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May 24, 2020

Abstract

We analyze cooperation within a company setting in order to study the relationship between cooperative attitudes and financial as well as non-financial rewards. In total, 910 employees of a large software company participate in an incentivized online experiment. We observe high levels of cooperation and the typical conditional contribution patterns in a modified public goods game. When linking experiment and company record data, we observe that cooperative attitudes of employees do not pay off in terms of financial rewards within the company. Rather, cooperative employees receive non-financial benefits such as recognition or friendship as the main reward medium. In contrast to most studies in the experimental laboratory, sustained levels of cooperation in our company setting relate to non-financial values of cooperation rather than solely to financial incentives.

Keywords: cooperation, social dilemma, field experiment, company.

JEL-Classifications: C93, D23, H41, J31, J32, M52.

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1 Introduction

Within organizations most processes and production steps entail voluntary cooperation among employees to realize optimal output. This is particularly true for teamwork, but also for other daily interactions like helping or knowledge sharing (see Gittell, 2000; Fehr, 2018), where cooperation requires solving a social dilemma: those involved are better off if everybody provided high levels of effort or lots of time, but due to the individual incentive to contribute the enforceable minimum, the joint product is provided on a suboptimal scale, or not at all.

Social dilemmas have been studied extensively in the experimental laboratory (for reviews see Ledyard, 1995; Chaudhuri, 2011; Fehr and Schurtenberger, 2018) as well as in the context of governing the commons in the field (e.g., Ostrom, 1990; Rustagi et al., 2010; Fehr and Leibbrandt, 2011; Gneezy et al., 2016). Interestingly, there is much less empirical evidence on cooperation within organizations, and, in particular, companies.[1] They often have to solve a general tradeoff between creating a cooperative culture in order to provide internal public goods on an efficient level and securing a competitive environment in order to induce innovation and to be able to select the best employees for promotion. Striking the balance, given the tension between cooperation and competition, is probably one of the most difficult management tasks (Fehr and Fischbacher, 2002).

A key aspect of cooperation within organizations is that employees and teams often interact repeatedly. While reputation concerns and informal peer sanctioning can reduce the free-rider problem, they are often unable to solve social dilemmas fully (e.g., Fischbacher and Gächter, 2010).[2] Thus, even in repeated interaction and with peer sanctioning mechanisms in place, it is essential for companies to establish a cooperative culture in order to sustain high levels of cooperation over time, avoiding the often observed decay in cooperation.

In this paper, we exploit a unique setting for studying how financial and non-financial reward instruments within organizations relate to the cooperative culture among employees. Understanding this relationship entails relevant implications for many organizations. Our analysis is based on incentivized online experiments with 910 employees of a large software company.[3] We link data on the level of the employee from these experiments

[1] Notable exceptions are Charness and Villeval (2009) and Burks et al. (2009).

[2] Among other reasons, decreasing cooperation levels in repeated interaction result from contractual incompleteness of cooperative behavior (e.g., Holmstrom, 1982; Itoh, 1991), the existence of imperfectly conditional cooperators (see Fischbacher and Gächter, 2010; Ambrus and Pathak, 2011) or imperfect sanctioning mechanisms (Kandel and Lazear, 1992; Fehr and Rockenbach, 2003; Houser et al., 2008; Nikiforakis, 2008).

[3] Following the typology of Harrison and List (2004) our experiments can be referred to as an "artefac-

that measure cooperative attitudes in variants of the public goods game (see Fischbacher et al., 2001; Fischbacher and Gächter, 2010) with reward and context variables from company records.

Our setup allows for three main contributions. Firstly, we can systematically provide evidence on the association between cooperative attitudes and financial rewards within the company, while being able to control for determinants of cooperation whose relevance is suggested by economic theory. Secondly, we can assess potential non-financial reasons for cooperation in a natural environment that have so far almost exclusively been studied in the experimental laboratory. Thirdly, our study fulfills a methodological purpose by assessing the external validity for a business context of one of the most frequently applied laboratory measures of cooperation.[4]

With respect to our first contribution, we find that cooperativeness of employees does not lead to higher individual financial rewards. In stark contrast, our estimates show that within our study period from 2016 to 2018, cooperative employees received on average 29% lower annual wage increases and 15% lower financial award payments than their more selfish colleagues. Being cooperative is not rewarded in terms of remuneration.

Regarding our second contribution, we observe that a large fraction of employees exhibits comparatively high levels of cooperation, despite the financial disincentives and the existence of selfish employees. Hence, in contrast to laboratory experiments, in which opportunistic cooperation is usually observed by selfish players in repeated cooperation that leads to a quick decay of contributions over time, we observe a potentially stable pattern of cooperation in the company. Consequently, behavior in the field experiment and observational data form the company together suggest that there must be substantial non-financial rewards of cooperation for the cooperators. Otherwise, cooperation should break down over time. While our online experiment features a one-shot interaction and thus cannot observe contribution dynamics, the high share of perfect conditional cooperators and the substantial number of unconditional cooperators provide the basis for stable cooperation.

We find supportive evidence for this interpretation when linking experimental data with record data from a non-financial recognition tool that employees can access via the company's intranet. Cooperative employees receive 51% more recognition awards from their colleagues. In a similar vein, we find that cooperative employees and teams

tual field experiment". Alternatively, one could call it a "lab-in-the-field experiment" (Gneezy and Imas, 2017).

[4]There is an active methodological discussion about the generalizability/external validity of standard laboratory measures (see Levitt and List, 2007; Falk and Heckman, 2009; Burks et al., 2016; Gneezy and Imas, 2017).

comprised of a larger share of cooperative employees report stronger team cohesion and higher work satisfaction in our post-experimental survey, which is again a sign for non-financial reward components of a cooperative environment.

Regarding our third contribution, we document that cooperative employees send more than twice as many recognition awards than selfish employees. This correlation corroborates the external validity of cooperative attitudes measured in our experiments as sending an award requires some individual cost to write a justification and induces a positive externality on a co-worker.

Overall, our data is indicative of the idea that the company positively affects levels of cooperation through supplying non-financial compensating differentials to cooperative employees.[5] This is our preferred interpretation of the data, because it provides a joint mechanism for (i) high levels of cooperation, (ii) a negative nexus between financial rewards and cooperativeness, and (iii) a positive nexus between non-financial rewards and cooperativeness. We also investigate three other mechanisms that are likely to be present in our setting, but that are unlikely to be the sole driver of our three findings: an omitted variable bias related to performance or skills that are specific to cooperative attitudes (Bowles et al., 2001; Barr et al., 2009; Leibbrandt, 2012), selection based on cooperative attitudes (Falk and Heckman, 2009; Dohmen and Falk, 2011), and context-dependent preferences (Bowles, 1998; Levitt and List, 2007; Cohn et al., 2014).

The remainder of this paper is structured as follows. We first relate our study to the literature on artefactual field experiments to study cooperation in the field. In Section 3, we outline the company setting at hand. In Section 4, we describe our experimental setup and the data for our analysis. Then, we report the correlation between cooperative attitudes and relevant outcome variables from the company context in Section 5. Section 6 discusses the main findings and potential underlying mechanisms. Section 7 concludes the paper.

2 Related Literature

It is impossible to do justice to the large experimental literature on cooperation, even if one restricts attention to (artefactual) field experiments and lab experiments predicting prosocial behavior outside the laboratory (for a survey see Galizzi and Navarro-Martínez, 2019). Examples for field experiments on cooperation are List and Lucking-Reiley (2002),

[5] This interpretation is in line with a strand of literature that emphasizes an intrinsic value of cooperation beyond its financial consequences (Hamilton et al., 2003; Bandiera et al., 2005, 2011, 2013; Ruff and Fehr, 2014).

Cardenas (2003), Frey and Meier (2004), Alpizar et al. (2008), Benz and Meier (2008), Burks et al. (2009), Carpenter and Seki (2011), Croson and Shang (2008), Charness and Villeval (2009), Rustagi et al. (2010), Fehr and Leibbrandt (2011), Voors et al. (2011, 2012), Stoop et al. (2012), or Gneezy et al. (2014, 2016). People have studied charitable giving, fishermen, truck drivers, visitors of national parks and many more. However, there is very little evidence on company settings.

Regarding our main research interest, the financial and non-financial rewards of cooperative attitudes of employees in a company there is particularly scarce existing empirical evidence from the field. This is despite an abundance of case studies and anecdotical evidence on firms that must balance cooperative and competitive elements in their incentive schemes or that must foster cooperation within teams to be successful (e.g., Dirks, 1999; Dirks and Ferrin, 2001; Gratton, 2009, 2011; Grant, 2013). Beersma et al. (2003) discuss the relevant management literature and provide a study on the cooperation/competition tradeoff, including personality differences and task characteristics.

In the following, we provide an upshot of the existing literature on our three main contributions. Our first contribution is on the association between cooperative attitudes and financial rewards within the company. Burks et al. (2009) use a naturally occurring social dilemma among bicycle messengers in Switzerland and the United States. Their focus is on the selection of messengers into companies based on incentive schemes. Workers in companies that pay for performance show less cooperation than workers in companies that pay fixed hourly wages or that are members of cooperatives.

There is more closely related literature in other than a standard workplace domain (or using other paradigms than the standard public goods game) that can still inform our setup. Leibbrandt (2012) compares behavior of professional shrimp sellers in a laboratory public goods game with natural market outcomes. He finds a positive relationship between cooperativeness and market success as measured by achieving higher prices for shrimps and establishing longer lasting trade relations. He argues that the detected correlation is driven by cooperative employees being able to signal trustworthiness. Similarly, Essl et al. (2018) study the trustworthiness of sales employees of an Austrian retail chain using a modified trust game and relate behavior in the game to individual sales performance data. The authors find that higher trustworthiness is associated with lower sales per day, but with higher revenue per customer. Cardenas and Carpenter (2005) look at experimental measures of cooperation and link them to household expenditures in Vietnam and Thailand, showing that more cooperative individuals are better off. Likewise, Barr and Serneels (2009) provide evidence that experimentally elicited trustworthiness is positively related to wages of manufacturing workers in Ghana.

Regarding the relationship between cooperative attitudes and non-financial rewards – our second contribution – there again exists limited evidence. Ruff and Fehr (2014) summarize evidence from laboratory FMRI studies that indicate "[...] an experienced value of cooperation per se that might bias individuals to display cooperative behavior" (p. 557). In the field, Hamilton et al. (2003) show that workers at a garment plant voluntarily select into a team-based work organization despite financial losses as compared to performing sewing tasks individually. They argue that such selection behavior is likely driven by non-financial reasons such as hedonic benefits from team work. In a similar vein, Bandiera et al. (2005, 2011, 2013) find that UK fruit pickers increase efforts or forgo financial benefits due to social ties to co-workers.

Our third contribution relates to the external validity of experimentally elicited cooperative attitudes. While we know quite a lot on the external validity of different measures on uncertainty preferences (risk and ambiguity) and time preferences, we know much less on the external validity of standard measures of cooperative attitudes. Existing studies that provide evidence of the external validity of the standard linear public goods game, i.e., the voluntary contribution mechanism (VCM), are mainly linked to the problem of the commons. Rustagi et al. (2010) elicit cooperative attitudes of members of 49 forest user groups in Ethiopia in an artefactual field experiment setting. They link cooperative attitudes to natural forest commons outcomes and find that groups that are comprised of a larger number of conditional cooperators are doing a better job in managing the forest commons. In a similar vein, Gneezy et al. (2016) study Brazilian fishermen who are organized differently in different places regarding the need for team work. Fishermen at the sea who are forced to work in teams cooperate and trust more than their counterparts at lakes who mostly work individually (see also, for instance, Carpenter and Seki, 2011; Fehr and Leibbrandt, 2011; Stoop et al., 2012; Voors et al., 2011, 2012).

Evidence for contexts, apart from common pool management, is provided by Burks et al. (2016) who conduct prisoner's dilemma experiments with truck drivers. More cooperative truck drivers are found to send satellite uplink messages from their trucks more frequently (messages are costly but benefit an anonymous colleague). Englmaier and Gebhardt (2016) perform a lab-field comparison by inviting student participants to a laboratory public goods game and to a natural work setting (registering books in a library database) in which incentives condition on team outcomes. From the positive correlation of behavior in the laboratory and in the natural work task, the authors conclude that the laboratory public goods game captures important aspects of structurally equivalent

situations outside the laboratory.[6]

Our study adds the novel elements of a work team and company setting and the link of financial as well as non-financial outcome data with behavioral data from incentivized experiments to the existing literature in economics and management.

3 The Company Setting

We conduct our study in partnership with a large, multinational software company. About 40% of the employees work as software developers, 40% work in the sales and consulting area, and the remaining 20% work in more general service areas like Human Resources, Accounting & Finance or Marketing. Several institutional features are important to understand how the company and its reward systems operate.

Business Models. Most individual and teamwork tasks in the company are mainly taking place in either a customer business model or cloud business model. The customer model uses servers that are on the premise of the client and that are serviced by company employees, whereas the cloud business model uses internet cloud solutions that concurrently apply to many clients. According to our discussions with managers of the company before conducting the study, the latter model requires more cooperation among workers at the software producer than the former; in other words, it entails a production function with much more pronounced complementarities (for instance, between software development and consulting).[7] Interestingly, due to the cloud model connecting several software products on an interface, sales employees also have sales bags that are comprised of items that, if sold, positively affect the performance of their sales team, i.e. other team members.

Pay Schemes. Employees are enrolled in one of two co-existing pay schemes: either the company performance or the individual performance pay scheme. Both schemes involve a fixed component and a variable pay component. They differ in how the variable pay component is determined. In the company performance pay scheme, employees receive

[6] As in our study, Charness and Villeval (2009) deploy a linear public goods game in actual companies, but they focus on the difference in behavior of junior and senior employees. The main finding is that senior employees are more cooperative than junior employees. Von Bieberstein et al. (2020) analyze student performance in math exams and partner work assignments at university using public goods game measures, however, they find no correlation (but free-riders are performing better in the exam).

