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Article

Networks and new mutualism: how embeddedness influences commitment and trust in small mutuals

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Abstract

Mutualism is reviving again in several countries, replying to state and market failure with an alternative, social insurance setup. We study participation in such new mutuals with a focus on embeddedness. We distinguish group-level embeddedness (network structure) and individual embeddedness (the type and quantity of ties to other group members) and study how these relate to members' commitment to mutuals and their trust in the commitment of others. We show that group-level embeddedness primarily affects trust, while individual embeddedness more strongly associates with commitment. We reveal these dynamics for mutuals of different ages using a unique multilevel dataset on the motivations, beliefs and social relations of more than 5000 members of 230 small Dutch mutuals. Our results highlight the importance of thinking critically about the levels at which social embeddedness plays a role, as the dynamics are more subtle and not all means of embeddedness are equally fruitful.

Key words: cooperation, uncertainty, trust, embeddedness, social networks

JEL classification: D71 social choice, clubs, committees, associations; G22 insurance, insurance companies, actuarial studies; Z13 economic sociology, economic anthropology, language, social and economic stratification

1. Introduction

Mutual insurance is the oldest, most basic and cross-culturally applied means of risk-sharing worldwide.[1] In most of Europe, the USA and Australia, mutuals were the most

1 The oldest forms of mutual insurance can be found among the early modern guilds, where craftsmen came up with a pre-modern social security system for their members (Epstein and Prak, 2008).

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widespread—and seemingly most successful—way of organizing insurance throughout the 19th century (Emery and Emery, 1999; Van Leeuwen, 2016). Nonetheless, the number of mutuals declined during the 20th century and their small-scale and local character disappeared. Many were dissolved as their tasks were taken over by national welfare states. Others seized operations in competition with rising private insurance companies, or, when they did manage to survive, merged and professionalized into large mutual insurance companies.

Yet even with large insurance companies nowadays forming the status quo, the establishment of new mutuals over the past decade demonstrates that mutualism is by no means a phenomenon of the past (De Moor, 2015; Vriens and De Moor, 2019). Mutuals still form a key means of risk-sharing among rural populations in sub-Saharan Africa (Lemay-Boucher, 2009), India (Ligon *et al.*, 2002) and Southeast Asia (Fafchamps and Lund, 2003). Moreover, mutuals are reviving in western countries as well (examples are *Lemonade* in the USA, *Friendsurance* in Germany and *Broodfonds* in the Netherlands); particularly among the self-employed, migrants or people working in the informal sector—subpopulations that are often poorly insured (or not at all) (ILO, 2001).

In this article, we focus on these recently established mutuals, which institutionally resemble their 19th-century counterparts. Responding to failures in the insurance provisions of both market and state, they envision an insurance that is based on solidarity, fairness, transparency and innovation (Vriens and De Moor, 2019). That is, members take out an insurance not only to help themselves but to help others in their risk-sharing pool as well; the premiums they pay to the insurance pool are (partly) returned if they were not needed for payouts to pool members by the end of the term; they cooperate within an umbrella institution governed by a minimum set of rules and clarity on, for example, payouts and eligibility; and (transcending the historical model) they organize their cooperation through digital communication platforms and artificial intelligence tools.

This organizational form, which (partly) returns organizational responsibility to the members, categorizes the new mutuals as institutions for collective action (De Moor, 2015). Organized on an informal, voluntary basis, mutuals often cannot rely on binding legal agreements to enforce members' participation, but depend on principles of responsibility, reciprocity and trust instead. This creates a classic cooperation problem (Ostrom, 1990) at the heart of mutuals, as members face uncertainty regarding, for instance, the genuineness of insurance claims or other members' willingness to pay the costs for insurance payouts. In addition, members do not know whether they will ever need an endowment from the fund or how many others (simultaneously) will.

Basically, while the decision to join a mutual implies a promise to insure others as well (and thus to incur costs to meet other members' needs), this initial decision gives no guarantee for the future. Members could at any time decide to revoke their membership if they no longer want to pay to help others (e.g. because others file more claims than expected), and if they do, they take back the share of their contributions that has not been spent on payouts. Alternatively, remaining a member, they might start to take more risks because they are insured, exaggerate losses or even cook them up entirely (i.e. various degrees of *ex ante* and *ex post* moral hazard; Arrow, 1971) to reap the benefits of their contributions.

Experiences from the past have taught us that mutuals generally faced fewer moral hazard problems than early market and government insurers (Emery and Emery, 1999; Van

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Leeuwen, 2016). Due to their small risk-sharing groups, cohesive structures and strong social control, the number of claims was controlled over time. At the same time, we know that when moral hazard behavior did occur, it was often more detrimental. Trust could quickly deteriorate, particularly when many people need the insurance, resulting in reduced willingness to cooperate (Coate and Ravallion, 1993). Moreover, the small groups often did not have the financial stability to cope with increases in claims, leading to depleted insurance pools or even bankruptcy (De Swaan and Van der Linden, 2006).

Learning from the past, it follows that if the new mutuals are to become lasting insurance alternatives, they have to create an environment that not only triggers motivation for voluntary cooperation but sustains it as well. Therefore, this study serves to gain insight into factors affecting members' individual commitment and trust levels. We use these performance indicators because low levels of commitment and trust pose a threat to the mutual's survival, while high levels signal the members' intent to, *ceteris paribus*, continue cooperation in the future and their beliefs that others will do the same (Kollock, 1994; Gundlach et al., 1995). Since sudden changes due to internal or external shocks can by nature not be foreseen, these indicators are our best proxies for future behavior.

Following the new mutuals' belief in social motives over institutional arrangements, we aim to disentangle how various aspects of social embeddedness (both in general and through individual relations) relate to commitment and trust. While in our modern societies institutions are given a key role in solving all types of cooperation problems (Bravo, 2010), a large body of literature suggests that social embeddedness—conceived through reciprocity (Bowles and Gintis, 2002), reputation (Raub and Weesie, 1990), norms (Poteete and Ostrom, 2004), cohesion (Coleman, 1990) or communication (Balliet, 2010)—may be equally, if not more important (Granovetter, 1985; Bowles, 2008).

