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IT MATTERS WHOM YOU KNOW: MAPPING THE LINKS BETWEEN SOCIAL CAPITAL, TRUST AND WILLINGNESS TO COOPERATE

Trust and willingness to cooperate depend on the structure of one's social network and the resources one can access through it. In this study, based on a survey dataset of a representative sample of the Polish population (n = 1000) we create an empirical 'map' of four distinct dimensions of social capital: degree (number of social ties), centrality in the social network, bridging social capital (ties with dissimilar others), and bonding social capital (ties with similar others, primarily with kin). We investigate the links between social capital and its key correlates: generalized and particularized trust and willingness to cooperate. We find that centrality (or occupying the position of a network bridge) is positively related to trust, whereas for bonding social capital this relation is negative. We find also a puzzling effect of cooperation without trust in the case of individuals with high bridging social capital resources (ties with dissimilar others).

Key words: social capital; social network structure; social trust; willingness to cooperate

1. Introduction

The concept of social capital is as popular in the literature as it is ambiguous (Paldam 2000; Sobel 2002; Kadushin 2012; Bjørnskov, Sønderskov 2013). Scholars have defined it in many conflicting ways – ranging from catch-all multi-dimensional concepts[1] to more refined operationalizations focusing on selected behaviors or norms only – and subsequently used these definitions in

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[1] For example, van Oorschot, Arts, and Gelissen (2006) propose a multifaceted measure of social capital which encompasses (i) social networks (contacts with family and friends as well as participation in organizations), (ii) trust (towards people and institutions), and (iii) civic society values (interest in politics and support of civic attitudes and ethical behaviors).

their explanations of a variety of economic and social phenomena. This paper follows the strand of literature which views social capital as a relatively narrow term which relates only to individuals' social networks. More precisely, following Pierre Bourdieu (1986), we define social capital as the aggregate of resources accessible to individuals through their social networks.

However, the concept of social capital remains ambiguous even within the network approach to social capital measurement (Bourdieu 1986; Putnam 2000; Lin 2001; Burt 2005; Prell 2012). The current study aims to limit the extent of this ambiguity by creating an empirical "map" of four distinct dimensions of individuals' social capital: (i) degree (number of social ties), (ii) centrality, or occupying the position of a bridge in the social network (we put forward a direct survey-based measure of being a bridge in the social network, i.e. our *network centrality scale*. Our empirical measure of *centrality* is a product of this scale and degree), (iii) bridging social capital (ties with dissimilar others), and (iv) bonding social capital (ties with similar others, primarily with kin).

Hence our study addresses the following request: "One of the salient problems in social capital research is (...) that many social scientists subscribe to some interpretation of Putnam's definition [of social capital consisting of trust, norms and networks], although it encompasses different features that empirical studies document have quite diverse consequences. (...) What seems to be needed is therefore (...) an empirically based distinction between the potentially different dimensions of social capital" (Bjørnskov 2006: 24).

While each of the four dimensions has been already discussed at length both from the theoretical and the empirical angle, the key novelty of the current study is to provide new empirical evidence on the character of their interrelation as well as their diverse links with a few key correlates which are important in social psychology: generalized and particularized trust, as well as generalized and particularized willingness to cooperate (exact definitions of these concepts are provided in Section 3).

The contribution of the current study to the literature is twofold. First, we compile a survey dataset of a representative sample of the Polish population (*n* = 1000), which allows us to measure individuals' degree, centrality, bridging and bonding social capital.[2] To our knowledge, these concepts have not yet been simultaneously measured empirically. Hence, by providing detailed and statistically reliable summary scales characterizing the *inner structure* of social capital, we fill a substantial gap in the literature. Second, based on this unique dataset

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[2] The survey questionnaire and raw data are available online: http://web.sgh.waw.pl/~jg23234/Dane_SCap.dta [the dataset in Stata format], http://web.sgh.waw.pl/~jg23234/Ankieta_SCap.pdf [original Polish version of the questionnaire], http://web.sgh.waw.pl/~jg23234/Ankieta_SCap_EN.pdf [English translation]. The dataset includes also data on earnings, subjective well-being, and the dynamics of social capital formation, which we don't exploit in the current paper.

we identify the mutual relationships among the four social capital dimensions as well as their links with trust and willingness to cooperate, which we view as key immediate correlates of social capital. An important advantage of the theoretical framework that we use is that it allows to incorporate earlier, partial empirical results from the literature as elements of a more comprehensive encompassing structure. At the same time, it underscores that the structure and composition of individuals' social networks has a strong bearing on their trust and cooperation behavior, alongside other factors identified in the literature, e.g. individuals' social identity (Tanis, Postmes 2005), social identity complexity (Xin, Xin, Lin 2016) or self-monitoring (De Cremer, Snyder, Dewitte 2001).

The study focuses on the Polish society which, viewed against its European peers, is relatively distrustful towards strangers and unwilling to maintain social contacts. Therefore uncovering detailed links between trust, cooperation and social capital in this particular society may have additional value – identifying the characteristics of Poles' social networks which are potentially instrumental in discouraging the formation of trust and willingness to cooperate (which then feeds back to social capital, as arguably social capital and trust have the potential to be mutually reinforcing, Growiec, Growiec 2014a).

Our key results are as follows. First, reliability analysis of summary scales constructed from our survey questionnaire confirms that the measurement of the relevant concepts is reliable. This finding is particularly important for those of our empirical operationalizations which are novel to the literature (e.g., the network centrality scale).