[7] For validation, we ask all participants how important cooperation is to successfully fulfill their individual and teamwork tasks on a standard Likert scale in an online survey. We detect a strong correlation between the business models and responses to the survey question (Spearman correlation: -0.214, $p < 0.001$). While 42% of employees state that teamwork is of high importance in the cloud business model only 24% do so in the customer business model (t-test, $p < 0.001$).

bonus payments that are determined by the overall company performance. Under the individual performance pay, bonuses depend on individual performance assessments. Enrollment in either of these schemes is tied to job roles such that selection is only possible via job choice. While all developers and employees in the service areas work under the company performance pay, most sales employees work under individual performance pay. Consultants are equally likely working in either of the schemes depending on whether they are in-house or outgoing consultants.

Wages. The employees' target wage consists of a base wage and the bonus conditional on full target achievement (either company or individual target). This means that the target wage does not necessarily correspond to the actual wage payed. However, analyses by the company show that the target wage is a good proxy for actual wages, hence, we refer to them as wages.[8] Cross-sectional variation in wages is mainly due to jobs at different career levels or in different functions. Variations in the wage levels over time reflect job trajectories. For example, this includes promotions or other internal job changes that relate to a different pay mix. In addition, managers have a budget for merit increases paid to their employees to be decided upon on a yearly basis.

Financial Awards. Another important reward instrument of managers is the conferral of financial awards. At the end of a year, every manager can allocate financial awards that consist of shares of the company among employees in his/her team. An award conferred in a particular year is paid out in three tranches in the subsequent years. The budget is fixed for each year for the whole company and on team levels. The award guidelines handed out to the managers specify the idea of a financial award as recognizing employees that are important for the success of the company and as an instrument for employee retention. The guidelines apply to all departments, job positions and both pay schemes.

Recognition Awards. Furthermore, there exists a non-financial recognition system that every employee can easily access via the company's intranet. The program is an institutionalized way to thank a colleague for several desired behaviors including, for example, cooperation, promise keeping, or embracing diversity. If an employee receives an award, he/she is notified via e-mail. The e-mail prominently shows a slogan such as "Thank you for being cooperative!" (or the relevant other award justification). It also contains a message from the sending employee and his/her name. The receiving employee's manager can see every award and the total number of awards received for each team member. The

[8] In the company performance scheme, there was full target achievement over the relevant years; hence, target wages equal the wages payed. In the individual performance pay, target wage is a noisier measure of the actual wage payed. While on average there are very high target achievement rates (on average, above 100%), there is a higher standard deviation.

role of the manager is also to prevent employees from sending awards back and forth. There are no direct financial consequences related to a recognition award, neither for the sending nor for the receiving employee. However, sending an award requires some effort as it must be justified in a text of at least 150 characters.

4 Experimental Setup and Data

Our analyses are based on data from three different sources. First, we collect data from an incentivized online experiment. Second, in a subsequent survey module, we elicit a variety of control variables such as socio-demographic characteristics or behavioral measures that relate to cooperation. The gathered data is then merged with reward and context variables from the company records on the individual level. An overview of all collected variables can be found in Appendix A.

4.1 Behavioral Measure of Cooperative Attitudes

The first part is a public goods experiment according to the "ABC-framework of cooperation" (Gächter et al., 2017).[9] It uses the design of Fischbacher et al. (2001), including the elicitation of beliefs. In a VCM setting, we elicit an unconditional contribution to a public good, a full contribution schedule contingent on average contributions of other group members, and subjects' beliefs about others' average unconditional contributions.

Participants are randomly assigned to groups of three. Every participant knows that all other participants are randomly selected employees of the company. Each group member receives an initial endowment of 10 Tokens to be allocated to a private account or to be contributed to a public account. One Token equals €1. The invested amount $c_i \in \{0, 1, ..., 10\}$ is referred to as the unconditional contribution. The sum of all contributions to the public good is multiplied 1.5 in our case, and divided equally among all $n = 3$ group members. This leads to the following payoff function for subject i:

$$\pi_i = 10 - c_i + \gamma \sum_{j=1}^{n} c_j \tag{1}$$

which is linear in the public good contribution and where c_i denotes the contribution of group member i. The marginal per capita return (MPCR) from investing in the public good is $1/n < \gamma = 0.5 < 1$. From an individual perspective, free-riding (i.e., $c_i = 0$) is a

[9] The instructions of the public goods game can be found in Appendix B. The full experimental material provided to employees can be found in the Online Appendix.

dominant strategy. Since the sum of marginal returns is larger than 1, however, contributing the entire endowment (i.e., $c_i = 10$) is the optimal choice from a collective perspective. The decision is made only once and anonymously. Thus, there are no incentives and no possibilities to build a reputation.

Participants do not receive any feedback after indicating an unconditional contribution. Subsequently, participants are asked to fill in a contribution table indicating their contribution for each possible average contribution of the other group members, rounded up to integers. The conditional contributions from the contribution table allow us to classify three distinct cooperative attitudes. We depart from the existing literature for expositional reasons; the interpretation of our analysis is simplified when using the three categories. Fischbacher et al. (2001) and many follow-up papers classify free riders (zero contributions, regardless of the average contributions of others), conditional cooperators (increasing contributions with increasing average contributions of others), and hump-shaped contributors (increasing contributions with increasing average contributions of others up to a certain contribution level, and above decreasing contributions with increasing average contributions of others). Since we additionally observe a significant number of perfect conditional contributors (those who match the average contributions of others perfectly) and even some unconditional full contributors (contributing the maximum amount of ten Tokens regardless of the average contribution of others), we use the following classification:

- Net-Taker: We classify an employee whose average conditional contribution is smaller than five Tokens as a Net-Taker. This means that the employee, on average, free-rides (at least partially) on the contribution of others to the public good (mainly free riders, conditional cooperators with a self-serving bias[10]).

- Net-Giver: An employee that contributes more than five Tokens is defined as a Net-Giver. The employee, on average, contributes more than the two others (mainly conditional cooperators with an other-serving bias, unconditional full contributors).

- Matcher: An employee who, on average, exactly matches the average contribution of the two other members is considered a Matcher (almost equivalent to perfect conditional cooperators).[11]

[10] These are conditional cooperators that have an increasing contribution schedule, but they, on average, contribute less than the average of other members.

[11] Our main results are robust to using different definitions of cooperative attitudes. Details are provided in the results section and in the Appendix.

To make both the unconditional and the conditional contributions incentive-compatible, we use the mechanisms described in Fischbacher et al. (2001). That is, for one randomly selected subject the conditional contributions are payoff-relevant, whereas for the two remaining subjects the unconditional contribution is to determine the average contribution of other group members. We also elicit expected contributions of others in an incentivized way. Following Gächter and Renner (2010), participants are asked to guess the average unconditional contribution of the other group members and receive €5 if they are correct, otherwise they receive €0.

4.2 Survey and Company Variables

After the incentivized parts, we elicit additional variables that are relevant for the analysis of the determinants and the context of cooperation without using monetary incentives. Importantly, we ask whether an employee's individual and teamwork tasks are mainly related to the customer or the cloud business model. In addition, we capture personality traits (a short form of the Big Five; Rammstedt et al. (2013)), and survey measures of related social preference concepts like negative/positive reciprocity (Falk et al., 2018) and trust (Anderson et al., 2004). We also elicit a measure of individual competitive attitude (i.e., the competitiveness index as introduced by Newby and Klein (2014)) and basic socio-demographic variables (such as nationality, education, and number of kids and friends). Furthermore, variables with respect to perceived team cohesion (Ashforth and Mael, 1989), team stability, and work-related stress (Schulz and Schlotz, 1999) are elicited.[12]

We combine the elicited data with a rich data set from the company. On the employee level, this includes age, gender, seniority (years employed at the company), career levels, and personal leadership responsibilities. Using a work team identifier, we can also infer information about team compositions (for example, with respect to gender and age). Regarding reward institutions, we have individual level information on the employees' pay scheme, his/her wage level, and the value of financial award payments. Observing employees' wage levels over time allows us to calculate annual wage increases. We additionally observe the numbers of recognition awards received and sent for each employee.

[12] After the main public goods game, we also use incentivized coordination games and short social dilemma vignettes to elicit the shared perception of cooperative norms that prevail in the company (compare to Burks and Krupka, 2012). This provides us with a better understanding of the "cooperative culture" in the company. For an extensive discussion of these norm elicitations and the respective empirical results refer to Deversi et al. (2020).

4.3 Procedures

We conducted the described experimental and survey modules online.[13] Eligible employees received a personalized participation link. Every respondent knew that he/she can complete the experiment within a two-weeks period. There were two roll-out phases with different employees, the first in November 2017 and the second in February 2019. Employees could participate during regular work hours. The total completion of the experiment and the survey took about 30 minutes and could be interrupted at any time.

The online experiment did not require participants to simultaneously make decisions. Participants were informed that groups were assembled randomly ex post. Since nobody received feedback during the experiment, such a procedure is equivalent to simultaneously entered decisions. Participants could use their personal ID code to login after the roll-out phase had ended to get feedback on the results. We asked participants to perform the online experiment individually. The random and anonymous allocation to groups made sure that coalition formation among group members when filling in the online experiment was impossible.[14]

Before a participant could decide about the public good contributions, he/she needed to answer comprehension questions on the game. If an answer was wrong, the participant was notified and was shown the correct answer to be re-entered in the respective input box. We set up a telephone hotline and an e-mail address for potential questions during the experiment. We received very few calls and messages.

In the first roll-out phase in 2017, we implemented an unexpected donation option at the end of the experiment as a control for social desirability concerns. In 2019, we included an additional public goods game (administered in a within-subject fashion) that varied the MPCRs (either very high, 1.2, or very low, 0.3) to check whether participants would react to changes in the social dilemma characteristics. Notice that an MPCR of 1.2 makes it individually optimal to contribute, whereas an MPCR of 0.3 makes it both individually and social optimal not to contribute.

Individual data from the company was de-identified before linking it to our elicited data. The data collection and storage were facilitated through Qualtrics. There exists a data protection agreement between the company and Qualtrics; and a research agreement

[13] Our study represents one of many studies and surveys that employees fill out at the company. The company even has its own survey team. Hence, asking employees to participate in an online study while being at their workplaces is nothing unusual, although the incentivized experimental part was of course somewhat special to most employees.

[14] It was extremely unlikely that (matched) participants would be sitting in a shared office. Analyses of the participants' start and end times suggest that there was no communication or coordination of employees of a work team (for the analysis see Appendix C).

(including data protection) between the company and the research team. Data protection units at the company, at University of Munich and University of Heidelberg supervised the study. The company did not receive individual-level data, and all participants were informed about the full pseudonymization of their responses before the experiment. The data protection at the company was only to be involved in determining the exact procedures, not in handling the linked data. We made sure that the pseudonymized final data set was only stored on the computers of the researchers involved in this project within university fire-walls.

Employees were aware of the data protection procedures and provided informed consent before participating in the study. Ethics approval by the University of Munich was granted in September 2017. The study was pre-registered at the AEA registry (AEARCTR-0002596). The respective pre-analysis plan was slightly updated and re-submitted before the second round of experiments took place in 2019.

4.4 Sample and Selection

We invited 2,799 employees from 371 work teams to participate in our study.[15] This includes 1,297 employees invited in 2017 and 1,502 employees invited in 2019. We randomly selected teams that had between 8-20 team members of which more than 70% were based in the German-speaking area.

Overall, 910 employees from 299 teams participated.[16] This corresponds to a participation rate of about 32.5%. The characteristics of the participating employees are mostly representative for the employee population at the company (conditional on the invitation requirements) as can be seen in Table 1. There does not seem to be any selection bias into the experiment based on observable characteristics. However, compared to non-participating employees, participating employees less frequently work under the individual performance pay scheme (26% versus 22%). Almost all participating employees are placed in the German-speaking area (99% versus 98% in the invited sample). We did not receive wage data for 57 participating employees. These data were either secret, from

[15] In 2019, we excluded working students and temporarily employed consultants from invitations. Also, in 2017, we slightly oversampled employees from the individual performance pay scheme to have a larger comparison group. There was limited record data availability for these employees in 2017. Working students and external employees were not eligible to participate in award programs and worked under special fixed wage contracts. Hence, we decided to exclude these groups of employees from the second round of experiments in 2019.

[16] We count an employee's response as a full response if more than 90% of the questions were answered. Herewith we exclude 414 employees that answered on average only 9.8% of the questions – which corresponds to the first screen of the public goods game instructions.

	Non-Participating Employees			Participating Employees			
	Count	Mean	SD	Count	Mean	SD	P-Value
Socio-Demographics							
Female	1889	0.30	0.46	910	0.30	0.46	0.965
Age	1889	45.09	8.95	910	44.48	9.31	0.276
Company Controls							
Seniority	1889	14.33	7.34	910	14.03	7.47	0.292
Team Size	1889	13.60	3.54	910	13.78	3.48	0.264
Leader	1889	0.09	0.29	910	0.10	0.30	0.571
Career Level							
Low	231	0.12	0.33	111	0.12	0.33	0.993
Medium	1430	0.76	0.43	683	0.75	0.43	0.762
High	228	0.12	0.33	116	0.13	0.33	0.686
Indv. Performance Pay	1772	0.26	0.44	866	0.22	0.41	0.031
German Area	1889	0.98	0.01	910	0.99	0.01	0.041
Outcome Variables							
Recognition Awards							
Reception	1892	0.29	0.89	910	0.26	0.61	0.823
Sending	1892	0.21	1.51	910	0.22	1.19	0.623
Wage	1779	.	.	853	.	.	0.217
Wage Increase	1774	0.044	0.078	846	0.045	0.086	0.154
Financial Awards	1774	0.058	0.057	873	0.061	0.055	0.150
N	1889			910			

Table 1: Sample Selection

Notes: P-values rely on two-sample Mann-Whitney-U tests for continuous variables or χ^2-tests for categorical variables. For reasons of discretion, we do not provide wage level statistics here. However, there is no significant difference in wage levels between participants and non-participants. Career levels subsume several actual categories in each presented category. Financial awards are denominated in percent of wages.

working students or external employees, or were not available to the company's German human resources department that we worked with to retrieve the data from the records.