To put these ideas to a test we compare 230 different risk-sharing groups, established between 2006 and 2017, of a Dutch mutual called *Broodfonds*.[2] In Broodfonds groups, self-employed workers jointly arrange an income protection insurance for sickness and disability in groups of at most 50 members. The interesting feature of this mutual is that the 230 groups are organized on the same basic principles, thus enabling us to compare many large, natural networks. Additionally, compared to other new mutuals—most of which are established after 2016 (Vriens and De Moor, 2019)—a considerable share of Broodfonds groups has several years of experience, enabling comparisons of the extent to which commitment and trust have consolidated within these groups.

We therefore measured trust and commitment levels, as well as several indicators for social embeddedness, among 5192 members (51%) of the 230 different Broodfonds groups. And although our cross-sectional survey data obstruct causal analyses, they do enable us to explicate the generally kept implicit mechanisms underlying social aspects of participation. Moreover, it provides an integrated approach to test the combined effects for a set of hypotheses for which the isolated relevance is well established.

2 *Broodfonds* literally translates to Bread Fund (a fund that allows you to buy bread). The name signals the purpose of the insurance, which does not cover health expenses but serves as income replacement. It refers to the saying 'to put bread on the table', which means to earn enough for a living.

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2. Revival of mutualism

Before we proceed, a short characterization of the wider developments contributing to the emergence and organization of mutuals helps to grasp the framework within which the hypothesized relations on individual and social factors take part.

2.1 Economic and societal embeddedness

The revival of new mutuals initiatives is a response to the decline of the welfare state, which, over the past few decades, has taken place in many (particularly European) countries, where principles of neoliberalism have provided the economic justification for delegating the provision of social insurances (such as health insurance) to the private sector (Natalier and Willis, 2008). Moreover, these countries increasingly place responsibility with citizens and see as governmental tasks to inspire and assist citizens to take responsibility for social problems in their community (Ilcan and Basok, 2004). This spurred an increase in (the popularity of) institutions for collective action that, as often observed simultaneously (Schneiberg, 2011), takes place not only in the service sector (where the new mutuals emerge) but in fields of agriculture, energy and infrastructure as well, in domains where adequate provisions are lacking (De Moor, 2015).

This trend has direct parallels to the 19th century when mutuals and voluntary organizations also emerged side by side to create financial security and assist poor relief due to inadequate public provisions (Van Leeuwen, 2016). And although the new movement is still in its infancy, its development is promising. The initiatives all organize through umbrella structures (ranging from cooperatives and social enterprises to formal insurance entities), which they use to enable new members to relatively easy start their own risk-sharing pools using the same basic organizational framework (Vriens and De Moor, 2019). As such, they act as legitimate operators between market and state, as their 19th-century counterparts did before them (Ware, 1989).

2.2 Institutional embeddedness

Most small mutuals (past and present) have a stable, well-defined membership, clear procedures to accept new members and rules on, for example, schedules of payments, contribution levels and sanctions in case of non-payment or misbehavior (ranging from warnings to monetary fines to removal from the collective). Moreover, the groups are democratically organized, have a chairman, secretary and treasurer chosen from their members, and hold regular meetings for which attendance is largely compulsory. Finally, although some groups set particular restrictions to membership, such as by profession or location, the funds are generally open to everyone (Murgai *et al.*, 2002; Mariam, 2003; Lemay-Boucher, 2009).

To illustrate, the regulations of Broodfonds specify the following general conditions: (a) groups should contain between 20 and 50 members; (b) each member pays a fixed monthly contribution (chosen from a fixed set of contribution levels); (c) members who fall ill receive a monthly endowment (proportional to their contribution) for at most 2 years, the costs of which are shared by all group members; (d) members take alternating turns occupying board positions; and (e) the board has the right to terminate membership of members who misbehaved.

This basic organizational framework was designed by the first Broodfonds group, which started in 2006 with approximately 50 members. These members self-organized

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because from 2004 onward the welfare state left self-employed workers at the mercy of private insurance companies, who charged premiums that most self-employed workers cannot afford. From 2011 onward, more Broodfonds groups were established. To carry the name Broodfonds, all adhere at least to the basic institutional principles outlined above. The number of Broodfonds groups grew rapidly afterward, from 18 by the end of 2012 to 230 by February 2017 (reference date for our data collection) and 527 in September 2019.

Despite being largely similar there are also variations between the different Broodfonds groups. Each Broodfonds has the freedom to specify additional rules tailored to their local needs. This introduces some variation between Broodfonds groups, for instance, in restrictions posed on membership or on the annual number of meetings. Additionally, and central to the current study, the groups differ in the extent of intra-group social contact and the type of membership motivations that dominate.

3. Theory

Literature on understanding participation in mutuals starts from the theory of social dilemma's (Fafchamps, 1992; Coate and Ravallion, 1993). Cooperation entails joining the mutual, investing resources to create a collective insurance fund, and paying the costs to help other members in times of need, while defection entails moral hazard behavior or withdrawal to avoid paying the endowments of others. Obviously, the collective benefit (i.e. security in times of need) is obtained only when all (or most) players cooperate. However, the uncertainties inherent to mutuals, such as not knowing whether one ever needs the insurance or whether those who currently do will reciprocate in the future, may tip the balance in favor of defection—especially when one or several members actually call upon using the insurance fund (Platteau, 1997).

On top of these internal dynamics, in most natural settings the dilemma is not merely whether or not to engage in one specific partnership. For example, there may be several solutions to solve the insurance problem: Aside from participation in a mutual, people could rely on own savings, borrow money or take out an insurance with a private insurance company. In such settings, commitment to the current partnership has long been recognized as a crucial feature underlying long-term cooperation (Orbell *et al.*, 1984; Kollock, 1994; Hauert, 2002).

Commitment to mutuals is the result not only of individual needs and risk perceptions (Coate and Ravallion, 1993 but also of the belief that most others will behave similarly, that is, are also committed (Kollock, 1994). Without trust in others' commitment, no individual member will commit, while one's own commitment is required for others to do so. This interdependency also means that a drop in one means the other likely follows. When members start calling other members' commitment into question or even suspect some of them to commit fraud and misuse the insurance, this might set in motion a shift to withdrawal or deceptive strategies, potentially even resulting in failure of the collective.