Second, we find that the four considered social capital dimensions are distinct but interrelated. There is a robust positive correlation between degree and bridging social capital (those who maintain more social ties, are also more likely to be linked to dissimilar others). Being a network bridge is robustly positively correlated with bridging and negatively with bonding social capital. Even more interesting patterns emerge when inspecting the links between the four social capital variables and their immediate correlates – trust and willingness to cooperate. Bridging social capital is positively linked to (both generalized and particularized) willingness to cooperate, and (surprisingly) negatively linked to trust. Bonding social capital is negatively related to generalized trust. Being a network bridge is positively linked to (both generalized and particularized) trust. Generalized trust and generalized willingness to cooperate, though separate concepts, are robustly positively correlated in the data. The same follows for particularized trust and particularized willingness to cooperate.

The remainder of the paper is structured as follows. Section 2 provides a review of the associated literature. Section 3 discusses our dataset and outlines the construction of variables used in the empirical study. Section 4 presents the results. Section 5 concludes.

2. Literature Review

Social capital is an ambiguous, complex concept which has been defined in diverse ways in the literature. Our approach to tackling its multidimensional character is to single out its four key dimensions: (i) number of social ties (degree), (ii) centrality, or occupying the position of a bridge in the social network, (iii) bridging and (iv) bonding social capital. We acknowledge them as interlinked but distinct concepts that are able to form an "inner map" of the overarching social capital concept. In doing so, we make two important assumptions. First, following Pierre Bourdieu (1986) and numerous other scholars[3] we leave out the possibility that social capital includes non-network features such as social norms (e.g., social trust, civic society values). Second, we also exclude all possible network-based dimensions of social capital other than these four. While the former choice has been motivated by theoretical considerations, discussed below, the latter is partly also an empirical issue. In fact, our unique dataset allowed us to construct additional social capital measures: subjective local network density, intensity of social interaction, and the individual's ability to draw from network resources (or specifically, bridging or bonding network resources). These empirical measures however did not turn as useful as the original four.[4]

Theory. The current paper adopts the following definition of social capital due to Bourdieu (1986): "social capital is the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition – or in other words, to membership in a group – which provides each of its members with the backing of the collectivity-owned capital, a 'credential' which entitles them to credit, in the various senses of the word." (p. 128). The principal reason for accepting this purely network-based definition, widely shared in the literature (Lin 2001; Kadushin 2002; Li, Pickles, Savage 2005; Burt 2005), is that it enables us to precisely delineate people's objective behavior (maintaining social contacts with others) from social norms (trust, cooperation) which we treat as external correlates of social capital rather than its dimensions. It is also important that this definition links the social networks people maintain to the resources that may be accessed through them (Bourdieu 1986; Sandefur, Laumann 1998; Snijders 1999; Lin 2001), because access to network resources is vital for the identification of linkages between social capital and individuals' earnings or subjective well-being.

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[3] For example, Bian (1997); Woolcock (1998, 2001); Lin (2001); van der Gaag and Snijders (2005); Burt (2010); van der Gaag, Snijders, Flap (2012).

[4] This, of course, can mean many things. On the one hand, these auxiliary social capital dimensions may be conceptually flawed; on the other hand, however, it is also quite likely that the empirical measurement in our data was too noisy to uncover their true potential.

There are at least two further advantages of using a network-based definition of social capital. First, multifaceted measures of social capital are relatively more likely to suffer from incoherence, insufficient differentiation from other concepts (e.g., community, social support, trust), and low resonance of some of those concepts (Bjørnskov, Sønderskov 2013). Disentangling the roles of social networks and social norms in shaping social capital and concentrating on the former only allows to reduce the incoherence and improve resonance of the social capital concept. Second, it allows to forge links between "traditional" social capital theory and the emerging literature on computational multi-agent models (Prell 2012).

While Bourdieu's definition of social capital provides a useful theoretical frame for our study, it allows for further refinements in terms of inner structure of this concept. "The aggregate of the (...) resources which are linked to possession of a (...) network of (...) relationships" (Bourdieu 1986: 128) could be affected by a range of network features. First of all, it should be expected that, at least on average, more resources should be available to individuals who maintain more social ties.

Secondly, in line with the "structural holes" argument due to Ronald Burt (1992), relatively more resources should also be available to the individuals who form a bridge between otherwise separated sub-networks (cliques) because they are crucial for the flow of information and all other resources in the network. By exploiting structural holes, individuals may gain a unique position in their network and use it for their benefit. In fact, from Burt's empirical research we know that the position of a "bridge" in a network – between two or more dense clusters – is even more beneficial than the position of a "star" in the very center of such a cluster. The reason is that in the information acquisition process, "stars" are typically flooded with redundant information (Burt 2005, 2010), whereas "bridges" have simultaneous access to a few qualitatively different sources. They can link and bridge people in an organization, and thus are critical in the cooperation between, e.g., different departments of a firm, or more generally – in the allocation of network resources.

Thirdly, the associated literature points out that the access to network resources is also largely affected by the distinction between bridging social capital (social ties with dissimilar others) and bonding social capital (social ties with similar others), as proposed by Ross Gittell and Avis Vidal (1998) as well as Robert Putnam (2000). Both types of social ties are related to different resources, serving different purposes, and thus they should be viewed as conceptually distinct dimensions of social capital and not just opposite sides of the same spectrum. Ties with similar others are formed to satisfy the safety drive (the need for affiliation, emotional support, etc.) whereas ties with dissimilar others – the effectiveness drive (towards personal development, professional success,

etc., Bowlby 1969; Greenberg 1991; Kadushin 2002; Growiec 2015). It is therefore conceivable that some individuals may maintain a lot of social ties and yet have little bridging social capital (if these ties do not provide access to valuable "efficiency– related" resources) as well as little bonding social capital (if they are not helpful in terms of safety and support).