More generally, one might expect sample selection according to the unobserved level of cooperativeness of employees. Cooperative employees could more frequently volunteer to participate in surveys/experiments, which could bias our results and interpretations. First, this is not so much of a concern, given that we are not interested in the level of cooperation, but in the link between cooperation and company outcomes. Second, as a robustness check, we show in Section 5.2 that given a high correlation between, for example, recognition award sending and cooperativeness, we do not find any evidence for the systematic selection into our experiments based on cooperative attitudes. The significant correlates of cooperativeness are statistically indistinguishable between participating and non-participating employees.

5 Results

5.1 Cooperative Attitudes

About 24% (N=201) of the employees can be classified as Net-Takers, i.e., they contribute on average less than five Tokens (mean of 2.51 Tokens) in the conditional contribution decisions. We classify 35% (N=345) as Net-Givers who contribute on average more than five Tokens (mean of 7.23 Tokens). Around 41% (N=364) of the employees exhibit a contribution pattern best described by Matcher behavior, which implies an average contribution of exactly five Tokens.[17]

Table 2 presents an overview of the collected public goods measures for each of the three cooperative types. Overall the unconditional contribution decisions reveal very high cooperation levels (79% of the endowment), despite the existence of Net-Takers. Net-Takers contribute significantly less unconditionally than Matchers and Net-Givers (5.44 versus 8.41 and 8.77, respectively; Mann-Whitney-U (MWU) tests, both p-values < 0.001). They also expect lower unconditional contributions from their colleagues (4.54 versus 7.30 and 7.32, respectively; MWU tests, both p-values < 0.001). Differences between Matchers and Net-Givers are not statistically significant (MWU tests; unconditional contributions, $p = 0.876$; beliefs, $p = 0.436$).

	All (N=910)		**Net-Takers** (N=201)		**Matchers** (N=364)		**Givers** (N=345)	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Unconditional contributions	7.89	2.93	5.44	3.54	8.41	2.58	8.77	1.96
Belief about others' contributions	6.70	2.78	4.54	2.79	7.30	2.57	7.32	2.34
Mean conditional contribution	5.30	2.25	2.51	1.76	5.00	0.00	7.23	1.77
Slope parameter	0.71	0.43	0.46	0.43	0.95	0.24	0.59	0.45

Table 2: Overview of Public Goods Game Variables by Cooperative Attitudes

Following Fischbacher and Gächter (2010), we estimate each employee's slope parameter from a linear regression of the conditional contribution and the contribution schedule.[18] The average slope parameter is 0.71, which reflects a tendency to conditioning own

[17] We observe similar distributions of cooperative attitudes comparing the experimental waves in 2017 and 2019 (Komoglorov-Smirnov Test, $p = 1.000$). This also holds for the other public goods game variables. Hence, for the period of our study, we regard the cooperation pattern in the company as stable and pool the data whenever possible.

[18] If the slope parameter is equal to 1, all contributions of the employee coincide with the average contribution of the other two group members, i.e., there is a perfect linear relationship between their contribution and the contributions of the others (perfect conditional cooperation). If the parameter decreases the relationship becomes weaker, such that a value of 0 means that contributions are independent of the others'

contributions on others' contributions. The Net-Takers' average slope parameter equals 0.46 and is lower than the parameters of the other two attitude types (MWU tests, both p-values < 0.001). While the Matchers' slope parameter is almost 1 (mean of 0.95), reflecting that most of these employees are perfectly conditionally cooperative, the Net-Givers have a slope parameter of 0.59, which lies between the other two attitude types (MWU tests, all p-values < 0.001).[19]

5.2 Recognition Awards and Cooperative Attitudes

Figure 1 relates the number of received (left) and sent (right) recognition awards per employee to cooperative attitudes. We observe that Net-Givers act more cooperatively and are also recognized as such. They sent more than 2.5 times as many recognition awards and receive about 40% more than their colleagues (MWU tests, pooling Net-Takers and Matchers, $p = 0.057$ and $p = 0.039$, respectively). The difference between Net-Givers and Matchers in sending behavior is statistically significant (MWU test, $p = 0.012$), and the difference between Net-Givers and Net-Takers in reception levels is as well (MWU test, $p = 0.053$).

We model the number of received (R_r) and sent (R_s) recognition awards as

$$E(R_{(r,i)}|\boldsymbol{X}_i) = \exp\left(\alpha + \beta'_{(r,1)}\boldsymbol{C}_i + \beta'_{(r,2)}\boldsymbol{X}_i + \beta_3 \text{year}_i\right) \tag{2}$$

$$E(R_{(s,i)}|\boldsymbol{X}_i) = \exp\left(\alpha + \beta'_{(s,1)}\boldsymbol{C}_i + \beta'_{(s,2)}\boldsymbol{X}_i + \beta_3 \text{year}_i\right) \tag{3}$$

where $\boldsymbol{C}$ is the vector of dummies for Matchers and Net-Givers using Net-Takers as the base category. The covariate vector $\boldsymbol{X}$ consists of socio-demographics and company controls, including the career level and job role as defined by the department (e.g. software development). The variable year absorbs differences between 2017 and 2018.

The respective multivariate Poisson regression estimations presented in Table 3 are in

average contribution.

[19] In Appendix D, we show in more detail how our cooperative attitudes are related to the cooperation types proposed by Fischbacher et al. (2001) and Fischbacher and Gächter (2010). In Appendix E, we provide an extensive multivariate analysis that characterizes cooperative attitudes in terms of the employees' personal, behavioral and work-related characteristics. We observe a positive relationship between age and cooperativeness, and interestingly that female employees are less cooperative than male employees. In terms of the behavioral survey measures, we document that employees are more likely to be Net-Takers the more competitive, distrusting, negatively reciprocal, extroverted and neurotic they are. Besides, we find that employees in the individual performance pay scheme are more likely Net-Takers than Matchers as compared to employees in the company performance scheme. There are no significant differences in the distribution of cooperative attitudes with respect to career levels, leadership responsibility, seniority, or business model.

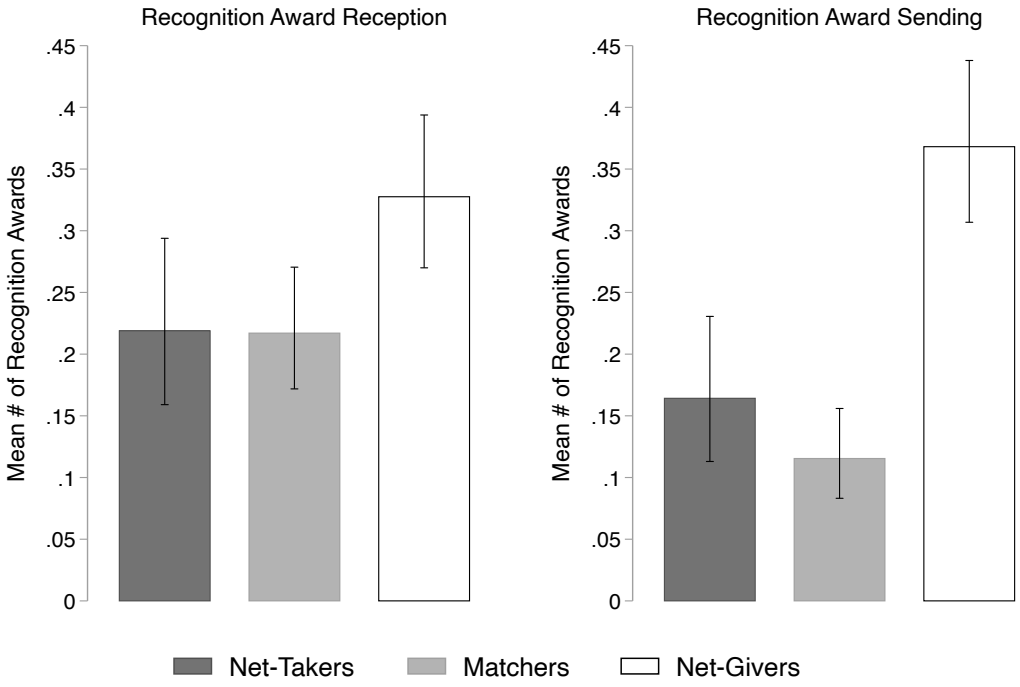

Figure 1: Recognition Awards and Cooperative Attitudes

Notes: The graph bar contains data on recognition awards from 2017 for participants in the experiments in 2017 and data from 2018 for participants in 2019. Bars show sample means for each cooperative attitude. Vertical caps show the 95%-confidence interval that is calculated based on a Poisson distribution.

line with the preceding non-parametric analyses. Net-Givers receive 51% more awards and send more than twice as many awards as Net-Takers, when including socio demographics and company controls (see columns (3) and (6)). Due to relatively low number of employees sending awards (about 11% sent at least one award), these estimates are less precise then the estimations for the reception patterns. Notably, we also observe that Matchers receive and sent significantly fewer awards than Net-Givers.

We take the comparatively high number of sent recognition awards by Net-Givers as evidence for the external validity of experimentally elicited cooperation levels. Sending an award induces a positive externality on a co-worker and requires writing a justification for the award, i.e., it represents a costly pro-social act similar to public goods game contributions. The externality may involve positive emotions on the recipient's side, but also potentially some indirect monetary value. Remember that managers observe awards; hence, monetary consequences could include financial awards and merit increases, respectively. Moreover, recognition awards seem to be unrelated to a strong reciprocity concern as Matchers, who exhibit strong reciprocity through their contribution schedule,

	(1) # Awards Received	(2) # Awards Received	(3) # Awards Received	(4) # Awards Sent	(5) # Awards Sent	(6) # Awards Sent
Net-Taker	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Matchers	-0.012	-0.009	-0.060	-0.358	-0.377	-0.445
	(0.214)	(0.214)	(0.224)	(0.405)	(0.407)	(0.388)
Net-Giver	0.403**	0.429**	0.413**	0.807*	0.789*	0.807**
	(0.191)	(0.194)	(0.195)	(0.431)	(0.433)	(0.379)
Constant	-1.829***	-1.892***	24.40**	-2.332***	-3.207***	28.89**
	(0.363)	(0.504)	(10.32)	(0.657)	(0.878)	(13.74)
b[Matchers] - b[Net-Givers]	p=0.016	p=0.013	p=0.013	p=0.001	p=0.001	p=0.002
Socio Demographics	X	✓	✓	X	✓	✓
Company Controls	X	X	✓**	X	X	✓**
Career Dummies	X	X	✓***	X	X	✓***
Dep. Dummies	X	X	✓***	X	X	✓***
Observations	910	907	842	910	907	842
Pseudo R2	0.042	0.048	0.080	0.056	0.063	0.157
Reg. Model	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson

Table 3: Regressions of Recognition Awards on Cooperative Attitudes

Notes: Standard errors clustered on team-level in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Asterisks for the control variables show the test result from an F-Test, testing the joint difference from zero. Alternative estimations using zero-inflated poisson models yield qualitatively very similar results.

receive and send significantly fewer awards than Net-Givers.

5.3 Financial Rewards and Cooperative Attitudes

Figure 2 shows the mean annual wage increases and the financial award allocation by cooperative attitudes and pay schemes. A similar pattern arises for both variables:[20] When pooling data from both pay schemes, Net-Takers receive a higher financial appreciation than their colleagues (MWU tests, wage increases, $p < 0.001$; financial awards, $p = 0.077$). Focusing only on company performance pay, we detect no heterogeneity with respect to cooperative attitudes (MWU tests, lowest p-value$= 0.534$). Focusing only on individual performance pay, Net-Takers receive significantly higher financial rewards than other employees (MWU tests, pooled, for both outcomes $p < 0.001$). This also holds when comparing Net-Takers with Net-Givers (MWU tests, wage increase, $p < 0.001$; financial awards, $p = 0.009$) and Matchers separately (MWU tests, wage increase, $p = 0.037$; financial awards, $p < 0.001$).

[20]The Spearman correlation coefficient between wage increases and financial awards is rather weak at 0.081, but still statistically different from zero at the 5% level ($p = 0.019$).

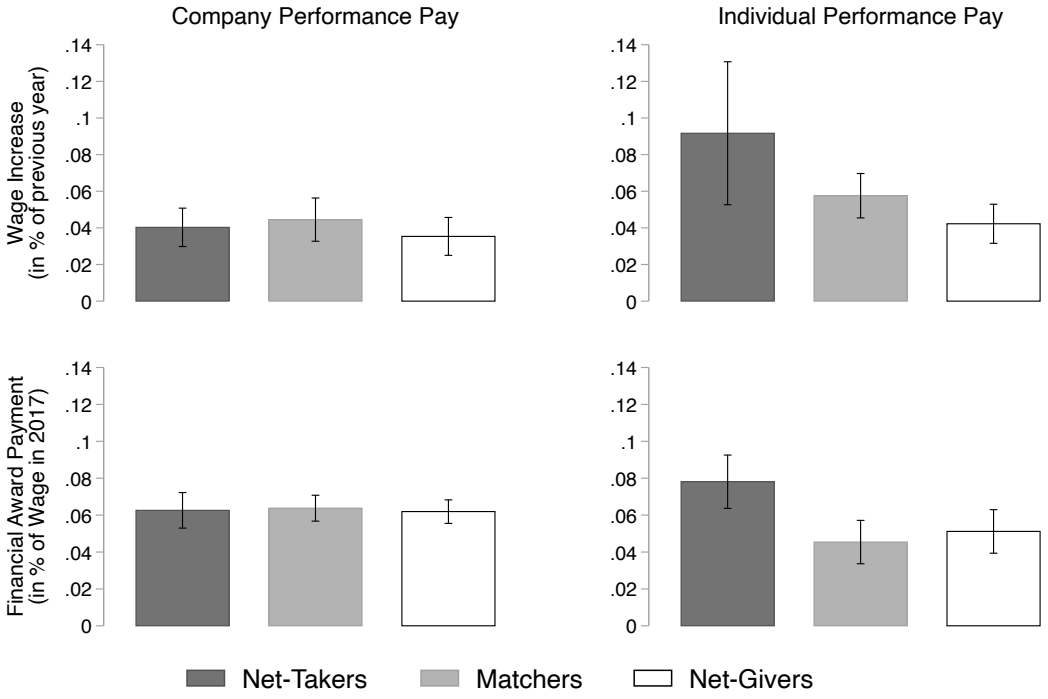

Figure 2: Financial Rewards and Cooperative Attitudes

Notes: Bars show sample means for each cooperative attitude. Vertical caps show the 95%-confidence interval that is calculated based on a standard normal distribution. (Top) The graph bars contain data from 2016-2018 for participating employees. (Bottom) The graph bars contain data from 2017 for all participating employees.