Commitment and trust are thus vital to sustain cooperation in mutual type of collective action settings. The relation between the two is well established (Sargeant and Lee, 2004; Ostrom, 2010) and their relevance in the collective action context is supported by evidence

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from field studies (Haapasaari *et al.*, 2007) and experiments (Baggio *et al.*, 2015). We therefore start from the following assumption:

A1: *Commitment and trust are interlinked in a positive and mutually reinforcing relationship.*

3.1 The role of social embeddedness

The reinforcing relationship between commitment and trust implies interdependencies in members' behavior, hence introducing a natural role for social embeddedness as predictor of both. Through social embeddedness, commitment and trust of members of the same group can be aligned. Studies on historical mutualism, for instance, demonstrate that as the member base of mutuals grew vastly throughout the 20th century, the institutions professionalized and social embeddedness decreased (Downing, 2012; Ismay, 2015). While the large member base would still institutionally be subdivided in smaller risk-sharing subgroups, within these subgroups the sense of mutual responsibility, solidarity and social control decreased. Members could or would no longer call each other out on their responsibilities, which translated in larger number of claims (hinting at increased moral hazard).

This suggests that in and of itself, the small size of the risk-sharing groups does not explain decades of mutuals' success in controlling moral hazard. Instead, it was the social structure within these groups that truly induced cooperative and prosocial behavior. This structure created the social bonds needed to establish helping norms and to control and monitor each other's behavior. We therefore argue that, even though cooperation is to some extent regulated within institutions, we should look at the social embeddedness within these institutions to understand commitment and trust. Moreover, when it comes to social embeddedness, we should not only consider group-level embeddedness, but individual relations as well (Lazega and Snijders, 2016). After all, a mutual group might have established strong helping norms overall, but there might be one or a few members located on the outskirts of the network, not in contact with (many) others. It is not evident that they would be equally inclined to comply to these social norms.

3.1.1 Group-level embeddedness

On the group level, embeddedness enhances participation through two main drivers: connectedness and cohesion. Connectedness enables the spreading of information about intentions and behavior of other group members and provides opportunities for control. Members who are tied can communicate their commitment, exchange promises (Orbell *et al.*, 1984), monitor each other's behavior (Raub and Weesie, 1990) and establish trust relations (Buskens, 2002). The higher the embeddedness, the sooner information about potential misconduct would be common knowledge to all members (Raub and Weesie, 1990). Connections to other members (both directly and indirectly) can thus foster both trust and commitment. This is supported by the large amount of evidence that shows that cooperation is higher when members can communicate (Balliet, 2010).

Cohesion, second, creates a sense of belonging to a group which induces behavior matched to group interests rather than personal ones (Orbell *et al.*, 1984). Particularly, it creates a cooperative norm that strengthens members' commitment by aligning personal values to that of the mutual as well as evoking a sense of obligation to remain a member. By fostering social norms and a sense of group identity, cohesion also increases trust in the

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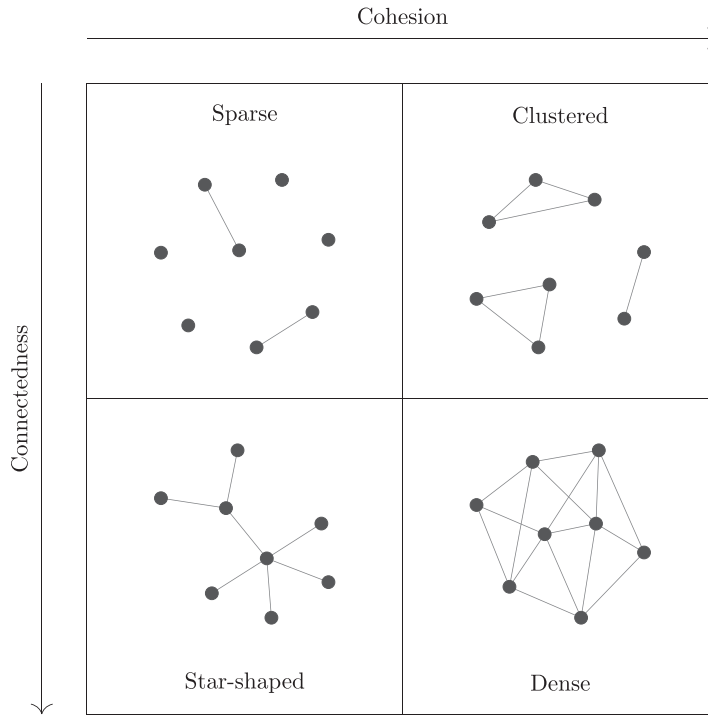

Figure 1. Typology of network structures.

intentions of other group members. After all, they relate to the same identity (Coleman, 1990). For mutuals, this positive effect of cohesion is found both in experiments (Attanasio *et al.*, 2012; Barr *et al.*, 2012) and in the field (Murgai *et al.*, 2002) in settings where individuals endogenously form their own risk-sharing groups. By grouping with known others, such as people from the same community, they ensure a common identity.

As can be seen from Figure 1, the two drivers do not necessarily require the same network structures to yield optimal results. A network can be well connected without being cohesive (e.g. star-shaped networks) or cohesive yet poorly connected (e.g. clustered networks, Janssen *et al.*, 2006; Bodin and Crona, 2009). In general, then, dense networks are most likely to advance trust and commitment levels, as they benefit both from connectedness and cohesion.

Sparse networks, on the other hand, are poorly embedded in any way. Trust in the cooperative tendencies of other members will not be reinforced through communication, nor is there a basis on which to turn individual solidarity into general helping norms. Hence, it follows that any network structure is more likely to come with high trust and commitment levels than the sparse network. As there are no theoretical foundations on which to expect connectedness to be more important than cohesion or vice versa, we do not hypothesize on differences between the star and clustered network but will confine ourselves to hypothesizing on these networks in comparison to the two extremes (i.e. the sparse and dense network).