Given that social ties help individuals access useful information and, more generally, mobilize the resources embedded in their social networks, the extent and structure of these social networks is very important for individuals' life chances and possibilities. While some individuals may benefit from being a central node of a large, diverse network of acquaintances, others may be trapped by the limitations of their social networks (which may be underdeveloped, locally dense, and embed scarce or inadequate resources). "Structure is always both enabling and constraining" (Giddens 1984: 169), because "high levels of social capital can be 'positive' in that it gives group members access to privileged (...) resources (...), but may be 'negative' in that it also places high particularistic demands on group members, thereby restricting individual expression and advancement" (Woolcock 1998: 165).

The distinction between bridging and bonding social capital is also important from the point of view of Toshio Yamagishi, Karen Cook, and Motoki Watabe (1998) theory which implies that "strong and stable relations (such as family ties and group ties) promote a sense of security within such relations but endanger trust that extends beyond these relations" (p. 166). In other words, people with strong family and group (bonding) ties should have a lower level of trust in strangers compared with people with weak (bridging) ties. Yamagishi, Cook, and Watabe (1998) argument is in congruence with earlier seminal work of Edward Banfield (1958), whose observations from a Southern Italian community show that strong family ties typically hinder generalized trust and cooperation.

Empirical measurement. Although many of the theoretical definitions of social capital invoked in the literature – including the one discussed above – relate directly to the structure of social networks, empirical studies have typically relied on heavily simplified operationalizations, largely due to the problems with availability of sufficiently detailed data. In particular, to the best of our knowledge the empirical literature thus far has lacked a study which would simultaneously quantify both structural characteristics of a social network (such as individuals' degree and centrality), and the bridging and bonding social capital content of these social ties.

The advantage of our empirical approach is that it permits to go beyond the operationalizations of social capital used thus far, characterized by a very limited number of proxy measures such as the number of often contacted friends and family members (e.g., Growiec, Growiec 2010; Kroll 2011; Leung, Kier, Fung, Fung, Sproule 2011), the importance of family / strength of family ties

(e.g., Beugelsdijk, Smulders 2003; Sabatini 2009; Alesina, Giuliano 2010; Growiec, Growiec 2014b), membership in voluntary organizations (e.g., Beugelsdijk, Smulders 2003; Winkelmann 2009; Kroll 2011) or having found one's job through social contacts (Mouw 2003; Franzen, Hangartner 2006). Apart from assessing the number of social ties the individuals hold (degree), we also devise a novel survey measure of their network centrality as well as quantify their resources of bridging and bonding social capital. In particular, we capture the diversity of individuals' social ties using the Bridging Social Capital Questionnaire constructed by Katarzyna Growiec (2015).[5]

Social capital, trust and willingness to cooperate. Social trust and willingness to cooperate are the key correlates of social capital, acting as channels through which it may influence the economic performance and psychological well-being of individuals and societies. According to Mark Granovetter (2005), social networks affect economic outcomes for three main reasons: they affect the flow and quality of information (even if it is subtle, nuanced and difficult to verify), they are an effective source of reward and punishment, and they are therefore a context in which trust can emerge. Moreover, social relations and the trust which emerges through them are the main factors responsible for the creation of generalized trust in the society. This, in turn, has far-reaching consequences because trust is "essential for stable relations, vital for the maintenance of cooperation, fundamental for any exchange and necessary for even the most routine of everyday interactions" (Misztal 1996: 12). As David Lewis and Andrew Weigert (1985) put it (p. 968), "it is the mutual 'faithfulness' (Simmel 1978: 379) on which all social relationships ultimately depend. Consequently, trust may be thought of as a functional prerequisite for the possibility of society in that the only alternatives to appropriate trust are 'chaos and paralysing fear' (Luhmann 1979: 4)". Moreover, trust allows people to reduce the perceived complexity of the social world and the uncertain future events (Luhmann 1979). "Trust succeeds where rational prediction alone would fail, because to trust is to live *as if* certain rationally possible futures will not occur. Thus, trust reduces complexity far more quickly, economically, and thoroughly than does prediction" (Lewis, Weigert 1985: 969).[6]

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[5] Similar but less detailed operationalizations have been used by Hurlbert, Haines, and Beggs (2000) and van der Horst and Coffé (2012).

[6] Arguably there could also be a reverse causal link, from social trust to social networks (Paldam 2000; Sønderskov 2008). That is why in this paper we speak of correlation rather than causation. Moreover, an important distinction exists between generalized and particularized trust (Putnam 2000; Uslaner 2002; Alesina, Giuliano 2010): if social networks are closed and homogeneous, they tend to produce particularized trust but not generalized trust; conversely, if social networks are open and heterogeneous, they tend to produce generalized trust rather than particularized trust.

Social networks are the context in which people learn to trust each other (Lewis, Weigert 1985; Field 2010; Rainie, Wellman 2014). Trust is a multi-faceted concept, though. It has cognitive, emotional and behavioral components (Lewis, Weigert 1985; Misztal 1996), that is, respectively, it reduces complexity, facilitates emotional investments, and underwrites social action. Specifically the behavioral component of trust is necessary to engage in action with uncertain outcomes on the confident expectation that all persons involved in the action will act competently and dutifully (Barber 1983). Furthermore, there is a feedback loop between the cognitive and behavioral component of trust: "behavioral displays of trust implying actions help to create the cognitive platform of trust. When we see others acting in ways that imply that they trust us, we become more disposed to reciprocate by trusting in them more. Conversely, we come to distrust those whose actions appear to violate our trust or to distrust us" (Lewis, Weigert 1985: 971).