We model the financial appreciation variables using linear regressions. Wage increases ($\frac{w_t}{w_{t-1}}$) are measured in percent of the base year (either 2016 or 2017 depending on the year of participation). Financial award payments (f) are measured in percent of the wage in 2017.

$$\left(\frac{w_t}{w_{t-1}}\right) = \alpha + \beta'_{(1}\boldsymbol{C}_i + \beta'_2\boldsymbol{X}_i + \beta_3 \text{year}_i + \varepsilon_i \tag{4}$$

$$\left(\frac{f}{w_{2017}}\right) = \alpha + \beta'_1\boldsymbol{C}_i + \beta'_2\boldsymbol{X}_i + \varepsilon_i \tag{5}$$

In model (4), we use the same covariates as described in model (2).[21] In model (5), we drop year dummies as we include data on financial award payments from 2017 only.

Table 4 shows estimated coefficients from OLS regression models. Columns (2) and (6)

[21] In Appendix G, we include the change in part-time shares for years 2016/2017 and 2017/2018 as a covariate for wage increases. This allows us to control for employees that moved to parental leave or partial retirement during the period of our study. The results remain largely robust.

contain estimated differences between cooperative attitudes, while controlling for socio-demographic and company covariates. We observe that Net-Givers' wage increases are 29% (1.5%-points) and financial award payments are 15% (1%-point) lower than Net-Takers' appreciation, respectively. As already suggested by Figure 2, this difference is only relevant in the individual performance pay scheme. Here, Net-Givers receive about 48% (4.4%-points) lower wage increases and 32% (2.7%-points) lower financial award payments than Net-Takers (see columns (4) and (8), respectively). We observe no differential financial appreciation between Matchers and Net-Givers and no differences in the company performance pay scheme.

One can also look at whether cooperative attitudes and observables determine *wage levels* instead of *wage increases*. The results of the analysis are provided in Appendix H. Controlling for relevant Career and Department Dummies as well as socio-demographic and company control variables, only age is a significant determinant of overall wage levels. There is no significant interaction effect with the incentive scheme, either. Obviously, short-term changes in the wage levels are much more responsive to cooperative attitudes. We know that these variations might change with age, with incentive schemes, and with other influences. Together with potential long-term selection effects into different areas or jobs within and outside the company and leveling effects of collective bargaining agreements over time that matter for the overall wage levels, regressions that use wage levels as dependent variable are probably not that informative for our setup. Hence, the results based on wage levels should be interpreted carefully; we would have needed a much more flexible wage determination environment (e.g., top-level management) to detect a potential relationship between cooperative attitudes and wage levels.

6 Analysis of Potential Mechanisms

How can a company achieve high levels of cooperation despite financial disincentives to cooperate? According to Rosen (1986), teamwork at the workplace (and cooperation) involves other, non-financial returns for employees such as less boring work or hedonic benefits from social interaction. In the context of our study, such non-financial returns (e.g. measured by the number of received recognition awards) are likely to act as equalizing or compensating differentials against the financial disincentives that may arise from cooperation when wage increases or merit-based awards are lower than for those who cooperate less.

In the following, we consider this mechanism and further plausible mechanisms that

	(1) Wage Increase (in %)	(2) Wage Increase (in %)	(3) Wage Increase (in %)	(4) Wage Increase (in %)	(5) Fin. Award Payment (in % of Wage)	(6) Fin. Award Payment (in % of Wage)	(7) Fin. Award Payment (in % of Wage)	(8) Fin. Award Payment (in % of Wage)
Net-Takers	0	0	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Matchers	-0.00820	-0.00475	0.00465	0.00533	-0.00666	-0.00702	0.00134	0.000536
	(0.00859)	(0.00791)	(0.00831)	(0.00792)	(0.00526)	(0.00435)	(0.00636)	(0.00509)
Net-Givers	-0.0190**	-0.0150**	-0.00439	-0.00344	-0.00719	-0.0102**	-0.000422	-0.00313
	(0.00776)	(0.00744)	(0.00716)	(0.00757)	(0.00486)	(0.00475)	(0.00577)	(0.00547)
Ind. Perf. Pay		0.0228**	0.00896	0.00896		0.00289	-0.00922	-0.00315
		(0.00980)	(0.00831)	(0.0105)		(0.00662)	(0.00749)	(0.00823)
Net-Takers ×			0.0454**	0.0442**			0.0268**	0.0269***
Ind. Perf. Pay			(0.0203)	(0.0197)			(0.0105)	(0.0103)
Matchers ×			0.00620	0.00561			-0.00754	-0.00347
Ind. Perf. Pay			(0.0119)	(0.0115)			(0.00955)	(0.00928)
Net-Givers ×	0	0	0	0	0	0	0	0
Ind. Perf. Pay	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Constant	0.0536***	0.0520**	0.0287**	0.0421	0.0576***	0.0261	0.0541***	0.0204
	(0.0107)	(0.0253)	(0.0134)	(0.0261)	(0.00731)	(0.0192)	(0.00808)	(0.0193)
b[Matchers] -b[Net-Givers]	p=0.134	p=0.139	p=0.291	p=0.296	p=0.898	p=0.346	p=0.713	p=0.424
b[Matchers | IPP] -b[Net-Givers | IPP]	.	.	p=0.085	p=0.079	.	.	p=0.002	p=0.005
Socio Demographics	X	✓	X	✓	X	✓***	X	✓***
Company Controls	X	✓	X	✓	X	✓	X	✓
Career Dummies	X	✓	X	✓	X	✓***	X	✓***
Dep. Dummies	X	✓	X	✓	X	✓***	X	✓**
Observations	846	831	836	831	863	857	863	857
R^2	0.007	0.046	0.025	0.054	0.006	0.236	0.018	0.244
Reg. Model	Linear	Linear	Linear	Linear	Linear	Linear	Linear	Linear

Table 4: Regressions of Financial Appreciation on Cooperative Attitudes

Notes: Standard errors clustered on team-level in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; For wage increases, we use data from 2016/2017 for participants in 2017 and data from 2017/2018 for participants in 2019. We use the value of financial award payments received in 2017 in percent of the 2017-wage level. Asterisks for the control variables show the test result from an F-Test, testing the joint difference from zero.

may be prima facie in line with our main results. In discussing alternative mechanisms, we do not necessarily assume that our three main results, (i) high cooperation levels, (ii) a negative nexus between cooperative attitudes and financial rewards, and (iii) a positive nexus between cooperative attitudes and non-financial outcomes, are connected. Obviously, only exogenous variation in some variables can provide a final answer on the sole driver of our results. However, some variables will never be varied exogenously in a meaningful way such as wage levels or wage increases. There is always a tradeoff between searching under the lamppost (and accepting that one studies very special setups that allow for exogenous variation) or using real-world environments that limit opportunities to exogenous variation. Nonetheless, we can provide heterogeneity analyses and robustness checks to shed light on the potential relevance of various mechanisms for our setting and for being in line with our main results.

6.1 High Levels of Cooperation

Our measures of cooperation are qualitatively comparable to the standard conditional contribution patterns documented in the behavioral economics literature; yet they appear higher (e.g., Fischbacher et al., 2001; Fischbacher and Gächter, 2010; Kocher et al., 2015).[22] To what extent cooperation rates in our setting reflect a general high level of cooperativeness of employees or rather a stronger role of a potential social desirability bias in our setup is a question that deserves further attention.

Within the framework of our study, we implemented an unexpected option to donate the experimental income at the end of the experiment in 2017. Participants could choose between receiving their income from the experiments in their personal bank account and donating it to one of five charities of their choice. At this point, participants did not know their income yet. We find a positive but insignificant relationship between donations and our public goods game variables (contributions and more cooperative types). This holds regardless of whether we use unconditional, conditional contributions or cooperative attitudes as regressors (see Table 5). Thus, donations seem to draw on a distinct concept

[22]With respect to other non-student samples, Charness and Villeval (2009) observes that employees in the manufacturing industry contributed between 32% and 38% of their endowment to a three-person public good. Another example is Burks et al. (2016), who classify 24% of truck drivers in the same company as free-riders using a Prisoner's Dilemma Game. Algan et al. (2013, 2014) conducted public goods games with programmers at Sourceforge.net (an open source software platform) and users that contribute to Wikipedia, respectively. In both samples, subjects have already selected in a voluntary contribution platform; still, they are less cooperative, on average, than employees in our company (the 850 Sourceforge.net users unconditionally contribute 64% of their 10 tokens; the 1,194 Wikipedia users are less likely unconditional contributors and more likely free-riders than employees in our setting).

	(1) Donation	(2) Donation	(3) Donation	(4) Donation
Uncond. Contribution	0.0235			
	(0.0205)			
Belief About Others'		-0.00976		
Uncond. Contribution		(0.0213)		
Mean Cond. Contribution			0.0290	
			(0.0275)	
Net-Taker				0
				(.)
Matcher				0.156
				(0.160)
Net-Giver				0.259
				(0.161)
Constant	-0.283	-0.0318	-0.250	-0.259**
	(0.173)	(0.155)	(0.157)	(0.128)
N	438	438	438	438
Pseudo R2	0.002	0.0003	0.002	0.004
Reg. Model	Probit	Probit	Probit	Probit

Table 5: Regressions of Donations on Public Goods Game Measures

Notes: Robust standard errors in parentheses. Regressions are based on employees participating in the experiments in 2017; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

than cooperative attitudes and cooperation. We consider this suggestive evidence that social desirability is not too much of an issue in our setup. Donation behavior (or dictator game giving more generally) is often thought of as being heavily affected by social desirability concerns. If cooperation in the public goods game was affected by social desirability concerns as well, we would observe a significantly positive correlation between the two sets of decisions.

In 2019, we implemented an additional public goods game after the main experiment in which the MPCR was set to either 0.3 or 1.2. Participants that are driven by social desirability concerns should be less likely to adjust their unconditional contribution to the reduction in the MPCR from 0.5 to 0.3, because they might want to signal cooperativeness. Responses to the increase of the MPCR to 1.2 should reflect mainly a sound understanding of the game's incentives. We elicited unconditional contributions, beliefs, and conditional contribution schedules for both alternative MPCRs, using the strategy method. We observe strong reactions to the two variations. Subjects significantly decrease unconditional contributions, beliefs, and conditional contributions when the MPCR decreases to 0.3 (means: 3.71, 2.91, 3.82, respectively, using Wilcoxon Signed-Ranks tests in comparison to the standard MPCR of 0.5; all p-values$<$ 0.001). The reverse happens when the MPCR increases to 1.2 (8.82, 8.53, 8.37, respectively, using Wilcoxon Signed-Ranks tests in comparison to the standard MPCR of 0.5 all p-values$<$ 0.001). We conclude that nei-

ther social desirability nor confusion are convincing explanations for the high levels of cooperation that we observe.

6.2 Negative Nexus Between Cooperative Attitudes and Financial Rewards

Following Bowles et al. (2001) and Barr and Serneels (2009), the correlation between cooperative attitudes and financial rewards could also be explained by an omitted variable bias with respect to skills that are specific to cooperative attitudes and related to performance differences. For example, Net-Givers could have a comparative advantage in networking or socializing and Net-Takers could be more strategically sophisticated. Table 6 shows OLS regressions of financial rewards on cooperative attitudes estimated for the two business models that exist in the company. As cooperation is more important in cloud-related jobs, we expect Net-Givers to perform better than Net-Takers in such jobs and thus receive higher wage increases or financial awards. However, Net-Takers receive significantly higher financial rewards than Net-Givers and Matchers (see columns (1) and (2) and column (5) and (6), respectively). This relationship does not exist in customer-related jobs (see columns (3) and (4) and columns (7) and (8), respectively). Thus, even if Net-Givers work on tasks with complementarities for which they should have the more appropriate cooperative attitude, Net-Takers get 2.1%-points higher annual wage increases and 2.5%-points higher award payments. The result indicates that there are no strong comparative skill and performance differences between attitudes; however, it might still be the case that Net-Takers have an absolute skill advantage. However, this would require Net-Takers, i.e. less pro-social types, to have, in general, higher levels of skill.

Another potential mechanism could be related to selection based on cooperative attitudes. Net-Takers could select into jobs with higher financial rewards, while Net-Givers could select into jobs with higher non-financial rewards (Falk and Heckman, 2009; Dohmen and Falk, 2011). Conversely, along the lines of Bowles (1998) and Levitt and List (2007), financial and non-financial rewards could also shape cooperative attitudes. Pay scheme specific norms could render selfish behavior in the individual performance scheme and pro-social behavior in the company performance scheme more appropriate and hence employees that comply with the norm get financially rewarded.