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For the context of mutuals, there is little research on the type of network structures fostering trust and commitment, largely because adequate data are lacking. A notable exception is the paper by Downing (2012), which compares referral networks of members bringing in new members for two Australian mutuals: one in the period 1855–1872 and the other between 1903 and 1915. Downing shows that where the first had a dense connection pattern, the second was more star-shaped because the majority of members did not feel responsible for bringing in new members. He tentatively took this as a sign that social embeddedness and commitment had waned.

H1: *Compared to mutuals with star and clustered networks, members who perceive their mutual as sparse (resp. dense) have lower (resp. higher) levels of (a) commitment to the mutual and (b) trust in the commitment of other group members.*

3.1.2 Individual embeddedness

While networks may on the group level be well-connected (directly and indirectly), this need not be the case for each individual. We therefore also consider individual variation resulting from their degree centrality (counting the number of ties per member of the network; Freeman, 1978). After all, studies repeatedly show that people are more likely to help people they are directly connected to (Leider *et al.*, 2009; Suri and Watts, 2011; Baldassarri, 2015).

As these are the ties for which members are in control over the monitoring process and the exchange of promises, direct ties are the ones with whom members can coordinate on cooperative behavior. They can, therefore, add to overall network embeddedness when it comes to trust and commitment. The more central members are in terms of degree, the more other members there are with whom they can exchange commitments and build individual trust relationships. Conversely, members with lower degree centrality participate less in the communication process and cannot rely as much on direct agreements to foster commitment and trust.

Underlying this relation is the mechanism that having (more) ties to other members decreases uncertainty. Uncertainty is largest when one does not know any other members, as that gives no ground for believing others will cooperate apart from a general assumption that they will behave similarly. Knowing one or a few others with whom promises can be exchanged will strongly reduce uncertainty and reinforce this general belief that others behave similarly. This also follows, for instance, from studies on social learning that show that people are more likely to use information from their network when they are uncertain about the strategy to proceed with (Mason and Watts, 2012; Vriens and Corten, 2018). However, we hypothesize that as intentions align, each next tie has a lower impact on reducing uncertainty, until at some point a ceiling effect occurs where additional ties hardly decrease uncertainty, that is, hardly contribute to commitment and trust levels.

H2: *There is a positive, marginally decreasing relation between members' total degree and their levels of (a) commitment to the mutual and (b) trust in the commitment of other group members.*

Although all ties can be expected to increase commitment and trust, strong ties likely offer something extra. They generally share the same social norms and beliefs and can therefore be trusted to behave similarly (Coleman, 1990). Moreover, communication tends to be

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more intensive among strong ties, which makes members more aware of each others considerations and commitment. Lastly, strong tie networks do not only encourage compliance with social norms and rules, but their strong informal control mechanisms also reduce the need for formal monitoring and sanctioning mechanisms (Buskens, 2002).

All of this means that members with strong ties more often want to cooperate and be given the chance to help each other. Thus, having strong ties within the mutual can be expected to increase levels of commitment and trust. Indeed, strong ties are often found to be associated with higher levels of trust, commitment and cooperation in social dilemma situations (Ostrom, 1990; Quentin Grafton, 2005). For mutuals, this feature is often highlighted in case studies that reveal strong solidarity networks, often based on kin relations, underlying old networks of mutuals (Fafchamps, 1992).

In understanding the association between the number of strong ties and individual factors such as commitment and trust, note should be taken of the natural limit in the number of strong ties that can be maintained. Strong ties are mutually used to seek advice, support or help in times of need, which also means that maintenance of these ties requires substantial time and effort (Vriens and van Ingen, 2018). This introduces a natural limit in the number of strong ties that can be maintained (Hill and Dunbar, 2003), implying that no individual needs strong ties to all members of the mutual to be willing to trust or commit. Hence, analogous to total degree, strong tie degree is expected to relate to commitment and trust in a marginally decreasing manner.

H3: *There is a positive, marginally decreasing relation between members' strong tie degree and their levels of (a) commitment to the mutual and (b) trust in the commitment of other group members.*

Summarizing, degree is expected to positively relate to commitment and trust, with strong ties providing an additive effect. The strength of this additive effect, however, may vary depending on the mutual's cooperation phase (Bodin and Crona, 2009). In mutuals that are established recently, there is no common history on which to base general trust in the functioning of the mutual, members might not know a lot of other members with whom they can exchange promises of commitment, and lastly, they might not be convinced yet whether the promises of those with whom they recently established a tie are actually trustworthy.

In general, uncertainty is highest in this stage, so it follows that if members were to have some strong ties (whom they know share the same norms and values), these ties probably play a large role in their decision-making process. In that regard, trust in strong tie connections can serve as a catalyst to initiate collective action (Krackhardt, 1992). In older mutuals, members know more other members, who in turn have proven their trustworthiness. Moreover, social norms on helping behavior have had the chance to develop. Finally, older mutuals have more likely experienced one or several occasions in which support was needed and indeed provided. This allows members to rely more on other aspects of social embeddedness, and therefore the relative importance attached to strong ties is likely to have wavered off. Without saying they are unimportant, it can be posited that they are less relied upon compared to the start-up phase.

The importance of strong ties to start cooperation is highlighted both in institutions for collective action (Ostrom, 1990; De Moor, 2015) and for social movements (Passy, 2002).

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Although we are not aware of any studies on this interaction in mutuals, we extrapolate the general mechanism to the current context for our final hypothesis:

H4: *The additional benefit of strong tie degree for (a) commitment and (b) trust in the commitment of others is smaller the older the mutual.*

4. Data and measurement

The hypotheses are tested using survey data collected among members of Broodfonds. We invited all 10 331 members of the 230 Broodfonds groups that were officially established before February 2017 to fill out an online self-completion survey that inquired about personal characteristics, motivations and social relations. The chairpersons of the 230 groups were asked to fill out a second survey, with questions about organizational properties. Data were collected between May 10 and June 14, 2017. In preparation, two research announcements were sent a few months and a few weeks prior to the start of the data collection. All members were invited via personalized emails containing a unique access code to the survey. After one week, we sent personalized reminder emails to those who did not participate yet. Chairpersons received a second reminder after three weeks, reminding them in particular of the survey on organizational properties.

