very different between social
31 capital studies, their ad hoc inclusion usually also adds to the incomparability of
32 findings. Only one indicator of social capital directly referring to specific, pro-
33 ductive persons in the network has found systematic use – this is discussed in the
34 section about the “position generator” measurement instrument.

35 Newer ideas for social capital indicators have moved away from any specific
36 presumptions about useful categories and configurations of persons and relation-
37 ships, and aim to characterize an individual's social network as a whole on more
38 general, morphological grounds.

39 **Volume** One of the first notions used to characterize an individual's social capi-
40 tal was formulated by Bourdieu (1980) in terms of volume, or the total amount of

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43 ³ It is possible to calculate network structure indicators from ego-centered data by asking
44 respondents whether, and how well their network members know each other (see section
45 “name generator”). Such observations are unreliable, however.

01 social resources one has potential access to. Having remained largely intuitive, the
02 idea is that having “more” social capital is productive as a result of all four mech-
03 anisms specified earlier, and adds to sustain the production of individual well-
04 being. Following this argumentation, it would be logical to construct measures of
05 social capital volume as cumulative indicators of “all resources” of “all members”
06 of an individual social network. This meets with the problem that, apart from the
07 fact that measurements of “all resources” of “all members” are susceptible to reli-
08 ability and boundary problems, this would require the collection of extensive sets
09 of data per individual (see section “name generator”). Therefore, measuring social
10 capital volume to any detail has not become very popular in this form. The use of
11 social network size as a social capital volume indicator, counting the number of
12 different alters mentioned in an interview, can be seen as a more economical ver-
13 sion, omitting resource measurements. This measure could be used as a single
14 indicator to detect goal-*un*specific effects of social capital, where any productivity
15 stems from the sheer number of people one knows (see section “questions”). How-
16 ever, an extended rationale that the more people one knows, the more resources
17 they will generally represent, and the more helpful the network will be, is perhaps
18 a bit limited. Using measures of social capital volume in explanatory analysis also
19 has limitations in terms of content validity. Theoretically, not all social capital
20 available in a social network can or will contribute to the attainment of goals: most
21 goals are attained by the use of personally owned resources,⁴ and there will be
22 many duplications of resources between alters. For most social resources, it is not
23 the question how much or how many of them are present in the social network in
24 order to be helpful (which is implicit in cumulative counting), but whether at least
25 one instance of them is present at all. Summarized, multiple alters giving access to
26 the same resources can be unnecessary, inconvenient, or normatively restricted to
27 give help (Van der Gaag & Snijders, 2004).⁵ An inventory of all resources may
28 therefore require the collection of much superfluous information.

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32 ⁴ This argument gets even more important when we realise that because it creates an
33 obligation to pay back services in the future, using social capital is also costly. For some
34 goals, using social capital is also awkward for the seeker of help – it is quicker and more
35 practical to clean one’s dishes oneself. Having social capital of some quality is therefore
36 not an immediate, automatic blessing. For the attainment of most goals individuals
37 are self-sufficient, either through the direct use of personal resources, or by buying solu-
38 tions (goods and services) on the market. Only a small proportion of potentially accessed
39 resources is used; when asked about the resource generator instrument, a number of
40 participants commented that they would probably not ask for a number of the resources
41 they had access to (Webber & Huxley, submitted).

42 ⁵ Several alters providing similar resources could be seen as “insurance” for a certain kind
43 of help, because across relationships the opportunities for alters to actually provide help will
44 vary over time. However, a possible lack of an opportunity to exchange help will only block
45 very specific social capital transactions – usually, helping is without hurry. Furthermore, in
many social networks there is an established order among network members who has to
help first; help is therefore less easily mobilised from other than “usual” alters. Therefore,
having social network “extras” in theory shows diminishing returns.

01 **Diversity** A logical further specification of social capital volume is its diver-
02 sity: an account whether elements of different kinds are represented in the social
03 network by at least one instance. Several authors have proposed the idea that spe-
04 cific resources and relationships can be located and accessed more successfully
05 when more differentiation in alters, resources and relationships is present in the
06 network, hence resulting in better social capital (Burt, 1992; Erickson, 1996,
07 2003; Flap, 1991; Granovetter, 1973; Lin, 2001; see also Erickson, in Lin &
08 Erickson, forthcoming). Social capital diversity measures can be constructed in a
09 straightforward way for relationships (e.g. variation in relationship strength or
10 role), alters with specific characteristics (e.g. variation in gender, age groups, eth-
11 nicity, etc.), but operationalizations most valid in terms of social capital are those
12 establishing the more explicit resource diversity of a person's social network
13 (e.g. variation in alters' education, occupational prestige, etc.). So far, diversity
14 measures are general, single social capital indicators making the most of their
15 parsimony, incorporating robust content validity, while being sufficiently trans-
16 ferable to diverse social capital contexts to enable comparisons between studies.