In line with both explanations, Appendix E shows that employees in the individual performance pay scheme are significantly more likely to be Net-Takers than employees in the company performance pay, which goes with conventional wisdom. Individual performance incentives do not foster pro-self behavior or they do not seem to attract more

	(1) Wage Increase (in %)	(2) Wage Increase (in %)	(3) Wage Increase (in %)	(4) Wage Increase (in %)	(5) Fin. Award Payment (in % of Wage)	(6) Fin. Award Payment (in % of Wage)	(7) Fin. Award Payment (in % of Wage)	(8) Fin. Award Payment (in % of Wage)
Net-Takers	0	0	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Matchers	-0.0326**	-0.0230**	-0.00272	-0.00141	-0.00515	-0.0136**	0.00188	-0.00475
	(0.0143)	(0.0117)	(0.0138)	(0.0156)	(0.00764)	(0.00643)	(0.00899)	(0.00844)
Net-Givers	-0.0337**	-0.0213*	-0.00532	-0.00782	-0.0130*	-0.0245***	0.00164	-0.00453
	(0.0148)	(0.0123)	(0.0118)	(0.0117)	(0.00719)	(0.00701)	(0.00876)	(0.00920)
Constant	0.0672***	0.0934**	0.0303*	0.0505*	0.0655***	0.0680*	0.0340***	-0.0487*
	(0.0145)	(0.0457)	(0.0173)	(0.0278)	(0.0115)	(0.0357)	(0.0123)	(0.0263)
b[Matchers] -b[Net-Givers]	p=0.895	p=0.852	p=0.827	p=0.612	p=0.186	p=0.044	p=0.975	p=0.943
Included	Cloud	Cloud	Customer	Customer	Cloud	Cloud	Customer	Customer
Socio Demographics	X	✓	X	✓**	X	✓*	X	✓*
Company Controls	X	✓	X	✓	X	✓	X	✓***
Career Dummies	X	✓	X	✓	X	✓***	X	✓***
Dep. Dummies	X	✓	X	✓	X	✓***	X	✓***
Observations	410	406	236	233	422	417	248	245
R^2	0.022	0.109	0.005	0.129	0.008	0.294	0.042	0.294
Reg. Model	Linear	Linear	Linear	Linear	Linear	Linear	Linear	Linear

Table 6: Regressions of Financial Appreciation on Cooperative Attitudes by Business Model

Notes: Standard errors clustered on team-level in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; For wage increases, we use data from 2016/2017 for participants of 2017 and data from 2017/2018 for participants in 2019. We use the value of financial award payments received in 2017 in percent of the wage level in that year in 2017. We exclude employees that neither work in the cloud nor in the customer business model. Here, we do not observe statistically relevant differences in financial awards with respect to cooperative attitudes. In terms of wage increases, we observe that Matchers receive slightly higher increases than Net-Takers which is marginally significant (p=0.071). Asterisks for the control variables show the test result from a F-Test, testing the joint difference from zero.

pro-social employees. Also, our survey analysis confirms that employees in the individual performance pay consider cooperation to be less important to fulfill their tasks successfully. If this observation is due to the idea that incentives shape preferences, we would expect that employees who already work for several years in the company and presumably in the same pay scheme exhibit pay scheme specific norms more strongly. Thus, we expect that employees get less cooperative the longer they work in the individual performance pay scheme. Table 7 shows results from an OLS regression assessing the effect of seniority on the relationship between cooperative attitudes and pay schemes. While the significant difference in mean conditional contributions between pay schemes remains, we find no significant interaction effect with seniority. This evidence suggests that there is a potentially stronger role for selection.

	Mean Cond. Contribution
Ind. Perf. Pay	-0.906**
	(0.407)
Seniority	0.012
	(0.0172)
Ind. Perf. Pay *	-0.003
Seniority	(0.0280)
Age	0.006
	(0.0131)
Stability	0.037
	(0.127)
Constant	4.704***
	(0.804)
Socio-Demographics	✓
Company Controls	✓
Career Dummies	✓
Dept. Dummies	✓
Observations	857
R^2	0.036
Reg. Model	Linear

Table 7: Regressions of Cond. Contributions on Pay Schemes and Seniority

Notes: Robust standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Asterisks for the control variables would show the test result from a F-Test, testing the joint difference from zero. For none of the variables the joint difference from zero can be rejected at conventional significance values. The variable *stability* capture the employee's feeling of team stability that incorporate a survey item on how long the employee works in his/her job function and hence pay scheme.

6.3 Positive Nexus Between Cooperative Attitudes and Non-Financial Rewards

We observe that the positive relationship between cooperative attitudes and sending awards appears widely insusceptible to context factors like pay schemes and business models. Based on simple regression similar to those used in Table 3, we observe that Net-Givers send significantly more recognition awards than their colleagues in the cloud (means per employee: 0.32 versus 0.12, $p = 0.085$) and the customer business model (means per employee: 0.65 versus 0.13, $p = 0.002$) as well as in the company performance pay scheme (0.41 per employee versus 0.13 per employee, $p = 0.004$). We also observe a similar pattern in the individual performance pay scheme that is however not statistically significant; admittedly, there is a relatively small sample size for this comparison (0.27 per employee versus 0.19 per employee, $p = 0.492$). The existence of the relationship across different company contexts suggests a more general link between recognition awards and cooperative attitudes, corroborating our external validity argument.

At the same time, we observe strong differences in reception rates between context factors. We find that reception rates are generally higher in the cloud model than in the customer-based model (0.31 per employee versus 0.21 per employee; $p = 0.046$) and in the company performance pay versus the individual performance pay (0.30 per employee versus 0.16 per employee; $p = 0.023$). This indicates that the recognition tool is used more frequently in areas in which teamwork and cooperation is required.

In our post-experimental survey, we elicit further variables that may relate to non-financial rewards or non-financial costs of cooperation. On the individual level, we capture work-related stress and overall work satisfaction. While our stress measure appears to be unrelated to conditional contributions (Spearman Correlation= -0.098, $p = 0.438$), we observe a strong positive correlation between cooperativeness of employees and work satisfaction (Spearman Correlation= 0.916, $p = 0.014$) that is robust to including personal and company controls. On the team-level, we measure perceived team cohesion and team stability. In Appendix I, we show that there exists no statistically relevant relationship between team stability and the share of Net-Givers in a team, but teams that perceive themselves as being more cohesive tend to consist of more Net-Givers.

7 Conclusion

This paper provides novel evidence on how cooperative attitudes of employees are related to professional behavior and rewards within a large company. We observe high

levels of cooperation among employees and evidence on the external validity of our experimental measure of cooperative attitudes for the company setting. In addition, we document a robust negative nexus between cooperative attitudes and financial appreciation, and a positive nexus between cooperative attitudes and non-financial rewards.

In line with a recent literature that emphasizes the intrinsic nature of cooperation (e.g., Hamilton et al., 2003; Bandiera et al., 2005, 2011, 2013; Ruff and Fehr, 2014) our analyses suggest that the company studied here positively affects levels of cooperation – despite financial disincentives for cooperators – through providing cooperative employees with non-financial compensations. We also document a potential role of selection based on cooperative attitudes in pay schemes similar to Burks et al. (2009).

Our findings have implications for the optimal design of incentives and management practices in companies that want to foster cooperation. A general implication is that companies should create a work context that allows non-monetary forms of rewards as values for cooperation to unfold. This might entail the opportunity for employees to voluntarily select into differently composed teams or work organizations, or the selection into organizational units with different cooperative cultures (Kosfeld and Von Siemens, 2011). At the same time, our findings stress the importance of management practices that operationalize the non-monetary returns of cooperation (like the recognition award systems used in our company).

We see our study as a first step and encourage other researchers to study cooperation in corporations as well. Obviously, we have no way to take firm conclusions regarding company-specific and more general results, given that our focus is on one company. It might well be that the specific interplay between incentives and culture at our company is different than in other companies. It might well be that the industry that our company is operating in has specific characteristics in terms of how cooperation is rewarded. Given the importance of cooperation in teamwork, it is astonishing that there is not more research empirically addressing the relationship between corporate culture, financial and non-financial rewards, and cooperation within the company. Although we believe that the gist of our results will hold more generally, given its systematic pattern, our results at the very least provide a proof of concept: The experimentally elicited measures on cooperation are systematically related to outcomes in the company. Our tests for external validity provide promising results.

We have searched for evidence outside the light of a lamppost, in contrast to some other studies that use more artificial designs in the wild to get more powerful inference. Both approaches seem useful. Next to understanding the causal mechanisms underlying our findings, a deeper understanding of the nature of the relationship between financial

and non-financial incentives for cooperative behavior in organizations is required. Can financial and non-financial incentives work as substitutes on the individual employee level and, at the same time, work as complements when regarding the company's profits? How can the optimal mix of financial and non-financial incentives be characterized? More research is needed to empirically understand the optimal balance between cooperation-enhancing and competition-enhancing policies within organizations, probably dependent on cooperation culture and workforce composition.

References

Algan, Yann, Yochai Benkler, Emeric Henry, and Jérôme Hergueux, "Social motives and the organization of production: Experimental evidence from open source software," *Working Paper*, 2014.

_ , _ , Mayo Fuster Morell, and Jérôme Hergueux, "Cooperation in a peer production economy experimental evidence from wikipedia," *Working Paper*, 2013.

Alpizar, Francisco, Fredrik Carlsson, and Olof Johansson-Stenman, "Anonymity, reciprocity, and conformity: Evidence from voluntary contributions to a national park in Costa Rica," *Journal of Public Economics*, 2008, *92* (5-6), pp. 1047–1060.

Ambrus, Attila and Parag Pathak, "Cooperation over finite horizons: A theory and experiments," *Journal of Public Economics*, 2011, *95* (7-8), pp. 500–512.

Anderson, Lisa, Jennifer Mellor, and Jeffrey Milyo, "Social capital and contributions in a public-goods experiment," *American Economic Review*, 2004, *94* (2), pp. 373–376.

Ashforth, Blake and Fred Mael, "Social identity theory and the organization," *Academy of Management Review*, 1989, *14* (1), pp. 20–39.

Bandiera, Oriana, Iwan Barankay, and Imran Rasul, "Cooperation in collective action," *Economics of Transition*, 2005, *13* (3), pp. 473–498.

_ , _ , and _ , "Field experiments with firms," *Journal of Economic Perspectives*, 2011, *25* (3), pp. 63–82.

_ , _ , and _ , "Team incentives: Evidence from a firm level experiment," *Journal of the European Economic Association*, 2013, *11* (5), pp. 1079–1114.

Barr, Abigail and Pieter Serneels, "Reciprocity in the workplace," *Experimental Economics*, 2009, *12* (1), pp. 99–112.

Barr, Abigal, Jean Ensminger, and Jeffrey Johnson, "Social networks and trust in cross-cultural economic experiments," in "Whom can we trust?," New York: Russell Sage Foundation, 2009.

Beersma, Bianca, John Hollenbeck, Stephen Humphrey, Henry Moon, Donald Conlon, and Daniel Ilgen, "Cooperation, competition, and team performance: Toward a contingency approach," *Academy of Management Journal*, 2003, *46* (5), pp. 572–590.

Benz, Matthias and Stephan Meier, "Do people behave in experiments as in the field? Evidence from donations," *Experimental Economics*, 2008, *11* (3), pp. 268–281.

Bieberstein, Frauke Von, Jonas Gehrlein, and Anna Güntner, "Teamwork revisited: Social preferences and knowledge acquisition in the field," *Journal of Business Economics*, 2020, pp. 1–24.

Bowles, Samuel, "Endogenous preferences: The cultural consequences of markets and other economic institutions," *Journal of Economic Literature*, 1998, *36* (1), pp. 75–111.

_ , Herbert Gintis, and Melissa Osborne, "Incentive-enhancing preferences: Personality, behavior, and earnings," *American Economic Review*, 2001, *91* (2), pp. 155–158.

Burks, Stephen and Erin Krupka, "A multimethod approach to identifying norms and normative expectations within a corporate hierarchy: Evidence from the financial services industry," *Management Science*, 2012, *58* (1), pp. 203–217.

_ , Daniele Nosenzo, Jon Anderson, Matthew Bombyk, Derek Ganzhorn, Lorenz Götte, and Aldo Rustichini, "Lab measures of other-regarding preferences can predict some related on-the-job behavior: Evidence from a large scale field experiment," *Working Paper*, 2016.

_ , Jeffrey Carpenter, and Lorenz Goette, "Performance pay and worker cooperation: Evidence from an artefactual field experiment," *Journal of Economic Behavior & Organization*, 2009, *70* (3), pp. 458–469.

Cardenas, Juan-Camilo, "Real wealth and experimental cooperation: Experiments in the field lab," *Journal of Development Economics*, 2003, *70* (2), pp. 263–289.

Cardenas, Juan Camilo and Jeffrey Carpenter, "Three themes on field experiments and economic development," in "Field Experiments in Economics," JAI Press, Greenwich, 2005, pp. 71–124.

Carpenter, Jeffrey and Erika Seki, "Do social preferences increase productivity? Field experimental evidence from fishermen in Toyama Bay," *Economic Inquiry*, 2011, *49* (2), pp. 612–630.

Charness, Gary and Marie-Claire Villeval, "Cooperation and competition in intergenerational experiments in the field and the laboratory," *American Economic Review*, 2009, *99* (3), pp. 956–978.

Chaudhuri, Ananish, "Sustaining cooperation in laboratory public goods experiments: A selective survey of the literature," *Experimental Economics*, 2011, *14* (1), pp. 47–83.

Cohn, Alain, Ernst Fehr, and Michel André Maréchal, "Business culture and dishonesty in the banking industry," *Nature*, 2014, *516* (7529), pp. 86–89.

Croson, Rachel and Jen Yue Shang, "The impact of downward social information on contribution decisions," *Experimental Economics*, 2008, *11* (3), pp. 221–233.