This approach was very effective: 5192 respondents filled out the member questionnaire (50.7%). The organization questionnaire was filled out for 196 of 230 groups (85.2%). These response rates are exceptionally high. In the Netherlands, response rates for web-based surveys usually lie around 35% for cross-sectional household surveys. Without telephone or face-to-face follow-up (as for this study), the response is generally even lower (Bethlehem and Cobben, 2013).

4.1 Dependent variables

The survey contained a series of statements that together measure the constructs commitment and trust. An overview of the precise statements and, if applicable, the surveys from which they were obtained is included in the Supplementary Material.

To measure commitment, first, we included seven items that covered both affective and normative aspects (i.e. both emotional attachment and perceived obligation toward the organization; Meyer *et al.*, 1993).[3] Example items are 'I tell others proudly that I am part of this broodfonds' (affective, Van Der Lippe *et al.*, 2016) and 'Even if it were to my advantage, I do not feel that it would be right to leave Broodfonds right now' (normative, Jak and Evers, 2010).

For trust we used a total of six items that jointly capture both trust in other group members commitment and trust in their trust. Example items are 'All members of my Broodfonds

3 In organization research, continuance commitment is generally called upon as a third dimension of commitment. This dimension depends on external factors (i.e. the presence or absence of attractive alternatives) and does not measure individual efforts of making the organization successful. Because small mutuals require active involvement of their members (in terms of deciding on organizational structures, organizing and attending meetings, and helping each other) and generally arise when no (or few) alternatives are available, affective and normative commitments are most useful as proxies for success.

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are basically honest' (Yamagishi and Yamagishi, 1994) and 'All members of my Broodfonds are trustful of each other'. Responses to all questions were measured on a 7-point scale ranging from −3 'completely disagree' to 3 'completely agree'. The items were measured so that higher scores reflect stronger commitment and trust.

Because the items form an adapted selection of their original scales, we used Exploratory Factor Analysis (EFA) to test their validity and Cronbach's alpha analysis to test reliability. All items were combined in a single EFA with Promax rotation. The EFA extracted two factors (based on the number of eigenvalues > 1 and the leveling off of the scree plot); one factor for all trust items and one for all commitment items (detailed results are reported in the Supplementary Material). All items had factor loadings above 0.32, implying that at least 10% of their variance is captured by the factor, and none of the items had cross-loadings above 0.32 to other factors. The Cronbach's alpha reliability scores were also very high ($\alpha = 0.824$ and $\alpha = 0.936$ for commitment and trust, respectively), so we ran one-dimensional factor analyses for each construct and saved the factor scores as variables.

4.2 Network variables

To measure the different network structures, we rely on the respondents' cognitive perceptions. Cognitive rather than actual network structures were used, for while this perception may be wrong, it is the mindset on which respondents base their ideas on social embeddedness and thus what influenced their commitment and trust levels (Krackhardt, 1987). The respondents could choose from the following descriptions: (1) 'In our Broodfonds most people know each other well' (dense network); (2) 'Our Broodfonds has some groups of members who know each other well, while members of these different groups don't really know each other' (clustered network); 'In our Broodfonds a small group of members knows most other members well, while the other members only know this small group but not each other' (star network); and (4) 'Our Broodfonds consists of a bunch of individuals who don't really know each other' (sparse network).

For each Broodfonds group, we created four group-level variables storing the percentage of respondents that chose this network structure. The larger the percentage for one network structure, the more reliably we can interpret this as resembling the actual network structure. Conversely, measurement error (indicated by high variety in individual responses) is captured by the low percentages for all network structures, and thus lower weight of this predictor variable in the analysis. In general, agreement levels were reasonable, with on average 54% of respondents within each mutual group choosing the same structure (SD = 14%, range [31%; 100%]), compared to a low 4% for the least applicable structure (SD = 4%, range [0%; 19%]).

In addition to perceptions of the overall structure, respondents reported their own degree within the mutual group. For total degree, we followed DiPrete *et al.* (2011, p. 1242) and considered two members to be minimally tied when they would stop to talk at least for a moment when they run into each other. Hence, we asked 'With how many members would you have a chat when you would run into them on the street?'. Strong tie degree was measured by asking 'With how many members of your Broodfonds do you discuss personal matters?'. This question is adapted from the well-known name generator question 'If you look back on the past six months, with whom did you discuss important matters?'. This question is thought to measure the respondent's core discussion network: the network of (the most

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important) strong ties in a person's life (Marsden, 1987). Both degree variables are operationalized relative to the potential number of ties (i.e. groupsize– 1).

The various network measures, although related, tap into distinct aspects of individual and group-level social embeddedness. Correlations between the measures are modest. The highest correlation is between strong tie degree and total degree ($\rho = 0.30$), which makes sense given that strong ties are part of total degree. Remaining correlations lie between $\rho < 0.01$ for the clustered network with total degree and $\rho = 0.13$ between the dense network and strong tie degree (disregarding the meaningless correlations between the structure dummies; see Supplementary Material for a correlation table of all variables).

4.3 Control variables

On the level of the mutual, we controlled for the mutual's group size and the number of years the mutual exists (with 0 years for mutuals that started in 2017, the year of data collection). Because one mutual started 11 years prior to the data collection while all other mutuals started between 0 and 6 years earlier, we recoded this variable so that 6 represents 6 years or more. Variables pertaining to membership characteristics measure the difference between the starting date of the mutual and how much later the respondent joined the mutual (or, for the few respondents that switched from Broodfonds group, how much earlier), whether the respondent is a member of the mutual's board, and whether the respondent received an endowment in 12 months preceding data collection.

As for basic sociodemographics, we included age, gender and risk aversion. We measured risk aversion by asking the respondent five times to choose between a safe bet or a gamble, where the next question depended on the answer to the previous question (i.e. a riskier gamble if the respondent chose the gamble in the previous question and vice versa; Falk *et al.*, 2016). This determined respondents' position on a risk 'staircase' of 32 steps, which we recoded to a proportion variable where 0 represents most risk-seeking and 1 most risk-averse.