17 **Social resources** While being the most obvious indicators for the concept of
18 social capital, measures referring to resources of social network members were
19 neglected for a long time. Perhaps the problem *which* of all possible social
20 resources should be indicated by social capital measures, and how these should
21 result in indicators, was central to this omission. The history of the concept of
22 "capital" shows that its operationalization has always been complex, even when
23 usually referring to relatively straightforward financial and material resources
24 only (Hennings, 1987). For social capital, this question is even more complex,
25 since the idea of "social resources" may refer to any collection of resources
26 owned by network members. In the traditional categorization of capital used in
27 the social sciences, social capital therefore includes the financial (money), human
28 (education and skills), cultural (symbolic knowledge), and political capital
29 (power) of network members. Investigations of the productivity, and especially of
30 the goal specificity of social capital, should therefore ideally be capable of indi-
31 cating which of these classes of social resources help individuals to attain their
32 goals; hence a good social capital measurement instrument should contain sepa-
33 rate indicators for each of these collections – within any research domain.⁶ How-
34 ever, since the number of *possible* social resources that can be distinguished
35 seems almost infinite, it is difficult to point out exactly which resources should be
36 included in indicators of social resources from each of these classes.

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39 ⁶ A measurement instrument constructed this way will be capable of specifying the
40 productivity of social capital as follows. If none of these indicators are significant
41 predictors for a central outcome, there is apparently no effect of social capital. If one,
42 or some of these indicators are significant predictors, social capital is productive and
43 goal specific – productivity then results from knowing the *right* people. If all of these indi-
44 cators prove significant predictors for an outcome with comparable magnitudes,
45 there is a very unspecific effect of social capital – the effect may then result from
knowing *enough* people.

01 There are two ways to deal with this problem. A first solution is the conversion
02 of various “social resources” into a single currency – this is the basis of the “posi-
03 tion generator” measurement model, where social resources are expressed as the
04 job-specific prestige of network members’ occupations (see section “position
05 generator”). A second option is to use some form of concretely listed, potentially
06 useful social resources. Starting from a theoretical classification, for each capital
07 collection some useful examples can be the basis for questionnaire items. This is
08 the basis for the “resource generator” measurement instrument, which is
09 explained in a separate section below.

11 2.3. Instruments

12 The translation of theoretical presumptions about social capital measurement into
13 questionnaire items meets with the problem that a general perspective on the
14 wording of questions needs to be chosen. When we wish to understand the role of
15 social capital in attaining outcomes at the personal level, it is important to distin-
16 guish between accessing and mobilizing social capital (Flap, 2004; Lin, 1999a) –
17 after all, not all potentially accessed social capital is mobilized, and furthermore,
18 asking respondents questions about whether they could access social resources
19 versus whether they have used social resources potentially retrieves very different
20 answers. Both ways of questioning bring along specific measurement problems.

21 When we ask questions about having *access* to certain social resources (such as
22 the questions listed in Table 2.1), the quality of the data remains rather hypothet-
23 ical. Answers to such questions may contain considerable unreliability, and in
24 case of social capital, social desirability.⁷ In addition, unused social capital is
25 probably not as well memorized as used social capital – people who actively use
26 their networks will more clearly remember the contents of their networks. More-
27 over, of many resources people do not know whether they are owned by personal
28 network members, because they are context specific, not commonly encountered
29 in social exchange, or knowledge about them is limited to intimate confidants.
30 Furthermore, as discussed earlier (see section “volume”) measurement of a col-
31 lection of unused social capital points towards superfluous measurements,
32 because most of the potentially accessed social capital will never be used.⁸ In
33 predictive analyses, this eventually reduces amounts of explained variance in
34 productivity and goal specificity questions.

35 Other, but more serious problems are encountered when we would ask respon-
36 dents questions about the *mobilization* of resources only. Questions about the use
37 of help from network members operate from a retrospective time perspective by
38 definition. This introduces the need for a pre-specified time frame (e.g. use in the
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43 ⁷ Especially in an interview situation, respondents will want to avoid they are seen as
44 “social losers”, and are eager to indicate they have access to a diverse social network.

45 ⁸ See note 4.

TABLE 2.1. Empirically determined domain specific cumulative social capital measurement scales for UK sample, based on a resource generator with stem question "Do you personally know anyone with the skill or resource listed below that you are able to gain access to *within one week* if you needed it?" (N = 295; sample of south London and Doncaster electoral registers); popularity and scale fit of individual items and scale diagnostics.