The behavioral component of trust, in separation from its cognitive and emotional elements, is sometimes referred to as willingness to cooperate (Misztal 1996; De Cremer, Snyder, Dewitte 2001). Hence, although trust and cooperation have been treated jointly in some studies (e.g., Butler, Giuliano, Guiso 2016), existing literature supplies sufficient arguments to treat them as related but not equivalent concepts. "Cooperation is seen as a by-product of trust rather than a source of trust and, moreover, a lack of cooperation can be a result of other factors (such as lack of sufficient information) rather than an absence of trust" (Misztal 1996: 17). For example, trustful individuals may refuse to cooperate in circumstances of low accountability and self-monitoring (De Cremer, Snyder, Dewitte 2001). In this paper, in investigating the links between social network characteristics and elements of trust we will follow the footsteps of researchers who treat trust and willingness to cooperate as related but distinct concepts. We will show that their relationships with social capital and other covariates can in fact be quite diverse.

As the process of trust and cooperation formation occurs in a social network, its outcome is affected by network characteristics. Dense networks – which tend to be formed among similar individuals due to the homophily principle (the like-me hypothesis, cf. Lazarsfeld, Merton 1954; Lin 2001) – lead to relatively greater conformity to the norms and norm convergence within groups (Festinger, Schachter, Back 1948; Meeussen, Agneessens, Delvaux, Phalet 2018) but are also relatively less conducive to social trust. This is because dense networks facilitate reputation formation and social control which are functional substitutes of social trust (Dasgupta 1988). Conversely, less dense networks, which are more likely to embed more bridging social capital resources provided by contacts with dissimilar others and contain more "structural holes" and bridges between separate cliques, convey relatively less information about the reputation

of other people in the network and are less efficient in imposing social control. That is why members of such networks need more social trust to engage in co-operation. However, social ties within such a network are more likely to provide non-redundant, potentially useful information, thus increasing the expected payoff of prospective cooperation (Burt 1992; Granovetter 2005).

Finally, the extent and structure of individuals' social networks also affects the magnitude of transaction costs they face, the possibility of implementing innovative (but risky) ideas in cooperation with others, and hence the individuals' overall cooperativeness and thrift (Inglehart, Baker 2000; Florida 2004; Klapwijk, van Lange 2009).

All these correlates of social capital have been found to be empirically important not only individually but also at the community and country levels, permitting to hypothesize that societies which form diverse, inclusive networks of the "small world" type should be more trustful and more willing to cooperate, and thus exhibit better economic performance, than societies which are permeated by visible and invisible barriers, fragmenting the networks into locally dense cliques of individuals who think alike and have similar sets of information and other resources. Empirical evidence at the macro level, while plentiful for the links between social trust, cooperation and economic performance (see e.g., Knack, Keefer 1997; Zak, Knack 2001; Algan, Cahuc 2010; Butler, Giuliano, Guiso 2016), is however scarce when the social network structure is concerned as the explanatory variable (Growiec, Growiec, Kamiński 2018).

Following the indications of the background literature we have developed a survey questionnaire that allows us to comprehensively measure individuals' social capital and analyze its relationships with trust and willingness to cooperate.

3. Method

3.1. The Dataset

The dataset covers a representative sample of the Polish population aged 15–75. We have used a stratified sampling procedure, designed to maintain representation of the Polish population with regard to voivodship (16), size of town of residence (7), age cohorts (5), and gender (2). Post-stratification weights have been applied to correct for (minor) ex post discrepancies in the structure of sample and population. The data has been gathered based on computer-aided personal interviews (CAPI) in May 2015 by Millward Brown SA. The survey questionnaire, designed by the authors of the current study, consisted of 40 questions, some of which contained multiple items. Additionally the respondents were asked about their basic demographics (such as age, gender, marital status, employment status, etc., altogether 22 items). It took approximately 15–20 minutes

to complete the survey. The sample size is $n = 1000$ respondents. The full questionnaire is available online.[7]

3.2. Construction of Variables

Based on the answers to the detailed survey questions, we have constructed a number of summary scales, capturing the relevant theoretical concepts. We have carefully tested the reliability and validity of each scale. The definitions and empirical characteristics of the respective measures are discussed below. We begin with the four key social capital variables, singled out for detailed investigation based on the implications from the associated literature: degree, centrality, bridging and bonding social capital. Next we discuss their key correlates, important in social psychology: social trust and willingness to cooperate. In the end, we also comment on the important socio-demographic control variables.

In the course of the study, we have also constructed a range of auxiliary social capital measures, providing additional insights as well as cross-checks to verify the results based on the main four dimensions of social capital. The discussion of these dimensions is relegated to the online appendix.

3.2.1. Social Capital Dimensions

- **Degree (number of acquaintances).** The number of social ties an individual holds is the most fundamental characteristic of her social network because it directly determines the degree to which the person may have access to various network resources. However, individuals often face troubles in recalling their exact number of acquaintances when asked directly. Therefore in our empirical operationalization of degree we combine four proxy measures of this number in a unique summary scale: (i) the reported number of acquaintances contacted during the last week, (ii) sum of reported total numbers of acquaintances from family, from work, and other acquaintances, (iii) sum of total reported numbers of persons from family, work, and other acquaintances contacted during the last month, and (iv) sum of total reported numbers of persons from family, work, and other acquaintances contacted during the last 7 days. The standardized Cronbach's alpha coefficient of the summary scale **Degree** (based on standardized items) is equal to 0.86. We use log degree in our analyses.