5. Results

Descriptive statistics of all variables are displayed in Table 1. The items underlying the factor scores of commitment and trust are mean-centered. The low minimum compared to the maximum suggests that the two variables are negatively skewed with the mean (rescaled to 0) above average on the original measurement scale. In other words, for the majority of respondents average commitment and trust levels are high.

With respect to the indicators of network structure, we see that close to half of the respondents consider the network within their mutual to be clustered. A quarter of the respondents perceive a star-shaped network (most likely with the board members in central positions), while a minority considers the network as dense (13%) or sparse (16%). The average respondent has a relative total degree of approximately 43% and has strong ties to approximately 7% of the other members within the mutual. Both variables seem to be strongly positively skewed, which already suggests that a marginally decreasing function might better fit the data.

5.1 Model fitting

We estimated Multilevel Structural Equation Models (ML SEMs) to estimate the effects on commitment and trust while controlling for their interdependencies. To identify the model, this recursive relationship was modeled not as a covariance, but as reflexive direct effects

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Table 1. Descriptive statistics ($N = 4294$)

Variable	Mean	SD	Min	Max
Commitment	0.01	0.92	−3.89	1.54
Trust	0.02	0.96	−4.54	1.38
Total degree	0.43	0.35	0	1
Strong tie degree	0.08	0.11	0	1
Yrs Existence − Yrs Member	0.64	1.06	−5	5
Insurance use	0.05		0	1
Board member	0.11		0	1
Female	0.47		0	1
Age	49.28	8.64	21	74
Risk	0.37	0.23	0	1
Dense network	0.13	0.14	0	1
Clustered network	0.46	0.18	0	0.95
Star network	0.25	0.13	0	0.67
Sparse network	0.16	0.16	0	0.80
Yrs Existence	2.69	1.32	0	6
Group size	46.13	5.64	21	53

that were constrained to be equal. We took a stepwise approach and estimated first a model including all direct effects (Model 1) before including the interaction between strong tie degree and years since the mutual started (Model 2). Moreover, each model was estimated using relative and log-transformed variables for the two degree types. All models were fitted using Maximum Likelihood estimation.

First, we tested whether the relationship between degree and our dependent variables indeed follows a marginally decreasing function. For that, we evaluate both overall model fit (Table 2) and differences in the strength of standardized coefficients (Figure 2). Overall model fit was evaluated by comparing the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC), as these allow for comparisons between non-nested models. For both models, the AIC and BIC statistics are lower when the degree variables were log-transformed, with differences far exceeding the threshold of 10 (Burnham and Anderson, 2003). Moreover, we see larger standardized coefficients after log-transformation, particularly for strong tie degree. All in all, this supports the hypotheses that the utilities of increasing total and strong tie degree are marginally decreasing.

We therefore proceed to interpret the results of the SEM models with log-transformations of the degree variables (Table 3) and report the alternative analyses in the Supplementary Material. In general, we find that most variation in both commitment and trust is on the individual level, rather than across mutual groups. Intraclass correlations were only $\rho = 0.03$ and $\rho = 0.06$ in the empty model. Moreover, for commitment the predictors do a poor job explaining the limited group-level variance there is: while they explain 31% of the variance on the individual level, they only explain 6% of the mutual-level variance. Interestingly, for trust the results are the reverse: the predictors explain 55% of the variance on the mutual level and 23% on the individual level. This signals that commitment seems to be more of an individual consideration that can vary among members of the same

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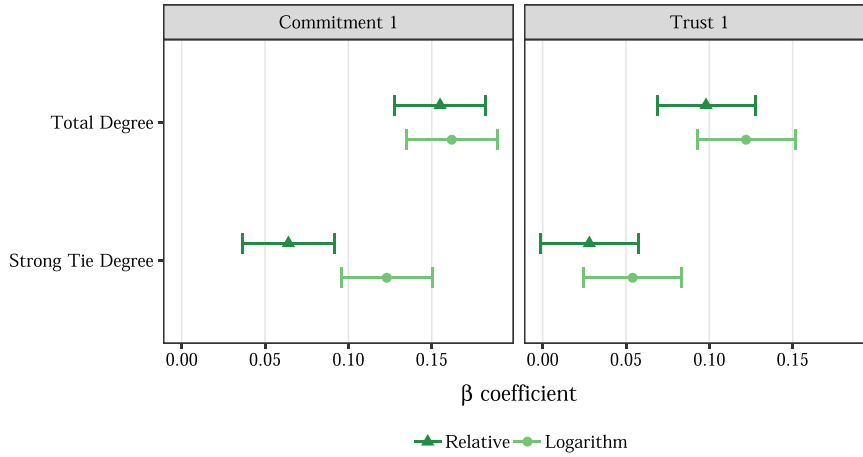

Figure 2. Standardized regression coefficients of direct effects ML SEM models for relative and log-transformed degree variables.

Table 2. Comparison of fit statistics for absolute and log-transformed degree models ($N = 4294$)

Fit indices	SEM Model 1		SEM Model 2	
	Absolute	Log-transformed	Absolute	Log-transformed
AIC	21 102.19	20955.09	21 100.37	20 948.79
BIC	21 312.23	21 165.13	21 323.15	21 171.56

group, while trust depends more on group-level interdependencies and requires that other members and the group as a whole are taken into account.

5.2 Hypotheses tests

More differences between commitment and trust appear in relation to the network structure variables. No matter what reference category, there are no associations between any of the network structures and commitment. Network structures only play a role in relation to trust, with all structures outperforming the sparse network and the dense network outperforming the clustered ($b = -0.28$) and sparse ($b = -0.77$) network, but not the star-shaped network. While a lack of difference between dense and star-shaped networks in relation to trust might suggest that connectedness trumps cohesion in advancing trust, we find no significant difference between star-shaped and clustered networks. The data are thus inconclusive with regards to these mechanisms, but we do have partial support for Hypothesis 1 (i.e. only with respect to trust).