Domestic resources	% "yes"	H_i^a
A17 – knows a lot about DIY	84	0.40
B3 – help you to move or dispose of bulky items	81	0.43
B4 – help you with small jobs around the house	88	0.58
B14 – get you cheap goods or "bargains"	53	0.54
B15 – help you to find somewhere to live if you had to move home	65	0.56
B16 – lend you a large amount of money	46	0.59
B17 – look after your home or pets if you go away	86	0.51
n = 276, $H^b = 0.52$, $\rho^c = 0.78$		
Professional resources	% "yes"	H_i
A7 – has a professional occupation	88	0.60
A12 – knows a lot about government regulations	43	0.58
A13 – has good contacts with the local newspaper, radio or t.v.	18	0.46
B1 – give you sound advice about money problems	70	0.49
B2 – give you sound advice on problems at work	70	0.58
B8 – give you careers advice	50	0.52
B9 – discuss politics with you	59	0.52
B10 – give you sound legal advice	55	0.49
B11 – give you a good reference for a job	85	0.61
n = 266, $H = 0.54$, $\rho = 0.83$		
Personal skills	% "yes"	H_i
A1 – can repair a broken-down car	72	0.34
A3 – is a reliable tradesman	76	0.39
A6 – is good at gardening	83	0.45
A9 – works for the local council	43	0.32
A11 – can sometimes employ people	56	0.36
A15 – knows a lot about health and fitness	65	0.36
n = 279, $H = 0.37$, $\rho = 0.69$		
Sticky hole resources	% "yes"	H_i
A4 – can speak another language	60	0.45
A5 – knows how to fix problems with computers	77	0.39
A8 – is a local councillor	23	0.54
B5 – do your shopping if you are ill	90	0.34
B7 – lend you a small amount of money	90	0.41
n = 287, $H = 0.42$, $\rho = 0.60$		

^{a,b} Loevingers homogeneity index indicating individual item fit in scale (H_i) and scale homogeneity (H) (see text)

^c Scale reliability index as calculated by software MSP5 for windows

01 last three or six months), and may result in unreliability of data in terms of spe-
02 cific memory effects. In addition, the action of using social capital is an outcome
03 of a decision process that is influenced by personal wealth (e.g. more wealth
04 could make social capital less useful), the individual need for help in general (e.g.
05 being of old age or ill health increases the need for support), and one's personal-
06 ity, including an individual's propensity to ask for assistance. Therefore, informa-
07 tion about the use of social capital is not only unreliable to some extent, but also
08 confounded by many other important variables.

09 In comparison, the mobilization perspective seems more problematic than the
10 access perspective (Van der Gaag & Snijders, 2004). Therefore, we advise investi-
11 gators to use highly standardized versions of questionnaires using the access per-
12 spective. Perhaps ideally, social capital measurement instruments would include
13 questions from both perspectives; however, time and resources will often prevent
14 inclusion in questionnaires. The development of social capital questionnaire forms
15 has largely followed three models, which can all be adapted to both the access and
16 use perspective on social capital.

17 18 *2.3.1. Name Generator* 19

20 The oldest measurement tool for individual social capital stems from 1970s social
21 network research. It comprises an extensive social network inventory performed
22 with a combination of "name generator" and "name interpreter" questions. Orig-
23 inally designed for the estimation of social network size, and the identification of
24 social network structure and contents, the method comprises two or three rounds
25 of data collection. In the first "name generator" part, a systematic list of queries
26 asks the respondent to mention names of persons he or she knows, which are
27 recorded by an interviewer. A second, "name interpreter" part collects informa-
28 tion about all alters listed in the first part, comprising the relationships with the
29 focal individual and alter attributes, among which questions about any social
30 resources embedded in these relationships. (A third, optional round is sometimes
31 added to assess existing relationships between alters; for an example, see Flap,
32 Völker, Snijders, & Van der Gaag, 2004).

33 This procedure was the main method of social capital data collection until the mid
34 1990s and still is the staple instrument for studies of social network structure. While
35 various types of name generating questions have been tested (e.g. Van Sonderen,
36 Ormel, Brillman, & Van Linden van den Heuvell, 1990), the "exchange" type name
37 generator proposed by McCallister and Fischer (1978) was eventually most widely
38 used; its most famous example is the single "core"-network identifying item "with
39 whom do you talk about personal matters?", recurrent in annual rounds of the US
40 General Social Survey (Burt, 1984; Marsden, 1987; for various early forms see
41 Marsden, 1990).

42 For social capital research, the name generator / interpreter combination can
43 provide very detailed social network and social capital information. It is the
44 only social capital measurement instrument that identifies single alters and their
45 various attributes, which enables the study of individual network structure,

01 relationship-specific attributes and relationship multiplexity – research issues
02 closely related to social capital. The wealth of possible information collected with
03 this tool has also led to an abundance of differently calculated social capital meas-
04 ures (see section “measures”).

05 The costs of data collection with name generators can be high. Dependent on
06 the limits set to the allowed number of alters to be mentioned in response to each
07 question, interviews can become lengthy and repetitive when large networks are
08 encountered, and many interpretative (such as social capital) questions are added.
09 Even though this specific part of the information is usually later deleted, some
10 respondents also become suspicious when asked to identify their network mem-
11 bers (Fenne Pinkster, personal communication). Moreover, the central idea of
12 making a complete resource inventory of individual social networks theoretically
13 retrieves much superfluous data (see section “volume”). The flexibility of the
14 design of name generator / interpreter sets has led to many different versions.
15 Although several name generator questions have become relatively standardized,
16 there is no general agreement on which questions to include for alter identifica-
17 tion in social capital studies. Therefore, results of social capital studies using
18 name generators are often difficult to compare.