- **Centrality.** Theoretically, the "structural holes" argument due to Burt (1992) underscores that individuals forming a bridge between otherwise separated sub-networks (cliques) are crucial for the flow of information and resources in a social network and can therefore expect to draw

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[7] http://web.sgh.waw.pl/~jg23234/Ankieta_SCap.pdf [original Polish version of the questionnaire], http://web.sgh.waw.pl/~jg23234/Ankieta_SCap_EN.pdf [English translation].

certain advantages from their central location. To reflect this argument, we have constructed our novel empirical measure of individuals' network centrality based on the their reported ability to act like a bridge between otherwise disconnected sub-networks. The measure can also be interpreted as having preferential access to valuable network resources (but not necessarily making use of them). It is based on a 7-item summary scale capturing whether the respondent knows people with valuable skills, people who can help "get things done", whether the respondent is a person who can help others get a job or solve a difficult work-related problem, whether he/she actually has helped someone get a job or solve a difficult work-related problem, whether he/she often contacts his/her acquaintances with one another, whether he/she shares information obtained from other sub-networks (i.e., acts as a bridge in information diffusion), and whether he/she shares information on job seekers, vacancies, and business opportunities (**Bridge_Net**). The standardized Cronbach's alpha coefficient of this scale amounts to 0.78. We use the log of **Bridge_Net** in our analyses.

- The above empirical definition can be linked directly to the theoretical definition of centrality (e.g., eigenvector centrality) in networks (Bonacich, 1972, 1987), based on the evaluation of influence of the node in the network.[8] **Centrality** is computed as a product of **Bridge_Net** and **Degree**.

- **Bridging social capital.** The concept of bridging social capital refers to forming social ties across social cleavages and requires people to transcend their simple social identity (Putnam, 2000; Leonard, 2008). Therefore, as its empirical operationalization we use a measure of trait heterogeneity within one's network of acquaintances. It is a summary scale based on Growiec (2015) Bridging Social Capital Questionnaire,[9] encompassing 8 items related to maintaining social ties with dissimilar others – people of opposite gender, largely different age, with a different level of education, other interests, different worldview, living far away, a lot poorer/wealthier, or from distant family (**Bridging**). Its standardized Cronbach's alpha coefficient amounts to 0.85.

- **Bonding social capital.** The concept of bonding social capital refers to forming social ties within relatively impermeable confines of one's family and groups of close friends (Putnam 2000). Hence, as opposed to

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[8] For a formal discussion of the similarities and differences between centrality and forming a network bridge, as well as the role of redundancy, see Borgatti (2006); Valente and Fujimoto (2010).

[9] For detailed justifications of the choice of specific items for this scale, please consult the book by Growiec (2015).

bridging social capital, these are typically social ties with people holding a similar social-economic position. We further narrow down the original Putnam's theoretical concept to kinship ties only (Kääriäinen, Lehtonen 2006; Alesina, Giuliano 2010; Growiec 2015), in line with the presumption that "kin ties are a conservative measure of strong ties" (Tian, Lin 2016: 123). Consequently, we measure individuals' bonding social capital as the reported percentage of family members among all people contacted during the last week (**Bonding**). Furthermore, as robustness checks we also consider three alternative variants of this variable: (i) the percentage of family members among all people contacted during the last month, (ii) the percentage of family members among all declared acquaintances, (iii) the percentage of social time spent with family members. All these measures define homophily on the basis of intensity of contact with kin, and the key source of variation lies with contacts with extended kin.[10]

3.2.2. Trust and Willingness to Cooperate

- **Generalized trust** (social trust). This variable is based on the standard, single survey question used also in the ESS (**Trust**): should most people be trusted, or one cannot be too careful (with other people)? The answers are measured on a scale from 1 to 5.

- **Particularized trust.** We separately measure the degree of trust one holds against people whom he/she knows, i.e., the acquaintances.[11] Excluding social ties with kin,[12] we measure whether the respondent thinks his/her acquaintances always behave honestly with him/her, whether he/she can always count on their help, and whether he/she trusts them completely (**Trust_Net**). The standardized Cronbach's alpha coefficient of this scale amounts to 0.85.

- **Generalized willingness to cooperate.** Our measure of generalized willingness to cooperate is based on four items capturing whether the respondent (i) declares to always behave honestly with others, (ii) is

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[10] The measure based on social time spent with family members appears very noisy and thus of limited usefulness for subsequent analyses. Other three measures are highly correlated; our final choice is motivated by the assumption that maintaining bonding social capital requires frequent contacts and it should be easiest for the respondents to recall the contacts from a relatively short time period such as the last week.

[11] See Uslaner (2002); Sønderskov (2008) for a discussion of the importance of distinguishing between generalized and particularized trust.

[12] We exclude social ties within family when computing our measures of social trust and willingness to cooperate because these ties are subject to different social norms, a higher degree of social control and are formed and dissolved based on different criteria. In our data, respondents are on average much more trustful and willing to cooperate with acquaintances from family than with acquaintances from work or other acquaintances.

convinced that others are honest with him/her as well as (iii) with them-
selves, and (iv) agrees that all rules should be obeyed (**Cooperation**).
The standardized Cronbach's alpha coefficient of this scale is not as high
as the previous ones but remains acceptable – it amounts to 0.60.

- **Particularized willingness to cooperate.** Our measure of willingness to
cooperate with one's own acquaintances is based on six items. Excluding
social ties with kin, we measure whether the respondent always behaves
honestly with his/her acquaintances and whether they can always count
on the respondent's help, also when this would require substantial sacri-
fice (**Coop_Net**). The standardized Cronbach's alpha coefficient of this
scale is 0.82.