Deversi, Marvin, Martin Kocher, Robert Schmidt, Christoph Schweighofer, and Christiane Schwieren, "Norms of cooperation in a company," *Working Paper*, 2020.

Dirks, Kurt, "The effects of interpersonal trust on work group performance," *Journal of Applied Psychology*, 1999, *84* (3), pp. 445–455.

_ **and Donald Ferrin**, "The role of trust in organizational settings," *Organization Science*, 2001, *12* (4), pp. 450–467.

Dohmen, Thomas and Armin Falk, "Performance pay and multidimensional sorting: Productivity, preferences, and gender," *American Economic Review*, 2011, *101* (2), pp. 556–90.

Englmaier, Florian and Georg Gebhardt, "Social dilemmas in the laboratory and in the field," *Journal of Economic Behavior & Organization*, 2016, *128*, pp. 85–96.

Essl, Andrea, Michael Kosfeld, Markus Kröll, and Frauke Von Bieberstein, "Sales performance and social preferences," *Working Paper*, 2018.

Falk, Armin and James Heckman, "Lab experiments are a major source of knowledge in the social sciences," *Science*, 2009, *326* (5952), pp. 535–538.

_ , **Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde**, "Global evidence on economic preferences," *Quarterly Journal of Economics*, 2018, *133* (4), pp. 1645–1692.

Fehr, Ernst, "Behavioral foundations of corporate culture," *UBS Center Public Paper No. 7*, 2018.

_ **and Andreas Leibbrandt**, "A field study on cooperativeness and impatience in the tragedy of the commons," *Journal of Public Economics*, 2011, *95* (9-10), pp. 1144–1155.

_ **and Bettina Rockenbach**, "Detrimental effects of sanctions on human altruism," *Nature*, 2003, *422* (6928), pp. 137–140.

_ **and Ivo Schurtenberger**, "Normative foundations of human cooperation," *Nature Human Behaviour*, 2018, *2* (7), pp. 458–468.

_ **and Urs Fischbacher**, "Why social preferences matter–the impact of non-selfish motives on competition, cooperation and incentives," *Economic Journal*, 2002, *112* (478), pp. 1–33.

Fischbacher, Urs and Simon Gächter, "Social preferences, beliefs, and the dynamics of free riding in public goods experiments," *American Economic Review*, 2010, *100* (1), pp. 541–56.

_ **, Simon Gächter, and Ernst Fehr**, "Are people conditionally cooperative? Evidence from a public goods experiment," *Economics Letters*, 2001, *71* (3), pp. 397–404.

Frey, Bruno and Stephan Meier, "Social comparisons and pro-social behavior: Testing" conditional cooperation" in a field experiment," *American Economic Review*, 2004, *94* (5), pp. 1717–1722.

Gächter, Simon and Elke Renner, "The effects of (incentivized) belief elicitation in public goods experiments," *Experimental Economics*, 2010, *13* (3), pp. 364–377.

_ **, Felix Kölle, and Simone Quercia**, "Reciprocity and the tragedies of maintaining and providing the commons," *Nature Human Behaviour*, 2017, *1* (9), pp. 650–656.

Galizzi, Matteo and Daniel Navarro-Martínez, "On the external validity of social preference games: A systematic lab-field study," *Management Science*, 2019, *65* (3), pp. 976–1002.

Gittell, Jody Hoffer, "Organizing work to support relational co-ordination," *International Journal of Human Resource Management*, 2000, *11* (3), pp. 517–539.

Gneezy, Uri and Alex Imas, "Lab in the field: Measuring preferences in the wild," in "Handbook of Economic Field Experiments," Vol. 1, Elsevier, 2017, pp. 439–464.

_ **, Andreas Leibbrandt, and John A List**, "Ode to the sea: Workplace organizations and norms of cooperation," *Economic Journal*, 2016, *126* (595), pp. 1856–1883.

_ **, Elizabeth Keenan, and Ayelet Gneezy**, "Avoiding overhead aversion in charity," *Science*, 2014, *346* (6209), pp. 632–635.

Grant, Adam M, *Give and take: A revolutionary approach to success*, Penguin, 2013.

Gratton, Lynda, "How to foster a cooperative culture," *Harvard Business Review*, 2009.

_ , *The shift: The future of work is already here*, HarperCollins UK, 2011.

Hamilton, Barton, Jack Nickerson, and Hideo Owan, "Team incentives and worker heterogeneity: An empirical analysis of the impact of teams on productivity and participation," *Journal of Political Economy*, 2003, *111* (3), pp. 465–497.

Harrison, Glenn and John List, "Field experiments," *Journal of Economic Literature*, 2004, *42* (4), pp. 1009–1055.

Holmstrom, Bengt, "Moral hazard in teams," *Bell Journal of Economics*, 1982, pp. 324–340.

Houser, Daniel, Erte Xiao, Kevin McCabe, and Vernon Smith, "When punishment fails: Research on sanctions, intentions and non-cooperation," *Games and Economic Behavior*, 2008, *62* (2), pp. 509–532.

Itoh, Hideshi, "Incentives to help in multi-agent situations," *Econometrica*, 1991, pp. 611–636.

Kandel, Eugene and Edward Lazear, "Peer pressure and partnerships," *Journal of Political Economy*, 1992, *100* (4), pp. 801–817.

Kocher, Martin, Peter Martinsson, Dominik Matzat, and Conny Wollbrant, "The role of beliefs, trust, and risk in contributions to a public good," *Journal of Economic Psychology*, 2015, *51*, pp. 236–244.

Kosfeld, Michael and Ferdinand Von Siemens, "Competition, cooperation, and corporate culture," *RAND Journal of Economics*, 2011, *42* (1), pp. 23–43.

Ledyard, John, "Public goods: A survey of experimental research," *Handbook of Experimental Economics*, 1995, *Vol. 1.*

Leibbrandt, Andreas, "Are social preferences related to market performance?," *Experimental Economics*, 2012, *15* (4), pp. 589–603.

Levitt, Steven and John List, "What do laboratory experiments measuring social preferences reveal about the real world?," *Journal of Economic Perspectives*, 2007, *21* (2), pp. 153–174.

List, John A and David Lucking-Reiley, "The effects of seed money and refunds on charitable giving: Experimental evidence from a university capital campaign," *Journal of Political Economy*, 2002, *110* (1), pp. 215–233.

Newby, Jennifer and Rupert Klein, "Competitiveness reconceptualized: Psychometric development of the competitiveness orientation measure as a unified measure of trait competitiveness," *The Psychological Record*, 2014, *64* (4), pp. 879–895.

Nikiforakis, Nikos, "Punishment and counter-punishment in public good games: Can we really govern ourselves?," *Journal of Public Economics*, 2008, *92* (1-2), pp. 91–112.

Ostrom, Elinor, *Governing the commons: The evolution of institutions for collective action*, Cambridge University Press, 1990.

Rammstedt, Beatrice, Christoph Kemper, Mira Céline Klein, Constanze Beierlein, and Anastassiya Kovaleva, "Eine kurze Skala zur Messung der fünf Dimensionen der Persönlichkeit: Big-Five-Inventory-10 (BFI-10)," *Methoden, Daten, Analysen*, 2013, *7* (2), pp. 233–249.

Rosen, Sherwin, "The theory of equalizing differences," *Handbook of Labor Economics*, 1986, *1*, pp. 641–692.

Ruff, Christian and Ernst Fehr, "The neurobiology of rewards and values in social decision making," *Nature Reviews Neuroscience*, 2014, *15* (8), pp. 549–562.

Rustagi, Devesh, Stefanie Engel, and Michael Kosfeld, "Conditional cooperation and costly monitoring explain success in forest commons management," *Science*, 2010, *330* (6006), pp. 961–965.

Schulz, Peter and Wolff Schlotz, "Trierer Inventar zur Erfassung von chronischem Sre (TICS): Skalenkonstruktion, teststatistische Überprüfung und Validierung der Skala Arbeitsüberlastung.," *Diagnostica*, 1999, pp. 8–19.

Stoop, Jan, Charles Noussair, and Daan Van Soest, "From the lab to the field: Cooperation among fishermen," *Journal of Political Economy*, 2012, *120* (6), pp. 1027–1056.

Voors, Maarten, Erwin Bulte, Andreas Kontoleon, John List, and Ty Turley, "Using artefactual field experiments to learn about the incentives for sustainable forest use in developing economies," *American Economic Review*, 2011, *101* (3), pp. 329–33.

_ , Ty Turley, Andreas Kontoleon, Erwin Bulte, and John List, "Exploring whether behavior in context-free experiments is predictive of behavior in the field: Evidence from lab and field experiments in rural Sierra Leone," *Economics Letters*, 2012, *114* (3), pp. 308–311.

Appendix

A Variable Overview

Variable	Scale	Description	Details
team membership	nominal	Unique team identifier (from ORG structure)	
team size	ratio	Number of team members	
age	ratio	Age of employee	
gender	nominal	Gender of employee	
seniority	ratio	Seniority of employee (in years)	
job function	nominal	Twelve functional areas (departements) which consists of clusters of several job families based on generic job content	Communications, Development, Education and Training, Finance, Administration, Human Resources, Information Technology, Marketing, Sales, Consulting, Not assigned
career	ordinal	Nine career level of employee (describes contribution based upon business results, accountability, complexity, experience and communication)	Not specified for reasons of discretion
leader	binary	Leadership responsibility	Yes/No
pay scheme	nominal	Employees pay scheme	Either company performance pay or individual performance pay
wage	ratio	Yearly wage before taxes	
financial awards	ratio	Amount of money received in a year	
received recognition	ratio	Number of peer-to-peer awards received for being cooperative (received)	
sent recognition	ratio	Number of peer-to-peer awards received for being cooperative (sent)	

Table A.1: Variables Collected from Company Records

Variable	Scale	Description	Details
contribute	ratio	Unconditional contribution	
x-contribute	ratio	Contribution conditional on x contributed by other team members	
belief contribute	ratio	Belief about average contribution of the other team members	
with mpcr variation	ratio	Only in 2019: *contribute* and *belief contribute* for mpcr= 0.3 and mpcr= 1.2	Strategy method, within subject
donation	nominal	Only in 2017: earnings from experiments transferred to individual account or to a charity	Personal bank account, Deutsche Aidshilfe, rzte ohne Grenzen, World Wide Fund For Nature (WWF), SOS Kinderdorf, Amnesty International

Table A.2: Variables Collected from the Experiments

Variable	Scale	Description	Details
team cooperation	ordinal	Need for cooperation among team members	
team cohesion	cardinal	Perception of team cohesion	
team stability	cardinal	Perception of staff stability within the team	
neg. competiveness	ordinal	Perception of negative competitive pressure among team members	
pos. competiveness	ordinal	Perception of positive competitive pressure among team members	
stress	cardinal	Perceived chronic stress	Individual average score
big five	cardinal	big five personality measure	Individual average score (for each personality trait)
neg. reciprocity	ordinal	Social preference measure indicating the participants tendency for negative reciprocity	
pos. reciprocity	ordinal	Social preference measure indicating the participants tendency for positive reciprocity	
trust	ordinal	Social preference measure indicating the participants trust	
competitive attitude	cardinal	The participants individual competitive attitude	Individual average score
children	binary	Indicating whether the participant has children or not	
friends	ratio	The participants number of friends	
complement	nominal	In which business model is the employee working? Cloud model requires much more cooperation than customer model	Cloud, Customer, Neither

Table A.3: Variables Collected from the Survey

B Instructions

You are a member of a group of three, consisting of anonymous participants in this study. All participants are randomly selected employees of [COMPANY]. The combination into groups of 3 occurs randomly. The payouts for you and the other group members in this section depend on your decisions and the decisions of the other members of your group.

Decision-making situation
Each member of the group must decide on the use of 10 tokens each. You and the other group members can put the 10 tokens into a private account, or you can deposit them in whole or in part into a common account. Any tokens that you do not deposit into the common account are automatically added to your private account.

Income from the private account
You earn exactly one euro for each token you put in your private account. For example, if you put 4 tokens into your private account, you will earn exactly €4 from your private account. No one but you receives income from your private account.

Income from the common account
For each token that is added to the common account, you will receive €0.5. The other two group members also each receive €0.5 for each token you contribute. Conversely, you also earn money from the contributions of the other two group members to the common account. The income of each member from the common account is determined as follows:

Individual income from the common account = Sum of the contributions of all three group members to the common account times 0.5

For example, if the sum of all three group members' contributions to the common account results in 30 tokens, then you and the other two group members each receive 30 x 0.5 = €15 from the common account. If the three group members pay a total of 10 tokens into the common account, you and the other two group members receive 10 x 0.5 = €5 each from the common account.

Total income Your total income is the sum of your income from your private account and your income from the common account. So:

Income from the private account (= 10 - contribution to the common account) + income from the common account (=0.5 x sum of contributions to the common account) = Total income

As described above, you can use 10 tokens to fund your private account and the common account. Each group member has to make two types of contribution decisions, which we will refer to below as the contribution and the contribution table. You can find a detailed description of your entries on the entry screens.

B.1 Comprehension Questions

Please answer the following questions to ensure that you have understood the instructions of the experiment. If you are unsure, you can return to the instructions by clicking on "Back".

1. Assume that none of the group members (even you yourself) pay a contribution into the group account.
    - How high is your total income?
    - How high is the respective total income of the other two group members?
2. Assume that all three group members (also you yourself) each pay a contribution of 10 tokens into the group account.
    - How high is your total income?
    - How high is the respective total income of the other two group members?
3. Assume that you deposit 0 tokens into the common account and that the other two members of your group deposit 10 tokens each.
    - How high is your total income?
    - How high is the respective total income of the other two group members?
4. Assume that you pay 10 tokens into the common account and the other two members of your group each pay 0 tokens.
    - How high is your total income?
    - How high is the respective total income of the other two group members?