20 2.3.2. *Position Generator*

21 A measurement method focusing more on the presence of social resources than
22 relationships in networks is the “position generator” (Lin & Dumin, 1986; Lin, Fu, &
23 Hsung, 2001) – an instrument deliberately designed to cover social capital in the
24 “general” life of the modern Western individual, without considering specific
25 areas of goal attainment, life domains, or subpopulations. A position generator
26 typically asks about a systematic list of 10–30 different occupations whether the
27 respondent “knows” anyone having this occupation; subsequently, it is checked
28 whether people in these positions are known as family members, friends, and
29 acquaintances. Social capital data from the position generator are based on the idea
30 that the occupations of network members represent social resource collections that
31 can be quantified with job prestige measures. Based on a model of an hierarchi-
32 cally modeled society, following Lin’s theories of social resources and social
33 capital (Lin, 1982, 2001), the most important underlying assumptions of this meas-
34 urement model are that having access to persons with high-prestige occupations
35 gives 1) access to large resource collections, and 2) such alters may exert important
36 influence in their (second-order) social networks.

37 The position generator instrument has been consistently applied in research
38 since its first publication, and has gradually become a popular measurement
39 instrument in individual social capital research (for an overview of recent
40 research see Lin & Erickson, forthcoming). The construction of social capital
41 measures from position generator data has developed into largely standardized
42 sets; three measures directly derived from Lin’s social capital propositions (Lin,
43 2001:61–63) are most frequently used in research: *highest accessed prestige* is an
44 indicator based on the hypothesis that accessing high prestige network members
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01 leads to the generation of higher returns (Lin, 2001:62). Two other position
 02 generator measures are indicators of beneficial diversity (see “measures”): *range*
 03 *in accessed prestige* is calculated as the difference in prestige between the highest
 04 and lowest occupation accessed, while *number of different positions accessed* is
 05 the total number of different occupations in which a respondent knows anyone.⁹

06 Because it takes much less interview time than sets of name generators and –
 07 interpreters, the position generator is more respondent-friendly. Moreover, since
 08 this measurement model is firmly rooted in theory, the logic and theoretical rigor
 09 behind its operationalization enables a systematic development of versions for
 10 every society in which occupations, occupational prestige or job-related socioe-
 11 conomic indices have been catalogued. These characteristics make the instrument
 12 appealing for systematic comparisons of returns to social capital between popula-
 13 tions. However, although its aim is to be “content free” (Lin, Fu, & Hsung, 2001),
 14 position generator data rather emphasize the identification of social capital pro-
 15 ductive for instrumental use: accessing social prestige is not relevant for every
 16 social capital question (e.g. receiving emotional support from a surgeon is not
 17 better than from a cleaner), and alters without any identifiable job prestige can
 18 still be very relevant and useful social capital (e.g. home-makers have no official
 19 occupation or job prestige, but are essential network members to many people)
 20 (Van der Gaag, Snijders, & Flap, 2006). Especially when applied in the domain of
 21 health studies, the validity of position generator data may therefore show some
 22 systematic shortcomings.

23 Using position generator data for research into the goal specificity of social
 24 capital is difficult. The amalgamation of social resources into social prestige
 25 measures prevents the design of multiple indicators that each refer to specific
 26 social resource collections. One way to construct more specific indicators is to
 27 establish separate indicators for the financial and cultural resources attached to
 28 each of the included occupations, which can subsequently be used as social
 29 capital sub-dimensions (see dimensional analyses in Flap & Völker, 2001;
 30 Webber & Huxley, 2006). Another is to specify the positions for male and female
 31 network members separately (Erickson, 2004).¹⁰

32 Position generator data are liable to some problems regarding their validity and
 33 reliability. Ideally, respondents say “yes” to included positions because they actually
 34 know someone in a specified occupation. However, respondents can also do so when
 35

36
 37 ⁹ Some of these measures show little variation in scores, especially when few items (<15)
 38 are included in the instrument. Less often used position generator measures
 39 without this disadvantage are the *average accessed prestige* (introduced by Campbell,
 40 Marsden, & Hurlbert, 1986), calculated as the mean of the prestige of all occupations in
 41 which the respondent knows anyone, and *total accessed prestige*, a social capital volume
 42 measure, calculated as the cumulative prestige of all accessed occupations (Boxman, Flap,
 43 & Weesie, 1992:47–48; Hsung & Hwang, 1992).

44 ¹⁰ A third method to construct more specific measures from position generator data is
 45 the performance of latent trait analyses on the sets of items (Van der Gaag, 2005:ch.6; Van
 der Gaag, Snijders, & Flap, 2006). This method is further explained in section “resource
 generator”.