Moving to individual embeddedness, a logarithmic increase in total degree coincides with increases in both commitment and trust. This supports Hypothesis 2. For the relation to strong tie degree, we estimated both the direct effect (Models 1) and its interaction with

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Table 3. Results of multilevel SEM models for commitment and trust (unstandardized coefficients, $N = 4294$)

	Model 1		Model 2	
	Commitment	Trust	Commitment	Trust
Level 1				
Commitment		0.26*** (0.01)		0.26*** (0.01)
Trust	0.26*** (0.01)		0.26*** (0.01)	
Total Degree	0.33*** (0.03)	0.25*** (0.03)	0.33*** (0.03)	0.25*** (0.03)
Strong Tie Degree	0.26*** (0.03)	0.12*** (0.03)	0.26*** (0.03)	0.11** (0.03)
Strong Deg * Yrs Mutual			0.04* (0.02)	–0.06* (0.02)
Yrs Mutual – Yrs Member	–0.02 (0.01)	–0.04**(0.01)	–0.02 (0.01)	–0.04**(0.01)
Insurance use	0.22*** (0.05)	0.12* (0.06)	0.22*** (0.05)	0.12* (0.06)
Board member	0.20*** (0.04)	0.02 (0.04)	0.20*** (0.04)	0.02 (0.04)
Female	0.09*** (0.02)	0.01 (0.03)	0.09*** (0.02)	0.01 (0.03)
Age	0.02*** (0.00)	0.00** (0.00)	0.02*** (0.00)	0.00** (0.00)
Risk	–0.17**(0.05)	0.10 (0.06)	–0.17** (0.05)	0.10 (0.06)
Level 2				
Dense network	0.14 (0.12)	0.77*** (0.14)	0.15 (0.12)	0.75*** (0.14)
Clustered network	–0.03 (0.11)	0.49*** (0.12)	–0.02 (0.11)	0.47*** (0.12)
Star network	0.08 (0.14)	0.49** (0.17)	0.10 (0.14)	0.46** (0.17)
Years Mutual	–0.01 (0.01)	0.05** (0.02)	–0.01 (0.01)	0.05** (0.02)
Group size	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Variance estimates				
Level 1				
σ	0.59***	0.67***	0.58***	0.67***
R^2	0.31	0.23	0.31	0.23
Level 2				
σ	0.01	0.02**	0.01	0.02***
R^2	0.10	0.55	0.12	0.55
Model fit				
AIC	20 955.09		20 948.79	
BIC	21 165.13		21 171.56	
LR χ^2 (1)	4.48		4.53	
RMSEA	0.03		0.03	
CFI	0.99		0.99	

the mutual's age (Models 2). Interestingly, the results in relation to trust are in line with our hypotheses, while the results for commitment show the reverse. A higher strong tie degree is associated both with higher commitment and higher trust (supporting Hypothesis 3), but in older groups the effect only becomes smaller in relation to trust. For commitment, the association with strong tie degree is actually stronger in older groups, signaling partial support for Hypothesis 4. It should be noted, though, that in comparison to Model 1 the R^2 does not change, the AIC only improves little and the BIC (which penalizes model complexity) decreases a little (although neither differences exceed the threshold of 10). This suggests that the substantial meaning of this effect might be modest and that significance may also be a result of the large sample size.

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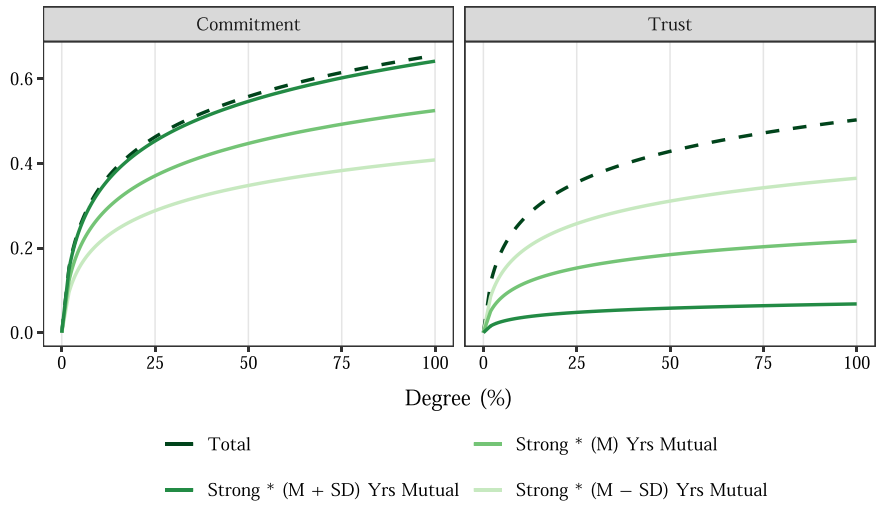

Figure 3. Marginal utility of increasing both degree types.

To better understand the log-effects of the two degree types, we plotted the relation over their untransformed scale (Figure 3). The effects of strong tie degree are plotted for members of mutuals of average age (2.7 years) and members of mutuals 1 SD above (4.1 years) and below average (1.3 years). As can be seen from Figure 2, the increase in commitment is strong for a relative total degree up to approximately 12% and strong tie degree adds substantially to the effect of total degree. Moreover, in older groups, it is clearly more beneficial to invest in additional strong ties. In relation to trust, all effects are smaller, and they waver off faster. The effect of total degree is largest, but the figure also signals that especially in younger groups, trust levels can substantially increase if members also have a few strong ties. For older groups, however, it is more beneficial to increase total degree than to invest in strong ties, as the nearly horizontal line suggests that strong ties hardly add to the effect of total degree.

6. Conclusion

New mutuals, seeking to organize a more social, fair and transparent insurance, are gradually emerging in several countries as an alternative within the existing insurance system. They consist of small risk-sharing groups in which members pool money to pay the costs for the insurance of others. While institutional arrangements can to some extent regulate individual behavior within these mutuals, we argue that network embeddedness is crucial for high levels of commitment and trust, two important factors underlying the willingness to participate. In substantiating this claim, we considered not only group-level embeddedness (here: in terms of perceived network structures), but individual embeddedness as well (operationalized through total and strong tie degree), thereby introducing within-group differences in embeddedness. Methodologically, we collected a unique multilevel dataset that comprises information about 5192 members of 230 comparable small Dutch mutuals (called Broodfonds), which enabled us to compare many individuals and how they operate within large, natural networks.