B.2 Contribution Decisions

When choosing the contribution to the common account, you determine how many of the 10 tokens you want to deposit into the common account. The deposit to your private account is automatically the difference between 10 tokens and your contribution to the common account.

- Please enter the amount you would like to pay into the common account (any whole-number value between and including 0 and 10 is possible): ...

Now you will be asked to fill in a contribution table. In the contribution table, you should specify how many tokens you want to pay into the common account for each possible (rounded) average contribution of the other two group members to the common account. So, depending on how much the others contribute on average, you must define your own contribution decision. For each average contribution of the other two group members, please indicate the amount you would like to pay into the common account (any whole-number value between and including 0 and 10 is possible; of course, you can also enter the same amount several times):

What is your contribution to the common account if...

- ... the other two group members deposit an average of 0 tokens.
- ... the other two group members deposit an average of 1 tokens.
- ... the other two group members deposit an average of 2 tokens.
- ... the other two group members deposit an average of 3 tokens.
- ... the other two group members deposit an average of 4 tokens.
- ... the other two group members deposit an average of 5 tokens.
- ... the other two group members deposit an average of 6 tokens.
- ... the other two group members deposit an average of 7 tokens.
- ... the other two group members deposit an average of 8 tokens.
- ... the other two group members deposit an average of 9 tokens.
- ... the other two group members deposit an average of 10 tokens.

Help option: The numbers in the left column are the possible (rounded) average contributions of the other two group members to the common account. You now have to specify how many tokens you want to deposit into the common account for each slider, provided that the others contribute the specified amount on average. You have to make an entry in each field. For example, you are to specify how much you contribute to the common account if the other group members deposit an average of 0 tokens into the common account; how many tokens you contribute if the others contribute an average of 1 token or 2 tokens or 3 tokens, and so on. You can enter any whole-number contribution from 0 tokens to 10 tokens in each field and, of course, the same amount several times.

B.3 Incentive Compatibility

Payout relevance of your decisions
After all study participants have made their decisions, one member is randomly selected in each group of 3. For the randomly selected member, only the contribution table filled in by him/her is relevant for decision making and payout. For the other two group members who have not been selected, only the contribution is relevant for decision-making and payout. The average of the two contributions (rounded to the next whole number) then determines the relevant conditional contribution from the third member's contribution table. Of course, you do not yet know which of your contribution decisions will be randomly selected. You must therefore carefully consider both types of contribution decisions, as both can become relevant to you.

The following graphic (Figure 1) is intended to visualize the decision-making situation. For the randomly selected person on the right, the conditional contribution from the contribution table is relevant. For the other two group members, the contribution is relevant for payout.

B.4 Belief Elicitation

In addition to your earnings from your private and common account, you will receive a further payout for estimating the average contribution of the other two members of your group to your common account. Your payout will depend on how accurately you estimate the actual average contribution of your two group members. If you are exactly right, you will receive an additional €5. If your estimate differs by 0.5 or more tokens from the actual average contribution, you will receive €0. Please enter a number from 0 to 10 (each

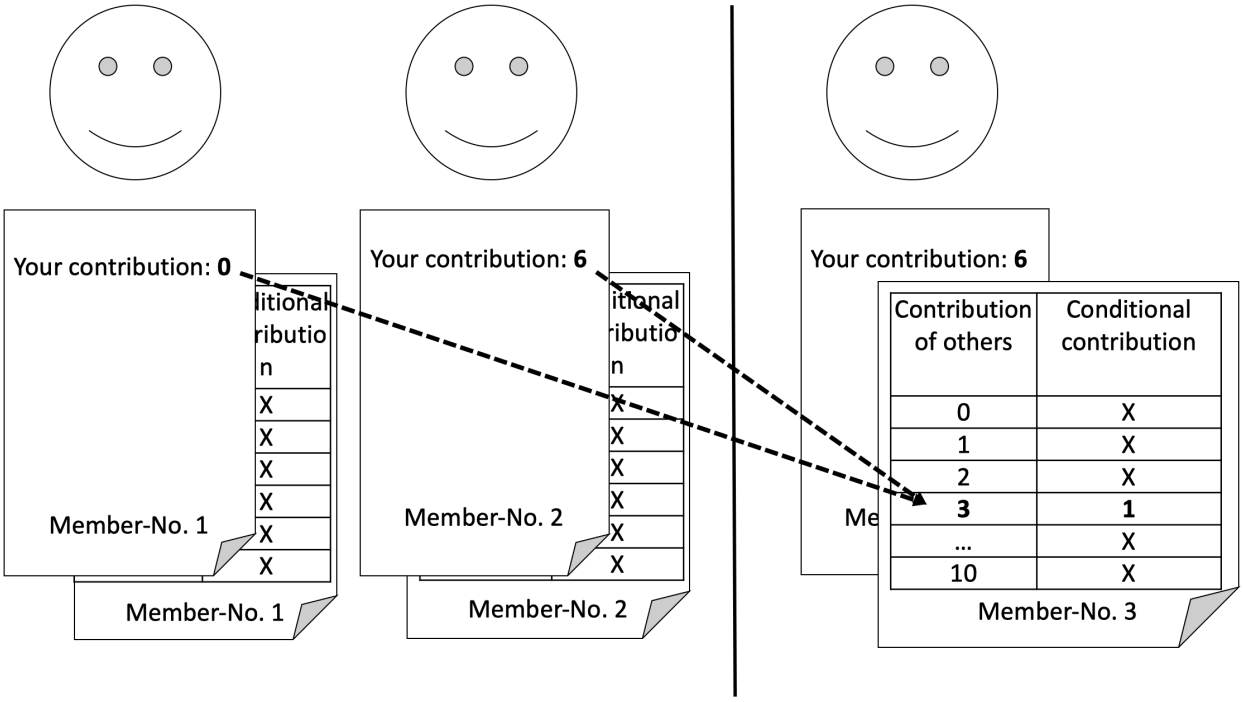

Figure 1: Incentive Compatibility

number is allowed in steps of 0.5).

What do you think is the average amount of tokens your two group members contribute to the common account?

- ... Average contribution of the other two members of your group

C Communication and Coordination of Employees

Employees could interrupt the experiments and continue at a later point in time. On average, employees finished the experiment and survey within approximately one and a half days (mean=1.35 days). While employees in a public goods game group were anonymously selected and matched, one might be concerned about communication and coordination during the experiment as some teams in the company are seated in shared offices (max four team members per office). To alleviate this concern, we observe no correlation between contribution behavior, beliefs and attitudes of employees with respect to the variance of finishing times within work teams (Spearman Correlations; uncond. contribution, $\rho = -0.004$, $p = 0.905$; belief about others' uncond. contribution, $\rho = -0.006$, $p = 0.853$; mean cond. contribution, $\rho = 0.008$, $p = 0.827$).

D Overview of Public Goods Game Measures

Our employee sample appears to be very cooperative as can be seen from Table 2. In the unconditional contribution decision, they contribute on average 7.9 Tokens (which corresponds to 79% of the endowment) in the public good. The average belief about the public good contribution of the other group members equals 6.7 Tokens. The difference in actual contributions and beliefs is statistically significant at the 1%-level (Wilcoxon Sign Rank Test, $p < 0.001$). Reassuringly, we observe very similar responses in the public goods games when comparing the variables collected from the experiments in 2017 and 2019. This holds for the data presented in Table 4 – see column "Comparison".

	All			Experiment 2017			Experiment 2019			Comparison
	Count	Mean	SD	Count	Mean	SD	Count	Mean	SD	P-Value
Unconditional Contributions	910	7.89	2.93	438	7.90	2.97	472	7.88	2.90	0.890
Belief about Others' Contributions	910	6.70	2.78	438	6.73	2.82	472	6.67	2.75	0.751
Mean Conditional Contribution	910	5.30	2.25	438	5.26	2.19	472	5.33	2.29	0.607
Slope Parameter	910	0.71	0.43	438	0.71	0.43	472	0.70	0.43	0.818

Table 4: Overview of Public Goods Game Variables by Wave

Notes: P-values rely on two-sample Mann-Whitney-U tests.

We observe that cooperative attitudes are highly predictive for unconditional contributions, also when we control for beliefs about other's contributions (see Table 5). Net-Givers contribute more than Matchers and Matchers contribute more than Net-Takers. Both differences are highly statistically significant.

The scatter plot in Figure 2 shows a significant variation in the average conditional contributions and the reciprocity parameter of employees. The size of the bubbles represents the frequency of the observed combination of mean conditional contribution and reciprocity. There are several mass points that stand out.

Next to our cooperative attitudes, we also classify cooperation types as described by Fischbacher et al. (2001) and Fischbacher and Gächter (2010). These types are also visible in the scatter plot. First, we observe employees that behave like perfect conditional cooperators ($[1, 5]$). Secondly, there are clusters of employees whose contributions are independent of the contribution schedule. They are either contributing nothing (free-riders) or they contribute a strictly positive amount (unconditional cooperators). Most of the uncon-

	Uncond. Contribution
Belief About Others'	0.642***
Undcond. Contribution	(0.0269)
Net-Taker	0
	(.)
Matcher	1.196***
	(0.196)
Net-Giver	1.536***
	(0.198)
Dummy (2019)	0.00693
	(0.137)
Constant	2.520***
	(0.282)
Observations	910
R^2	0.509
Reg. Model	Linear

Table 5: Determinants of Unconditional Contributions

Notes: Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

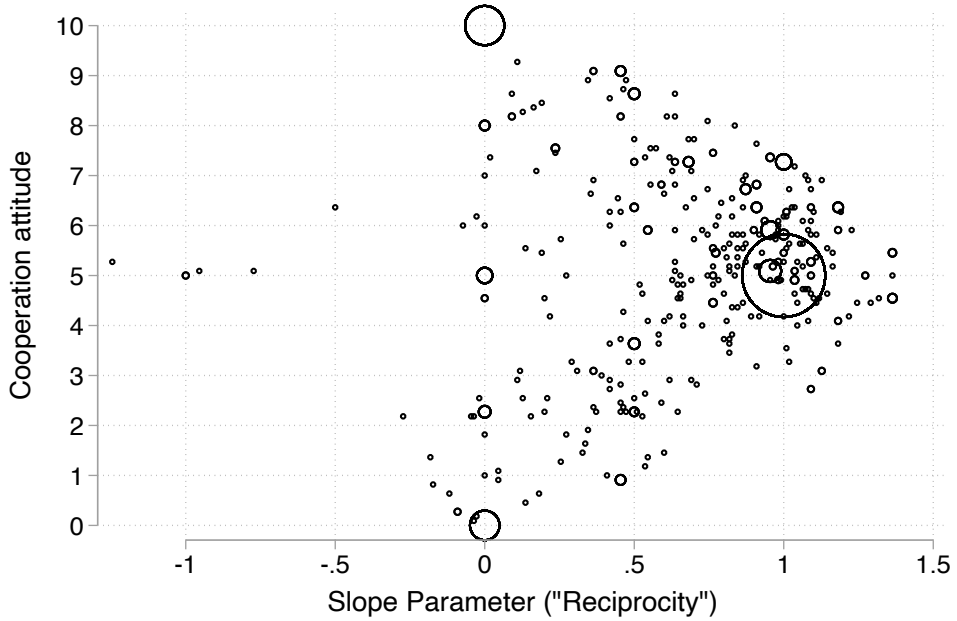

Figure 2: Relationship Between Mean Cond. Contributions and Slope Parameter

Notes: The graph contains data from all participating employees. Bubble sizes show the frequency of the combination of both variables. Reciprocity is the slope parameter from an OLS regression between an employees' conditional contributions and the contribution schedule.

ditional cooperators contribute all their endowment. Thirdly, imperfectly conditional cooperators are split in two groups, conditional cooperators with a self-serving bias (mean

unconditional contribution below 5) and conditional cooperators with an other-serving bias (mean unconditional contributions above 5). The remaining employees are classified as Others.

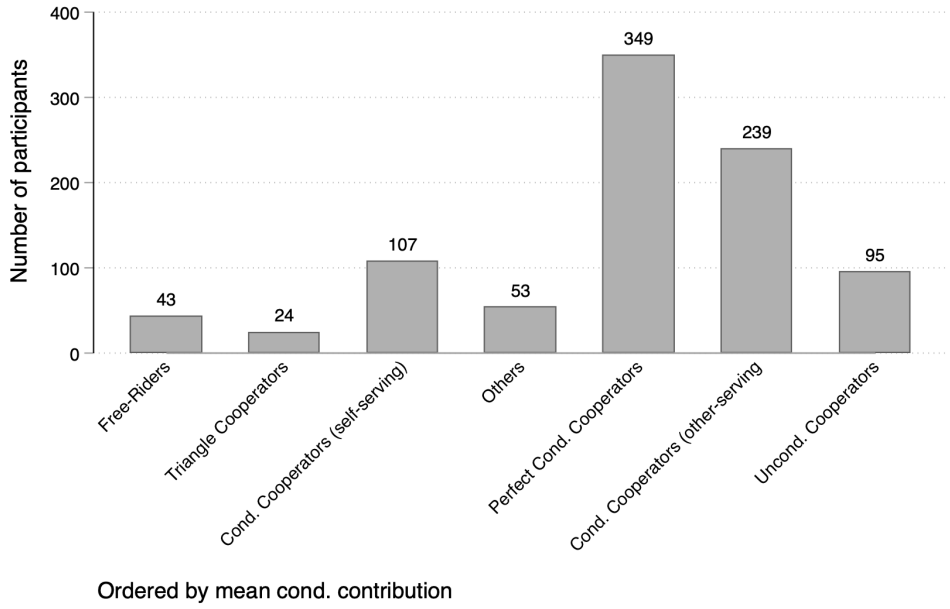

Figure 3: Distribution of Cooperation Types

Notes: Bars show the fraction of all participating employees that belong to a particular cooperation type. Bars are ordered by mean conditional contributions.