01 this occupation only somewhat resembles the occupation of someone they know,
02 while both could be rated at various levels of job prestige (e.g. “community worker”,
03 “civil servant”, and “member of armed forces”) (Webber & Huxley, 2006). “False
04 positive” answers can be given when people interacted with only professionally are
05 mistaken for personal network members (e.g. teachers, doctors, members of clergy,
06 sales people, and directors of firms should not be included as positions). Some occu-
07 pations may sound too salient to confess not to know anyone having it (e.g. artists or
08 managers) while this is not the case. Some studies have shown that people are only
09 vaguely aware of the actual professions of their network members (Laumann, 1969).
10 Lower educated respondents sometimes do not fully understand the question asking
11 to imagine occupations and “fill” them with people they actually know. In a recent
12 UK validation study, participants were however found to unambiguously refer to
13 persons they actually knew in specified occupations, which showed good to excel-
14 lent test-retest reliability (Webber & Huxley, 2006).¹¹

16 2.3.3. Resource Generator

17 The “resource generator” (Snijders, 1999; Van der Gaag & Snijders, 2005) offers
18 a new development in measuring social capital by using a “checklist”: in an inter-
19 view situation, access is checked against a list of useful and concrete social
20 resources, for which exchange is considered acceptable (see Table 2.1). This
21 method combines the economy of the position generator with the content validity
22 of the name generator / interpreter method, because of its vivid measurement of
23 social resources. In particular, when potential respondents are involved in the
24 construction of the instrument, a valid list of relevant resources can be readily
25 obtained and the questions can be phrased clearly to obtain a reliable response
26 (Webber and Huxley, Submitted).
27

28 Some methodological issues need further study. While its data are concrete and
29 its administration is quick, resource generator items have validity problems simi-
30 lar to the position generator – of many social resources it is unknown how much
31 people actually know about their social network members. Furthermore, the
32 inclusion of actual resource items in instruments is difficult to achieve with any
33 theoretical rigor. The examples of social capital included in the instrument need
34 to be potentially productive, exchangeable, acceptable to ask for, and memorable
35 for the respondent. Since most of these characteristics are culturally dependent,
36 developed versions of resource generator instruments are strongly bound to a spe-
37 cific population. Another problem proves to be that the popularity of the items is
38 rather high: respondents very easily give an affirmative answer to questions
39 whether they could access resources in their social networks; this also indicates
40 susceptibility for socially desirable answers (Van der Gaag & Snijders, 2005).

41
42
43 ¹¹ Occupations can also prove to be unsuitable for inclusion in a position generator
44 because they are not very well known in the general population, such as “academic
45 researcher”, “laboratory technician”, and “fishmonger” (Webber & Huxley, 2006).

01 The construction of single social capital indicators from resource generator
02 data can proceed in a theory-guided fashion (a single volume/diversity indicator
03 can be constructed from its data as the sum score of access to all different items,
04 whereas multiple indicators could be constructed for all sub domains included in
05 its items), but the data are also suited for an empirical construction of measures
06 (Van der Gaag & Snijders, 2005). This method comprises the construction of
07 population-specific sets of multiple, domain-specific social capital measures by
08 dimensional analysis of data. The idea behind this is that by checking the associ-
09 ations between all included items the latent structure of social capital is identified
10 for a specific population, in which groups of strongly correlated items point
11 towards the existence of separately accessed social capital domains. Since social
12 capital data are typically of an ordinal nature, factor-analytic models such as
13 e.g. Principal Components Analyses (designed for use with normally distributed
14 data of at least 5 categories the methodology) are generally not suitable to accom-
15 plish such dimensional reductions. Instead, models from Item Response Theory
16 are more appropriate (see e.g. Van der Linden & Hambleton, 1997).

17 The Resource Generator-UK (RG-UK) (Webber & Huxley, Submitted) pro-
18 vides a good example of such an analysis. The content validity of the items and
19 questions for this instrument was established through a qualitative process of
20 focus groups and an expert panel. This resulted in a pool of 35 usable social
21 resources items which were used to explore the social capital domain structure of
22 this population. Explorative analyses were performed using Mokken scaling
23 (Mokken, 1997), a non-parametric item response theory method that aims to find
24 robust and one-dimensional scales within sets of items. It begins by taking pairs
25 of items with the strongest associations and continues by gradually including
26 other well-fitting items until a scale has been formed that does not improve any
27 further when other items are added.

28 Cumulative scale analyses was performed using MSP5 for Windows (Molenaar &
29 Sijtsma, 2000). This uses Loevinger's H -coefficients (Loevinger, 1947) to express
30 the fit of specific items within a scale and for the homogeneity of the scale as a
31 whole. Uncorrelated items produce values of $H = 0$, whereas perfectly homoge-
32 nous scales produce values of $H = 1$. Conventionally, scales with $H \geq 0.3$ are
33 useful, $H \geq 0.4$ are medium strong and $H \geq 0.5$ are strong scales (Mokken,
34 1997). The Mokken scaling method allows for each item to appear in only one
35 scale. The procedure eliminates items that do not fit within any scale if their item
36 homogeneity (H_i) falls below a set value, conventionally $H_i = 0.3$ (Mokken,
37 1997). Further, a reliability coefficient (ρ) is calculated for each scale. Values
38 above 0.6 are conventionally taken as indications of sufficient reliability
39 (Molenaar & Sijtsma, 2000).