3.2.3. Control Variables

- **Sociability.** It may be argued that some individuals may maintain more
social ties than others as well as spend more time socializing, and at the
same time, e.g., be more satisfied with their lives, just because of their
innate psychological traits. If an innate trait of this type (which can be
called "sociability") were a cause both for more social capital and more
trust, then the inference on the relationship between the latter two variables
would be biased. Therefore it is required to control for such traits in mul-
tivariate analysis. As two alternative measures of these traits, we construct
a scale of sociability (**Sociability**), and a scale of general positive affect
towards others (**Pos_Affect**). The former of the two variables includes the
assertions of respondents whether they are sociable (like spending time
with others) and open, interested in the world. The standardized Cron-
bach's alpha coefficient of this scale is 0.70. The latter variable, on the
other hand, sums the replies on whether the respondent is emotionally
related with his/her acquaintances, knows them for a long time, behaves
honestly towards them, thinks others behave honestly as well, offers his/
her help, believes that he/she can count on help from others, can forgive
a lot, has full trust, and believes others trust in him/her in return as well.
The standardized Cronbach's alpha coefficient of this scale is 0.94.

- **Choice and control.** As an important control variable, we also include
the question whether the respondent feels that he/she has choice and
control over his/her life (**Choice_Ctrl**). The answers are measured on
a scale from 1 to 5.

- **Other control variables:** age, age squared, gender (female=1), size
of town of residence, employment and occupation status (especially:
student, retired, unemployed, housewife, farmer), civil status (especially:
widowed), education, work experience, disabled status, chronic illness.

Reliability of the above summary scales cannot be increased by removing
any of their constituent items.

4. Results

4.1. Descriptive Statistics

Table 1 presents the key descriptive statistics of our dataset. The respondents have recalled having 25 acquaintances on average, 17 of whom they contacted during the last month, and 10 of whom they contacted within the last week. All these numbers have been obtained by summing the numbers of reported acquaintances from family, work, and other acquaintances. When asked directly, without splitting the acquaintances into groups, the respondents

Table 1: Descriptive statistics

VARIABLES	n	Mean	Std. dev.	Skewness	Kurtosis	Normality p
SOCIAL CAPITAL						
Degree						
P2	1000	22.46	60.66	11.99	177.01	0.000
P3_TOTAL	894	25.15	57.14	12.64	235.70	0.000
P4_3ABC	1000	17.32	29.61	6.47	63.93	0.000
P4_2ABC	1000	10.42	16.56	7.19	80.32	0.000
lnDegree	1000	-0.13	0.45	1.74	8.11	0.000
Centrality						
Bridge_Net	1000	3.12	0.65	-0.40	3.30	0.000
lnBridgeNet	1000	1.11	0.23	-1.26	5.55	0.000
lnCentrality	1000	3.19	1.47	-0.56	3.12	0.000
Bridging	1000	3.13	0.69	-0.06	3.14	0.011
Bonding	928	0.36	0.32	0.62	2.43	0.000
TRUST AND WILLINGNESS TO COOPERATE						
Trust						
Generalized	1000	2.65	1.07	0.12	1.99	0.000
Particularized	957	3.69	0.66	-0.48	3.52	0.000
Cooperation						
Generalized	1000	3.54	0.57	-0.47	3.74	0.000
Particularized	957	3.85	0.60	-0.64	4.34	0.000
CONTROL VARIABLES						
Sociability	994	3.93	0.75	-0.89	4.33	0.000
Pos_Affect	1000	3.86	0.55	-0.48	3.87	0.000
Choice_Ctrl	1000	3.69	0.94	-0.74	3.38	0.000

Note: Normality p is computed from the Shapiro-Wilk test.

delivered however a higher average of 22 acquaintances per person contacted last week, with excessive standard deviation. Due to this inconsistency and the well-known general difficulty in recalling the exact number of acquaintances, we have decided to average out respondents' idiosyncratic errors by constructing a summary scale (Degree) based on all four survey measures, to be used in subsequent analysis.[13]

Our dataset confirms that the Polish society is rather distrustful towards strangers: mean generalized trust is below 3 and the most popular answer is 2. In comparison, the Poles display a relatively cooperative approach towards people in general: the mean is about 3.5 and the mode is 4. In line with the demonstration hypothesis, particularized trust and willingness to cooperate are higher than their respective generalized counterparts. Finally, although Poland has one of the lowest frequencies of social contact measured in ESS data, the respondents view themselves as quite sociable and exhibit general positive affect towards others (both variables record their mean at 3.9 and mode at 4).

4.2. Links Among the Four Social Capital Dimensions

The first step of the empirical study is to investigate the correlations among the four social capital variables. As shown in Table 2, we find a positive correlation between degree and bridging social capital. Occupying a position of a network bridge, in turn, correlates positively with bridging social capital, and negatively – with bonding social capital. These three correlations are sufficiently robust to be present at $p < 0.01$ also when controlling for the simultaneous effects of the other two social capital dimensions and additional controls. Among less robust correlations, we also observe that degree correlates positively with being a network bridge, and negatively with bonding social capital. Furthermore, bridging and bonding social capital are slightly negatively correlated in our data – in line with the theory which views them as functionally opposite dimensions of social capital. All these results accord with the associated literature (e.g., Putnam, 2000; Burt, 1992, 2005).

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[13] Reassuringly, all measures of respondents' degree are similarly strongly right-skewed and leptokurtic. The median respondent contacted only 6 acquaintances during the week and 9 during the month, but the sample includes also individuals who report regular contacts with more than a hundred people. In fact, the distributions are so spread out that degree remains significantly right-skewed and leptokurtic even after taking logs. In contrast to Degree (and Centrality = Bridge_Net × Degree), other variables are defined on bounded scales: bonding social capital is defined on [0, 1], and all other scales are constructed as averages of five-level Likert items and thus span the range from 1 to 5. Therefore they have limited kurtosis. On top of that, most of them are left-skewed, as follows from a negative skewness coefficient.

