**Social capital as mediator in research participation**

Participation in public goods remains an ongoing challenge for societies. This challenge resonates in the quest for sufficient contributions of citizens enabling scientific research or clinical care, for example by donating their personal data, blood, or organs. Currently, the demand of organ donors is still higher than registered organ donors (Caplan, 2016) and response rates in survey studies decreased recent 35 years (De Leeuw et al. 2018; Luiten et al 2020). This lack of participation in public goods requires a better understanding of a multitude of dimensions that could be relevant for people’s participation in and across public goods, in particular participation in research.

Participation in research is, like voting behavior, treated as a form of collective action (e.g. Healy, 2004, 2005; Ladin et al., 2015) or as a form of prosocial behavior (e.g. Bekkers, 2006; Merz et al., 2017), like volunteer work (Piersma et al., 2019). There is ample empirical evidence that connectedness to society is related to compliances to all participation requests, and the different participation behaviours are associated with each other. Brehm already in 1960, based on a study in Australia, demonstrated that voting in national elections correlates with survey participation. For the Netherlands it was recently shown that organ donation is related to participation in the survey on social cohesion and wellbeing (Schmeets and Peters, 2020). In the same vein, studies found a variety of similar indicators of connectedness to society for these behaviours, such as higher levels of societal trust and prosocial values (Critchley et al. 2012; Gaskell et al. 2013; Middleton et al. 2019; Milne et al. 2019; Broekstra et al. 2020).

Despite these indications that connectedness to society might provide opportunities for understanding of participation in public goods from a broader perspective, little is yet known about the association of levels of connectedness to society and participation in public goods. This paper aims therefore to investigate the impact of social capital on the participation in public goods, in particular scientific research. We compare the non-response bias of two studies conducted in the northern part of the Netherlands: the Survey on Social Cohesion and Wellbeing (S&W) and Lifelines biobank. The Lifelines biobank is a key infrastructure for biomedical research. It stores, like other biobanks, large quantities of biological specimens as well as data extracted from questionnaires and measurements, aiming to facilitate studies on patients with specific diseases or prospective studies on the onset and progress of chronic diseases (Krokstad et al., 2013; Scholtens et al., 2015; Sudlow et al., 2015; UK Biobank Coordinating Centre, 2007; van Staa et al., 2016). The biosamples and data of this repository are voluntary donated by at recruitment healthy citizens for a period of 30 years. (Klijs et al., 2015; Scholtens et al., 2015)

Survey participation is, similar to organ donation, a collective action problem because individual incentives are low. But also can participation in surveys be considered as prosocial behavior as in the invitation letters and the data-collection strategies the organizations in charge, such as Statistics Netherlands, appeals to the responsibility of the selected persons in the sample ‘by your participation is very important and you will give a firm signal’. From this perspective, social capital is a prerequisite for participation in a public good. Moreover, higher levels of social capital may improve the sharing of information on participation in a specific public good through social networks with shared values, and as such, foster participation in public goods as a form of collective action.

Our reasoning is that the bias is larger in Lifelines than in S&W as (1) Lifelines is not based on a random sample; and (2) the investments to participate in a longitudinal panel is higher compared to an one-time 20 to 25 minutes survey. We hypothesise that social capital is an important requisite for participation in surveys. People and communities with low levels of social capital, i.e. endowed with distrust to others and (political) institutions and who do not participate in society, are also reluctant to participate in social surveys conducted by governmental bodies. Our reasoning is that higher levels of social capital are needed for participation in the Lifelines panel compared to become a respondent in the survey on social cohesion and wellbeing, as this is an one-time investment of some 20 to 25 minutes.

This leads us to the following hypothesis:

 More individual social capital is needed for participation in Lifelines than in the survey on social cohesion and wellbeing.

We consider individuals within the community to be the owners or possessors of social capital rather than the community as a whole (Gannon and Roberts, 2018; Inkeles, 2001). To explore whether our hypothesis holds, we adopt the measure of individual social capital introduced by Statistics Netherlands (Van Beuningen and Schmeets, 2013). This measure is based on a composite index that includes nine indicators of a person’s participation in society and eight indicators of trust (see Annex 1). We will also control for other mechanisms that may facilitate participation in a public good. Given the relationship that religious involved persons are more willing to a potential organ donor (Bolt et al., 2010; Schmeets and Peters, 2016), and religion is often considered to foster social capital (for the United States and Canada, see Putnam and Campbell (2012), Smidt (2003), Wuthnow (2002); for the Netherlands, see Bekkers and Schuyt (2008), De Hart (2014), it is important that we include religion, along with some social-demographic background characteristics, as a control in our models.

To analyze the relationship between social capital and participation in the public goods, we link information from Lifelines to the Dutch Survey on Social Cohesion and Wellbeing from Statistics Netherlands. This survey was undertaken in the period 2012-2018 and covers over 53 thousand individuals aged 15 and above. The data were collected in a sequential mixed-mode design. Based on a random sample the selected persons were invited to participate in the survey by internet. After two reminders, the non-respondents were approached for a telephone or a face-to-face interview at home. Response rates varied from 63 to 70 percent in the 2012-2018 period. The Lifelines cohort study recruited unstructured 167 thousand participants, all living in northern part of the Netherlands, during 2006 and 2013 via General Practitioners, participating family members and self-registration. Participants in the longitudinal Lifelines study were linked to the 5,663 respondents in the S&W survey in the three northern provinces Groningen, Friesland and Drenthe. This resulted in 730 individuals who also participated in Lifelines and 4,914 who did not.

**Findings, conclusion and discussion**

The relevance of social capital for participation in Lifelines corresponds with the expectations expressed in our hypothesis. We found that if a person is endowed with more social capital, i.e. greater levels of participation and trust, the likelihood of them being a participant in Lifelines is higher. Our findings confirm that social capital increases the probability of a person is willing to be a respondent in the Lifelines studies. As this pattern is linear, this also implies that there is no ‘dark side’ of social capital, (for an overview, see Portes, 2014), which is in line with other studies on the relation between social capital and health (Wakefield and Poland, 2005; Gannon and Roberts, 2018).

We discussed the social capital composite index, based on nine participation and eight trust indicators, and explored which indicators contribute most to become a Lifelines participant. Our analysis revealed that certain components matter more than others. More specifically, we see that formal participation in organizations and political participation matter more than participating in informal activities with friends and neighbors and helping other people. And not all trust indicators are relevant. The most important predictor of Lifelines participation is trust in other people (‘generalized trust’). People who generally trust other people are much more willing to be a Lifelines participant. All other trust indicators do not have an impact, including trust in politics, while trust in large companies even has a negative impact on Lifelines participation.

Our interpretation of these findings is that trust in others and in established institutions resembles the trust people have in the medical system, which may an important facet of being a member of the Lifelines panel. Furthermore, the fact that social contacts do not appear relevant may indicate that being a Lifelines panel member is not a frequent topic of discussion between people. Instead, what fosters Lifelines participation is a person’s commitment to society as expressed through volunteering and being active in associations and politics. From the social capital lens, we also expected that membership of a religious community would increase the probability of being a Lifelines participant, given that social capital is more prevalent among religious groups. This expectation is not reflected in our results as religious involvement has no unique impact on being a participant in the Lifelines studies.

Our paper examined other variables that affect organ donor registrations. Women, people who with higher income, those aged 25-64 are more willing to be a Lifelines participant than men, the lower income groups, those in the 15-24 and 65+ age groups.

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