40 Data for scaling and item reduction in the RG-UK was obtained from a postal
41 pilot survey of individuals on the electoral register in south London and Don-
42 caster in south Yorkshire ($N = 295$). The 27 items together form a homogeneous
43 scale ($H = 0.37$) with high reliability ($\rho = 0.89$). The RG-UK scale and its sub-
44 scales have good test-retest reliability (full validity and sample details are
45 reported elsewhere (Webber & Huxley, Submitted). Using explorative Mokken

01 scaling, four consistent internal domains were found within the instrument, each
02 referring to a distinct dimension of an individual's social capital (Table 2.1).
03 Firstly, the domestic resources scale refers to resources that may be required to
04 assist daily living and improve one's living conditions. These are quite common
05 resources with four of the seven being accessible to over 80% of this sample. Sec-
06 ondly, the professional resources scale contains skills that are important for the
07 employment market or are associated with the domain of the professions. Empir-
08 ically, this is the strongest scale ($H = 0.54, \rho = 0.83$). Thirdly, the personal skills
09 scale draws together a range of attributes that are important for "getting the job
10 done". It includes tradesmen, mechanics and gardeners, though a less obvious fit
11 in this scale is someone who can employ others. Finally, a seemingly disparate
12 group of items came together to form a "sticky hole resources" scale. These could
13 all be useful in difficult situations that could become very frustrating for individ-
14 uals if they were not resolved.

15 Within-scale item correlations were positive and significant (Table 2.2).
16 Table 2.2 groups the items within their scales in order of popularity, starting with
17 the rarest resource in each scale. This shows that if one has access to someone
18 who could lend a large amount of money (B16), one is more likely to have access
19 to other resources within the domestic scale such as someone who could get
20 cheap goods (B14) or could help one find somewhere to live if one had to move
21 home (B15), for example. Similarly, if one knows someone with good contacts
22 with the local media (A13) one is also likely to know someone knowledgeable
23 about government regulations. The same is true for the other two scales. More-
24 over, since the scales have a cumulative character, individuals who have access to
25 rare social resources are likely to also have access to more common social
26 resources included in the same scale. Most of the items are correlated with items
27 from other scales, though none is correlated with every other item. This is further
28 evidence of the separate sub-domains of social capital that can be accessed
29 through informal networks.

30 A further pilot tested for an association between these scales and common
31 mental disorders such as depression and anxiety. Using postal questionnaires sent
32 to a random sample of 1000 people on the electoral registers in the same two
33 areas as mentioned above, 335 respondents completed the RG-UK and the twelve
34 item General Health Questionnaire (GHQ) (Goldberg & Williams, 1988), a well
35 validated self-complete instrument that assesses the likely presence of a common
36 mental disorder (further details reported elsewhere (Webber & Huxley, Submis-
37 sited). Table 2.3 shows the distribution of social capital sub-domains across the
38 population studied, illustrating that increasing age results in diminishing access to
39 social resources. Ethnicity is an important variable across all sub-domains,
40 though occupational status is particularly important in access to professional
41 resources.

42 On the GHQ, 27.3% ($n = 91$) of the sample scored three or above the threshold
43 value for a probable common mental disorder. Table 2.4 indicates that looking
44 after the home or being unemployed increase the odds of having a common men-
45 tal disorder, whereas having a low status occupation appears to be a protective

TABLE 2.2. Inter-Item correlations of empirically determined resource generator scales (N = 295; sample of south London and Doncaster electoral registers).