Table 2: Correlations among the four social capital dimensions

	Degree	Bridge_Net	Bridging
Simple correlation			
Degree	1		
Bridge_Net	0.15***	1	
Bridging	0.21***	0.26***	1
Bonding	-0.10***	-0.23***	-0.09***
Simple correlation with controls			
Degree	1		
Bridge_Net	0.10***	1	
Bridging	0.18***	0.18***	1
Bonding	-0.09***	-0.20***	-0.08**
Partial correlation			
Degree	1		
Bridge_Net	0.09***	1	
Bridging	0.17***	0.21***	1
Bonding	-0.06*	-0.21***	-0.02
Partial correlation with controls			
Degree	1		
Bridge_Net	0.05	1	
Bridging	0.17***	0.17***	1
Bonding	-0.06*	-0.16***	-0.04

Controls: sociability (2 variables), gender, age, age squared, choice and control, widowed, size of town of residence, education, cooperation, generalized trust, particularized trust. Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4.3. Links Between Social Capital, Trust and Willingness to Cooperate

The second step of the empirical study is to identify the links between the four dimensions of social capital and their key external correlates: social trust and willingness to cooperate. This is done in a series of multivariate regressions estimated with ordinary least squares (OLS).[14]

Our findings are summarized in Table 3 and discussed below. It should be noted that this table includes only the results from the most sophisticated

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[14] Even though the theoretical assumption underlying regression analysis is that the outcome variable does not influence the regressors, in fact we cannot exclude reverse causality because of the limitations of our cross-sectional survey dataset. Therefore we are careful to interpret our results as partial correlations rather than causal inferences.

variants of our regression models and thus contains estimates which are max-imally conservative. Some of our qualitative claims made in the text may not appear statistically significant in Table 3 but have been substantiated on the basis of numerous robustness checks (in the online appendix).

Table 3: Summary of key regression results

	(1)	(2)	(3)	(4)
VARIABLES	Trust	Trust_Net	Cooperation	Coop_Net
lnDegree	0.00034	-0.07**	-0.0072	0.017
	[0.004]	[-1.98]	[-0.19]	[0.58]
lnBridgeNet	0.84***	0.19**	0.089	-0.098
	[4.44]	[2.31]	[1.08]	[-1.32]
Bridging	-0.19***	-0.055**	0.053**	0.041**
	[-3.41]	[-2.55]	[2.06]	[2.05]
Bonding	-0.47**	-0.068	0.011	-0.011
	[-2.53]	[-1.34]	[0.18]	[-0.24]
Trust			0.12***	-0.037***
			[6.98]	[-2.80]
Trust_Net			0.051	0.63***
			[1.03]	[20.31]
Cooperation	0.46***	0.15***		
	[6.68]	[4.20]		
Coop_Net	-0.029	0.74***		
	[-0.25]	[21.61]		
Observations	843	877	882	877
R-squared	0.14	0.58	0.21	0.56
Adjusted R-squared	0.13	0.57	0.20	0.55

Notes: robust t-statistics in brackets. *** p<0.01, ** p<0.05, * p<0.1. Additional control variables included in the regressions have been omitted from the table for readability. Parameter estimates on control variables can be found the appendix, alongside a large number of robustness checks.

Trust (see Appendix Tables 4-7). We find that generalized trust is inversely related to bonding social capital (the share of family members among all social ties maintained by a given individual) and, unexpectedly, bridging social capital (diversity of one's acquaintances). It is however relatively higher among agents who act as a network bridge. Such a result corresponds with Meeussen, Agnees-sens, Delvaux, and Phalet (2018) result that high diversity hampers value sharing, highlighting potential costs of diversity (Lawrence, 1997). Particularized trust

is, in contrast, inversely related to the number of social contacts and bridging social capital, and positively related to being a network bridge. We also observe that trust (both generalized and particularized) is strongly positively correlated with generalized willingness to cooperate. Particularized trust is also positively correlated with particularized willingness to cooperate.

Willingness to cooperate (see Appendix Tables 8-11). We find that generalized and particularized willingness to cooperate are positively related to bridging social capital. The respondents' degree, centrality, and bonding social capital appear statistically insignificant. It is also confirmed that generalized trust is strongly positively correlated with generalized willingness to cooperate, and particularized trust – with particularized willingness to cooperate.

All these results accord with the associated literature (e.g. Gambetta 1988; Gellner 1988; Yamagishi, Cook, Watabe 1998; Alesina, Giuliano, 2010; Ermisch, Gambetta 2010).

Effects of control variables. All regressions considered in Table 3 as well as Tables 4-11 in the online appendix include a number of standard socio-demographic control variables. The effects of these variables are generally of expected sign, even if sometimes statistically insignificant. We find that:

- The feeling of choice and control over one's life (**Choice_Ctrl**) is a very important covariate which goes together with higher (generalized and particularized) trust and generalized willingness to cooperate.
- **Sociability** is positively related to particularized social trust and willingness to cooperate.
- Positive affect towards others (**Pos_Affect**) goes together with generalized willingness to cooperate.
- Some variables may exhibit nonlinear age profiles. In particular, a robust U-shaped profile is observed for generalized willingness to cooperate.
- Managers exhibit above-average willingness to cooperate within their social networks.
- Widowed people report, on average, lower generalized willingness to cooperate.
- Women exhibit, on average, greater generalized willingness to cooperate than men.