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We showed that both group- and individual-level network embeddedness play a vital role, albeit in different ways. The only commonalities between commitment and trust are that larger total degree and larger strong tie degree are positively related to both, although, as expected, the utility of extra (strong) ties marginally decreases with each new tie. Other than that, commitment and trust seem to be affected by different dimensions of embeddedness—a finding we did not hypothesize on *a priori*. It seems that group-level embeddedness matters only for trust levels. That is, our results indicate that all network structures with some type of interconnectedness (i.e. dense, clustered and star-shaped networks) outperform sparse networks when it comes to individual trust levels, with dense networks seemingly most favorable (outperforming clustered networks). Commitment, on the other hand, seems to be more of an individual trait, as it does not depend on group-level network structures but only relates to individual embeddedness.

The strong relationship between trust and group-level embeddedness signals the importance of group-level agreements, for example through the establishment of social norms, that all members want to participate, share risks and pay the costs to support each other. Members can exchange such promises with their own ties (which are also positively related to trust), but in the end they need to trust the whole group to commit to this agreement. This is signaled, for instance, by the finding that dense networks come with higher trust levels than clustered networks: in clustered networks, trust may be achieved within subgroups, yet this provides no guarantees for the commitment of members beyond these clusters.

Finally, commitment and trust again contrast in how the added benefit of strong ties changes over time. We hypothesized that strong ties would especially add to total degree in young groups, and indeed found this to be the case in relation to trust. This can be understood in line with the previous conclusion, namely because of the limited availability of shared helping norms in early cooperation stages. Group-level cohesion and social norms require time to develop, so in the early stages, when network structures are likely not as dense, members have to look for other indicators that others intent to commit. This makes them rely more on their strong ties: people they know well and trust. Over time, as mutuals become more dense and social norms arise, this reliance on strong ties wavers off.

However, for commitment we found the reverse: it is especially in older groups that having more strong ties advances commitment. While we did not foresee this, a possible explanation of this finding may be that commitment, given that it implies a willingness to pay the costs for the support of others, may mostly be directed at specific others. People are more willing to support others if they know these people personally, and particularly if they established stronger relations with them. This might reflect that commitment also involves solidarity motives (see also, for instance, Baldassarri, 2015): committed individuals not only help others because they believe others will reciprocate in the future, but also because they want to help them—especially those to whom they have developed stronger ties. Such solidarity motives might grow with experience, and when they target particularly one's strong ties, these also influence commitment more.

Before stipulating on the wider implications of these findings, some limitations of the study design should be taken into account. First, although commitment and trust are widely acknowledged as determinants of (future) cooperative behavior, they remain correlates. Several internal and external factors might cause (sudden or unexpected) changes in behavior. Moreover, members might be highly committed and actively involved while not behaving honestly (e.g. pretend illness to reap the benefits). Although the study proved insightful

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in terms of the mechanisms underlying commitment and trust, further implications regarding mutuals' overall success remain speculative.

Second, our dimensions of network embeddedness were solely based on self-reports. With complete network data, we would maybe understand better why certain networks impact trust and commitment differently. In our study, for instance, we do not know which of the other members are trusted (more), meaning that our trust indicator could also be an average of very high within cluster trust levels and low to non-existing between cluster trust levels. With more detailed network data, we could explore whether trust can transcend lower-level clusters or whether high trust within strong tie clusters inhibits trust in others outside of these clusters (Flache and Macy, 1996). Complete network data, combined with intra-organizational multilevel network analyses (Lazega and Snijders, 2016), are needed to disentangle the various intertwining and confounding mechanisms.

Third, the dataset used in this study, although rich, detailed and innovative in many ways, poses some limits to the generalizability of the results. Most importantly, the member base of the mutuals studied consists entirely of self-employed people. Doubts may arise on whether the intentions and behavior of this subgroup can be translated one-on-one to other (sub)populations, given that self-employed are generally considered to be more entrepreneurial, less risk-averse, and used to self-organization. However, although the last element goes undisputed, empirical evidence for the first two claims is often lacking (Holm *et al.*, 2013; Koudstaal *et al.*, 2015).

Therefore, if we keep these potential issues in mind, it still goes without doubt that this study adds important insights to existing literature on network embeddedness and mutuals (or institutions for collective action in general). For one, it sheds light on an up and coming phenomenon of new mutualism that seeks to fill the cracks that emerged in state and market dominated insurance systems. Moreover, in investigating participation, it shows the importance of distinguishing between group- and individual-level network effects as well as different cooperation phases. Where group-level embeddedness is most important in relation to trust, for willingness to commit individual connections seem to be most important.

With an eye toward the future, this implies that if the new mutuals want to follow their vision of a fair and social insurance, they have to actively create opportunities for communication and social exchange. In case any (internal or external) crises that threaten the survival of the mutual groups do occur, groups high in social embeddedness are more likely to overcome them. Practically, this means that the new mutuals should, for instance, regularly organize meetings with all members, as such meetings enable the development of group norms (thereby promoting trust) and provide opportunities to form new ties to other group members (fostering commitment).

Future research could build on these insights by replicating and further investigating these different effects for different levels of network embeddedness, either in comparative case studies or in controlled environments. Ideally, the study population would be followed over time. Since relations and networks are endogenously formed, it would then be possible to see how the formation of ties, rather than their existence, influences trust and commitment. Alternatively, other types of centrality or actual network structures could be explored. Finally, it would be interesting to disentangle trust in specific group members from trust in sub-clusters and the institution in general, preferably even separate for different levels of governance. Answers to each of these questions would further increase insight into the relations between individual and social factors, and especially their interaction with the wider context in which they take place.

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Supplementary material

Supplementary material is available at *Socio-Economic Review* online.

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