Item	Scale 1: Domestic resources							Scale 2: Professional resources							Scale 3: Personal skills							Scale 4: Sticky hole resources						
	B16	B14	B15	B3	A17	B17	B4	A13	A12	B8	B10	B9	B1	B2	B11	A7	A9	A11	A15	A1	A3	A6	A8	A4	A5	B5	B7	
Scale 1																												
B16	1																											
B14	0.37	1																										
B15	0.44	0.39	1																									
B3	0.28	0.27	0.36	1																								
A17	0.24	0.20	0.23	0.23	1																							
B17	0.34	0.30	0.35	0.29	0.28	1																						
B4	0.26	0.33	0.29	0.31	0.45	0.42	1																					
Scale 2																												
A13	ns	ns	0.13	ns	ns	ns	1																					
A12	0.32	0.22	0.28	0.17	0.22	0.12	0.12	0.25	1																			
B8	0.28	0.23	0.32	0.23	0.22	0.21	0.16	0.17	0.32	1																		
B10	0.27	0.26	0.26	0.24	0.21	0.13	ns	0.21	0.42	0.31	1																	
B9	0.29	0.21	0.33	0.17	ns	0.16	ns	0.16	0.42	0.45	0.44	1																
B1	0.32	0.23	0.33	0.24	0.26	0.17	0.17	0.16	0.37	0.33	0.35	0.32	1															
B2	0.34	0.34	0.34	0.33	0.23	0.29	0.17	0.12	0.40	0.54	0.36	0.36	0.50	1														
B11	0.24	0.22	0.22	0.22	0.19	0.21	0.17	ns	0.27	0.40	0.27	0.31	0.21	0.45	1													
A7	0.24	ns	0.28	ns	0.15	0.15	0.12	0.12	0.27	0.26	0.22	0.28	0.26	0.35	0.42	1												
Scale 3																												
A9	0.16	0.17	ns	0.13	0.18	ns	0.13	0.17	0.32	0.13	0.19	0.18	ns	0.21	0.17	0.16	1											
A11	0.26	0.26	0.24	0.26	0.25	ns	0.17	0.14	0.25	0.26	0.28	0.16	0.20	0.32	0.32	0.27	0.21	1										
A15	0.19	0.18	0.22	0.28	0.22	0.18	0.15	0.21	0.40	0.35	0.27	0.29	0.23	0.31	0.22	0.34	0.22	0.33	1									
A1	0.17	0.21	0.20	0.22	0.29	0.17	0.15	ns	0.19	0.21	0.19	0.17	0.14	0.13	0.17	0.13	0.15	0.23	0.22	1								
A3	0.21	0.19	0.23	0.31	0.34	0.16	0.15	ns	0.14	0.23	0.26	0.18	0.28	0.32	0.31	0.27	0.18	0.27	0.22	0.45	1							
A6	0.21	0.19	0.28	0.21	0.24	0.16	0.17	ns	0.13	0.19	0.15	0.18	0.18	0.19	0.24	0.27	0.21	0.23	0.37	0.23	0.31	1						
Scale 4																												
A8	0.19	0.16	0.21	ns	0.14	ns	ns	0.21	0.33	0.18	0.19	0.23	0.14	ns	ns	0.44	0.18	0.17	0.15	0.15	0.21	1						
A4	0.12	ns	0.18	ns	0.19	ns	0.13	0.32	0.28	0.22	0.28	0.22	0.26	0.24	0.25	0.23	0.16	0.21	ns	0.17	0.13	0.24	1					
A5	0.12	ns	0.18	0.15	0.22	0.12	ns	0.24	0.25	0.19	0.16	0.27	0.28	0.17	0.22	0.25	0.23	0.19	0.31	0.34	0.21	0.16	0.29	1				
B5	0.12	0.22	0.22	0.26	0.29	0.43	0.41	ns	0.19	0.15	0.14	ns	0.21	0.17	0.23	ns	0.15	ns	0.15	ns	0.16	0.18	0.16	0.16	1			
B7	0.25	0.28	0.26	0.12	0.26	0.26	0.20	ns	0.14	0.25	0.15	0.22	0.14	0.24	0.24	0.27	0.15	ns	0.12	0.15	0.12	0.13	0.19	0.19	0.34	1		

Pearson correlations: $p < 0.01$, $p < 0.05$

TABLE 2.3. Regressions of respondents' socio-demographic characteristics on scales constructed from Resource Generator-UK social capital items (N = 335, sample of south London and Doncaster electoral registers).

	Variable	Beta	p
Resource Generator scale	Age	-0.44	<0.001
(sum score of all items)	"Other" ethnicity ²	-0.19	<0.001
R ² = 22.8%, F(6,241) = 53.84, p<0.0001	Student ¹	-0.16	0.022
	Unemployed ¹	-0.15	<0.001
	Black ethnicity ²	-0.13	0.035
Domestic resources scale	Mixed ethnicity ²	0.09	0.001
R ² = 17.9%, F(4,280) = 17.28, p<0.0001	Age	-0.32	<0.001
	"Other" ethnicity ²	-0.22	<0.001
	Black ethnicity ²	-0.16	0.010
Professional resources scale	Age	-0.28	<0.001
R ² = 25.6%, F(11,254) = 8.83, p<0.0001	Retired ¹	-0.26	0.003
	Armthorpe ward ³	-0.24	<0.001
	Student ¹	-0.23	0.002
	Looking after the home ¹	-0.17	0.002
	SOC 7-9 ¹	-0.16	0.013
	Unemployed ¹	-0.14	0.011
	Disabled ¹	-0.14	0.005
Personal skills scale	Unemployed ¹	-0.23	<0.001
R ² = 17.7%, F(7,277) = 17.32, p<0.0001	Age	-0.22	<0.001
	"Other" ethnicity ²	-0.17	<0.001
	Asian ethnicity ²	-0.09	0.047
Sticky hole resources scale	Asian ethnicity ²	0.10	0.035
R ² = 16.1%, F(8,278) = 6.79, p<0.0001	Age	-0.31	<0.0001
	Unemployed ¹	-0.22	0.002
	Disabled ¹	-0.17	0.004
	Selhurst ward ³	-0.15	0.021
	Armthorpe ward ³	-0.15	0.033

¹Contrast group = SOC groups 1-3 (Office for National Statistics, 2000)

²Contrast group = White ethnicity

³Contrast group = Torne Valley ward (largest mean)

Only variables significant at p<0.05 tabulated

factor in this sample. When access to social resources is included in the model, it becomes apparent that the volume or diversity of accessible social capital is a protective factor for mental health. However, when the total scale score is replaced by the four sub-domain scores, this effect disappears. This suggests that in this context social capital has an unspecific effect, and that having access to a diversity of social resources across all domains, resulting from having an extensive social network, is important for the prevention of mental disorder; alternatively, the effect may stem from the social resources indicated by items not included in the four subscales.