4.4. Discussion

Our key empirical results are summarized in Figure 1. We find that the four considered social capital dimensions can be reliably operationalized in our data, and that their empirical measures are distinct but interrelated, and also related to

generalized as well as particularized trust and willingness to cooperate. Bridging social capital goes together with higher willingness to cooperate but lower trust; trust is also negatively correlated with bonding social capital but positively – with occupying the position of a network bridge.
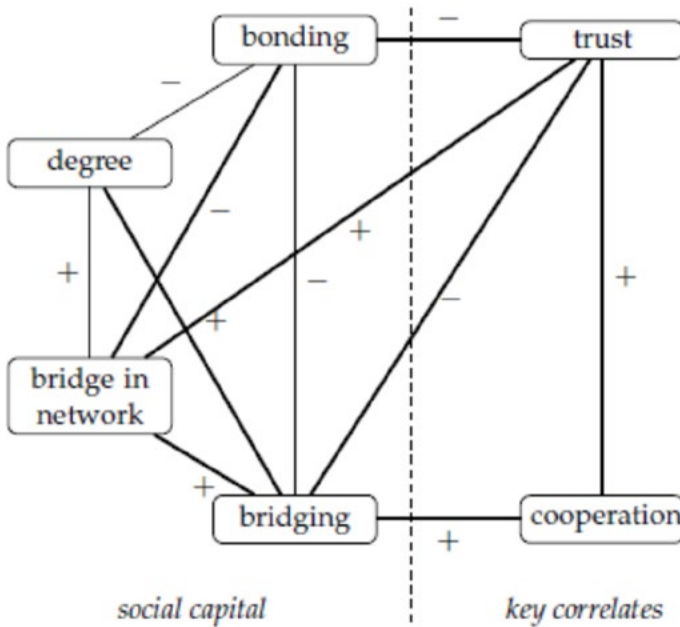

Figure 1: Empirical relationships between the four dimensions of social capital as well as their key correlates.

Notes: + positive relationship, − negative relationship. Thick lines denote robust relations, i.e. the ones which survive also when controlling for the simultaneous effects of numerous other covariates.

The observation that the sets of predictors of generalized trust and generalized willingness to cooperate are different draws specific attention. In line with the theoretical claim by Misztal (1996) – that "cooperation is (...) a by-product of trust rather than a source of trust" (p. 17) – we find that people in a central position in the social network are both more likely to trust others and to cooperate, but the positive effect of centrality on cooperation disappears when controlling for trust (Appendix Table 9). This suggests that centrality may not affect willingness to cooperate directly, but rather indirectly through its impact on trust. Furthermore, in line with Woolcock (1998) ("high levels of social capital can be 'positive' in that it gives group members access to privileged (...) resources (...), but may be 'negative' in that it also places high particularistic demands

on group members, thereby restricting individual expression and advancement",
p. 165) we find that bridging social capital – social ties with dissimilar others –
goes together with more cooperation but less trust. This suggests that contacts
with dissimilar others may offer opportunities for valuable cooperation (i.e., the
"privileged resources") while also – given the Polish context of broad-based
distrust – making people even more cautious towards others ("restricting indi-
vidual advancement").

The result of cooperation without trust in the case of individuals with high
bridging social capital resources, while puzzling, aligns well with the observation
that high diversity social networks are likely to fail in providing value sharing
and – more generally – social norming (Meeussen, Agneessens, Delvaux, Phalet
2018) because they do not provide common identity.

5. Conclusion

The current paper has provided a survey dataset allowing to map the inner
structure of the network-based social capital concept. We have identified the
mutual relationships among four key social capital dimensions at the individual
level: (i) degree, (ii) centrality, or occupying the position of a network bridge,
(iii) bridging and (iv) bonding social capital, and characterized their links with
trust and willingness to cooperate, which we view as key immediate correlates
of social capital. To our knowledge, this is the first comprehensive study of all
these relationships. The literature thus far has focused only on selected elements
of the map, such e.g. the relationships between the number of social ties and
bridging social capital, or between family ties and trust. Our theoretical frame-
work allows to incorporate these results as parts of a larger, encompassing struc-
ture which features four separate dimensions of social capital as well as clearly
distinguishes between (generalized and particularized) trust and willingness to
cooperate – concepts which have been sometimes intertwined in earlier studies.

The current study can be extended in various ways. First of all, it would be
highly rewarding if the proposed survey questions could be included in a larger
cross-country or panel survey program. The absence of sufficiently detailed in-
formation on social capital variables in large survey datasets such as the WVS
and ESS is a serious drag on the research on the effects and determinants of
social capital. Gathering panel data on variables similar to the ones defined here
would clearly allow the researchers to depart from studying cross-sectional cor-
relations towards the identification of relationships that have a decidedly more
causal character.

Secondly, the dataset provided with the current study can also be exploit-
ed to provide evidence on the links between social capital and such important

outcome variables as earnings and subjective well-being. It can also be used to study the patterns of social capital formation. Both objectives remain high on our research agenda.

Thirdly, the empirical results of the current study could be compared with their theoretical counterparts. For example, Growiec, Growiec, Kamiński (2018) construct a multi-agent simulation model which delivers within-country results that are in broad agreement with the ones from this paper, and provides useful extrapolations helpful in studying cross-country differences.

In sum, the current paper has documented that *it matters whom you know*: people's position in the social network is systematically related to their trust and willingness to cooperate. The more people you know (high degree), the more they are dissimilar from you. The more central you are in the social network, the more you are trustful. But if you have many ties with people dissimilar from you (bridging social capital), though, you may find yourself in a position of cooperation without trust.

Declaration of interest statement

The authors declare no conflicts of interest.

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