TABLE 2.4. Logistic regression models with predictive factors for common mental disorder^a including none, one general resource generator social capital sum score measure, and four domain specific social capital resource generator measures (N = 335, sample of south London and Doncaster electoral registers).

Model	Variable	Odds ratio (95% CI)	p
No social capital variables	Looking after the home ¹	6.11 (1.83–20.45)	0.003
R ² = 14.2%, $\chi^2(22) = 51.05$, p = 0.0004	Unemployed ¹	5.28 (1.04–26.80)	0.044
	SOC 7–9 ¹	0.18 (0.04–0.86)	0.032
RG-UK total score	Looking after the home ¹	4.58 (1.30–16.09)	0.018
R ² = 17.3%, $\chi^2(23) = 51.80$, p = 0.0005	Age	0.96 (0.92–0.99)	0.012
	RG-UK total	0.93 (0.87–0.99)	0.029
	SOC 7–9 ¹	0.18 (0.04–0.91)	0.038
RG-UK sub-scales	Looking after the home ¹	5.54 (1.51–20.38)	0.010
R ² = 18.7%, $\chi^2(26) = 55.73$, p = 0.0006	Age	0.96 (0.93–0.99)	0.017
	SOC 7–9 ¹	0.19 (0.04–0.95)	0.043

¹Contrast group = SOC groups 1–3 (Office for National Statistics, 2000)

^a Common mental disorder measured with twelve item General Health Questionnaire (GHQ) (Goldberg and Williams, 1988), GHQ; dichotomisation scoring under 3/3+

Only variables significant at p<0.05 tabulated

As this data is cross-sectional it is not possible to determine the direction of any causal relationships between these variables. However, there are a number of possible explanations. An absolutely low level of resources may act as a vulnerability factor in the development of common mental disorder. Also, the loss of previously accessible and valued resources may increase vulnerability or act as a trigger for an episode. It is also possible that access to resources may diminish as common mental disorders persist, possibly as a result of diminished social interaction and exchange through social withdrawal.

Further work is underway in which the RG-UK is being used in a cohort study of people with depression in London. Studies of this nature will further our understanding of how access to social capital affects recovery or influences the chronicity of illness. The hypothesis being tested is that those with access to a larger number of resources will have a faster rate of recovery over a six month period. Early results from this study suggest that people access resources within their networks after the acute phase of illness has passed. These resources may assist recovery in a number of ways. In addition to the various forms of advice, help and support that can be obtained from informal social networks, people with chronic illnesses may improve their employment or promotion prospects by having more resourceful networks which, in turn, may assist recovery, for example (Webber, 2005). It will be instructive to learn how the different domains of social capital contribute to recovery.

2.4. Conclusion

Recent methodological research has shown that measures calculated from different social capital measurement instrument indicate very different aspects of social capital, and that separate measures from separate instruments also have different predictive value for different outcomes of social capital. Therefore, the selection of measurement instruments should be careful, and according to specific research interest, for which a general research strategy has been proposed (Van der Gaag, 2005:181–205; Van der Gaag & Snijders, 2003). Researchers are therefore advised to use two social capital measurement instruments in questionnaires whenever possible: one instrument aiming to measure the presence of specific social resources, which may identify social capital sub domains and illustrate the usefulness of particular resources (such as the resource generator), and one instrument that is more structurally comparable to other studies (preferably the position generator).

Social capital measurement instruments to be used in health studies ideally need extensive pre-testing to ensure their validity and reliability in the population being investigated. When effects of the presence of network structure or particular alters and/or relationships are not specifically investigated, studies including name generators are not recommended for reasons of efficiency. Resource generators work best if they are sufficiently large to contain a number of sub-domains of social capital so that specific groups of resources can be identified as influencing the outcome being studied. If specific resources are identified as useful in a particular population for preventing illness or enhancing recovery from it, more specific interventions can be designed to maximize the availability of, or access to, them.

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UNCORRECTED PROOF

QUERIES TO BE ANSWERED (SEE MARGINAL MARKS)

IMPORTANT NOTE: Please mark your corrections and answers to these queries directly onto the proof at the relevant place. Do NOT mark your corrections on this query sheet.

Chapter-02

Query No.	Page No.	Line No.	Query
AQ1	31	19	“Felling, Fiselier, & Van der Poel, 1991” has been changed to “Felling, Fiselier, & Van de Poel, 1991” in order to match with the reference list.
AQ2	47	12, 14	These references are not cited in the text part. Please provide citations.
AQ3	47	29	Shall we change “forthcoming” to “2006”. Please clarify.
AQ4	47	43	Please update publication year, volume, start and end pages.