Figure 3 shows an overview of all types and Figure 4 relates our cooperative attitudes and the cooperation types. Cooperative attitudes subsume the classification types reasonably well. We use cooperative attitudes because they prove handier for the statistical analysis.

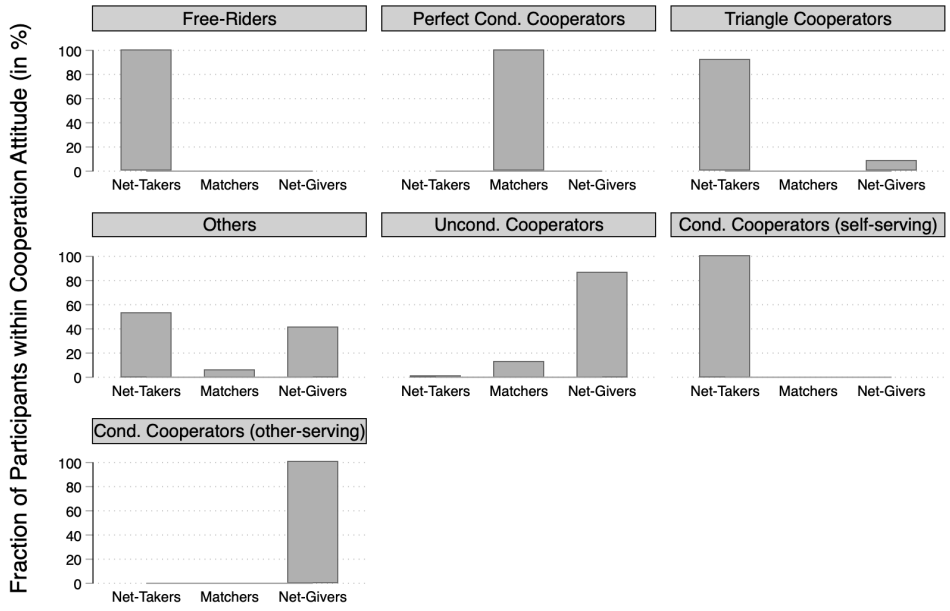

Figure 4: Cooperation Types and Cooperative Attitudes

Notes: Bars show the fraction of participating employees that belong to a particular cooperative attitude.

Table 6 shows an inverse U-shape relationship between cooperative attitudes and reciprocity.

	Slope Parameter
Net-Taker	0
	(.)
Matcher	0.497***
	(0.0328)
Net-Giver	0.134***
	(0.0331)
Constant	0.456***
	(0.0263)
N	910
R^2	0.238
Reg. Model	Linear

Table 6: Reciprocity and Cooperative Attitudes

Notes: Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

E Correlates of Cooperative Attitudes

In Table 7, we present correlations of cooperative attitudes with socio-demographic characteristics and behavioral measures. We account for the categorical scale of the dependent variable by using a Multinomial Logit Regression Model.

	Cooperative Attitude		
	Matcher	Net-Giver	Net-Taker
Age	0.00196	0.0252**	*Base Category*
	(0.0108)	(0.0110)	
Female	-0.166	-0.418**	
	(0.192)	(0.200)	
High Education	0.102	-0.0451	
	(0.201)	(0.205)	
Patience	0.0191	0.0226*	
	(0.0131)	(0.0136)	
Competitiveness	-0.286***	-0.391***	
	(0.103)	(0.106)	
Distrust	-0.175*	-0.278***	
	(0.103)	(0.108)	
Positive Reciprocity	0.368**	0.442***	
	(0.153)	(0.161)	
Negative Reciprocity	0.290***	0.0965	
	(0.103)	(0.109)	
Dummy (2019)	-0.00368	-0.198	
	(0.198)	(0.201)	
Constant	-1.431	-1.716	
	(1.066)	(1.115)	
Observations	905		
Pseudo R^2	0.032		
Reg. Model	MnLogit		

Table 7: Cooperative Attitudes, Socio-Demographics and Behavioral Measures

Notes: Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Five subjects missing because they did not insert information on their socio-demographic status. High Education is an indicator for higher than median education subsuming two out of five education categories.

First, we observe an indication for age being positively related to the cooperativeness of employees. Older employees are significantly more likely to be Net-Givers rather than Net-Takers. The share of Matchers is relatively stable across age cohorts. Second, female employees are less frequently Net-Givers than Net-Takers and, again, the share of Matchers is very similar. Marginal effect calculations show that female employees are about 7%-points more likely to be Net-Takers rather than Net-Givers than male employees are. Third, the competitiveness index correlates with cooperative attitudes. Intuitively, employees are more likely to be Net-Takers the more competitive they are. Moreover, we

find that the agreement to the statement "You can't trust strangers anymore" is highly predictive for the cooperative attitude. The likelihood of being a Net-Taker decreases with reported distrust in strangers. Finally, we observe positive correlations between survey measures for positive and negative reciprocity (agreement with "When someone does me a favor, I am willing to return it" and "If I am treated unjustly, I will take revenge at the first occasion, even if there is a cost to do so", respectively) and cooperative attitudes – again, in the expected positive direction.[23]

In Table 8, we present the correlations between cooperative attitudes and structural variables from the company context. Here, the main observation is that the cooperativeness of employees is less pronounced in the individual performance pay scheme. While we classify 20% of participants in the company performance pay scheme as Net-Taker, the respective share increases to 27% in the individual performance pay. This increase in the share of Net-Takers comes along with a decrease in the share of Matchers (from 41% to 35%). The share of Net-Givers is not significantly different between incentive schemes. We do not observe significant differences in the distribution of cooperative attitudes with respect to career levels, leadership responsibility, seniority, or the team work production function.

Lastly, we use a short form of the big five personality trait questionnaire validated by Rammstedt et al. (2013) from our online survey. The traits consist of extraversion, agreeableness, conscientiousness, neuroticism, and openness. Table 9 shows the correlation between our cooperative attitude classification and the five traits. Net-Takers are significantly more extroverted and neurotic than Net-Givers, and more conscientious than Matchers.

[23]Other studies report that female subjects (both employees and students) are more cooperative (e.g., Charness and Villeval, 2009). Low cooperativeness of women compared to men in our context could be related to the selection of women working in a male-dominated work environment.

	Cooperative Attitude		
	Matchers	Net-Givers	Net-Takers
Female	-0.210	-0.415**	*Base Category*
	(0.200)	(0.206)	
High Education	0.127	0.0114	
	(0.209)	(0.210)	
Seniority	0.00382	0.0182	
	(0.0160)	(0.0161)	
Low Career Level	0.152	-0.105	
	(0.433)	(0.459)	
Medium Career Level	0.0924	0.403	
	(0.333)	(0.343)	
High Career Level	0	0	
	(.)	(.)	
Leader	-0.133	-0.0317	
	(0.322)	(0.319)	
Ind. Performance Pay	-0.511**	-0.370	
	(0.232)	(0.231)	
Cloud	0	0	
	(.)	(.)	
Customer	-0.163	-0.139	
	(0.218)	(0.222)	
Neither	-0.387*	-0.0336	
	(0.234)	(0.231)	
Dummy (2019)	-0.0606	-0.303	
	(0.218)	(0.217)	
Constant	0.792	0.714	
	(0.539)	(0.548)	
Observations		861	
Pseudo R^2		0.014	
Reg. Model		MnLogit	

Table 8: Cooperative Attitudes, Socio-Demographics and Company Variables

Notes: Standard errors in parentheses; * p $<$ 0.10, ** $p < 0.05$, *** $p < 0.01$; 49 subjects are missing be-cause they did not insert information of their socio-demographic status or there was no wage data available. High Education is an indicator for higher than median education subsuming two out of five education categories. Career levels subsume several categories in each presented category.

	Cooperative Attitudes		
	Matchers	Net-Givers	Net-Takers
Age	0.00814	0.0316***	*Base Category*
	(0.0106)	(0.0109)	
Female	-0.0421	-0.291	
	(0.192)	(0.200)	
High Education	0.0749	-0.145	
	(0.201)	(0.204)	
Extraversion	-0.136	-0.203**	
	(0.0927)	(0.0949)	
Agreeableness	0.0346	0.0957	
	(0.122)	(0.125)	
Conscientiousness	-0.272**	-0.129	
	(0.138)	(0.143)	
Neuroticism	-0.134	-0.292***	
	(0.103)	(0.107)	
Openness	0.0323	0.149	
	(0.0984)	(0.101)	
Dummy (2019)	-0.0274	-0.258	
	(0.195)	(0.197)	
Constant	1.972**	0.803	
	(0.984)	(1.021)	
Observations	906		
Pseudo R^2	0.018		
Reg. Model	MnLogit		

Table 9: Cooperative Attitudes, Socio-Demographics and Personality Traits

Notes: Standard errors in parentheses; * p $<$ 0.10, ** $p < 0.05$, *** $p < 0.01$; Four subjects missing because they did not insert information on their socio-demographic status. High Education is an indicator for higher than median education subsuming two out of five education categories.

F Description of Outcome Variables

In the following, we provide descriptive analyses of our main outcome variables. Company variables stem from the records as of 12/31/2017 for employees that were invited to participate in the experiments in 2017. For employees invited to the second experiment, we use record data as of 12/31/2018.

Table 10 shows the data availability for our main outcome variables. We have data on recognition awards from 2017 for employees that participated in 2017 and the data from 2018 for the participants from 2019. Wage data covers 2016/2017 and 2017/2018 for the employees in the different roll-out phases, respectively. This allows us to look at changes in wage over time. We do not have information on financial awards in 2018 for employees from the first experiments due to data restrictions at the company. In addition, the company-wide budget for the financial award allocation differed strongly between 2017 and 2018 such that there is low comparability.

	Wage			**Financial Awards**		**Recognition Awards**	
	2016	2017	2018	2017	2018	2017	2018
Participants from Experiments 2017	✓	✓	X	✓	X	✓	X
Participants from Experiments 2019	X	✓	✓	✓	✓	X	✓

Table 10: Overview of Record Data Used as Outcome Variables

Notes: Table shows the data availability of our main outcome variables for employees that could participate in 2017 and 2019, respectively. The variables are retrieved from the company records at the 12/31/2017 or the 12/31/2018, respectively.

Wages. Between 2016 and 2018, participating employees received an average yearly wage increase (in percent of the previous year) of 4.5% with a standard deviation of 8.61% within the range of -63.4% and 72.5%. Calculated as a full-time position equivalent, we observe an average increase of 4.2% with a standard deviation of 3.58% within the range of -8.5% and 33.9%. A full-time wage equivalent equals the nominal wage dived by the part-time share. For example, if an employee receives a wage of €50,000 but works part-time on a 50% position, the full-time equivalent is 50,000/50% = €100,000. Here, we assume a linear relation between the part-time parameter and the wage level which might not be true. In our analyses, we rely on the nominal compensation changes and levels (including potential variations in the part-time parameter).

Financial awards. We measure the award value in percent of the wage in 2017. In this year, conferred awards were worth up to 30% of the yearly wage. The average award payment was about 6% (standard deviation of 5.5%). About 60.4% of employees received

an award payment larger than 0.

Recognition awards. In total, we observe 354 recognition awards received by 225 (38.90%) employees and 274 awards sent by 102 (11.21%) employees in 2017 and 2018.[24] Conditional on sending at least one award, we observe that employees sent up to 20 awards with the median number being 2 and a mean of 2.69. Conditional on receiving at least one award, employees received up to 7 awards with the median number being 1 and an average of 1.57.

[24]The number of received awards and the number of sent awards do not need to equalize because we only have a subsample of employees and awards can, of course, be sent to non-participating employees.

G Part-Time Variations and Financial Rewards

Table 11 shows robustness analyses of our main effects with regard to the part-time share of employees.

	(1) Wage Increase (in %)	(2) Fin. Award Payment (in %of Wage)	(3) FTE-Wage Increase (in %)
Net-Takers	0	0	0
	(.)	(.)	(.)
Matchers	0.00568	0.000596	0.00128
	(0.00403)	(0.00506)	(0.00319)
Net-Givers	0.00413	-0.00312	0.00218
	(0.00289)	(0.00547)	(0.00275)
Ind. Perf. Pay	0.000506	-0.00326	-0.0000508
	(0.00599)	(0.00819)	(0.00580)
Net-Takers ×	0.0208***	0.0270***	0.0148**
Ind. Perf. Pay	(0.00773)	(0.0103)	(0.00734)
Matchers ×	0.00898	-0.00361	0.0128
Ind. Perf. Pay	(0.00855)	(0.00928)	(0.00818)
Net-Givers ×	0	0	0
Ind. Perf. Pay	(.)	(.)	(.)
Δ(Part-time Share)	0.0127***		
	(0.000541)		
Part-time Share		0.0000577	
		(0.000215)	
Constant	0.0909***	0.0145	0.0979***
	(0.0126)	(0.0273)	(0.0123)
b[Matchers] -b[Net-Givers]	p=0.655	p=0.412	p=0.737
b[Matchers | IPP] -b[Net-Takers | IPP]	p=0.218	p=0.002	p=0.816
Socio Demographics	✓***	✓***	✓***
Company Controls	✓	✓	✓
Career Dummies	✓***	✓***	✓***
Dep. Dummies	✓***	✓**	✓***
Observations	831	857	831
R^2	0.817	0.244	0.198
Reg. Model	Linear	Linear	Linear

Table 11: Regressions of Financial Appreciation Controlling for Part-Time Effects

Notes: Standard errors clustered on team-level in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; For wage increases, we use data from 2016/2017 for participants in 2017 and data from 2017/2018 for participants in 2019. We use the value of financial award payments received in 2017 in percent of the 2017-wage level. *FTE-Wage Increase* is the full-time equivalent of wage increases. Asterisks for the control variables show the test result from an F-Test, testing the joint difference from zero.

H Wage Levels and Cooperative Attitudes

Columns (1) to (3) of Table 12 show that we find no significant relationship between wage levels and cooperative attitudes. In columns (4) to (6), we additionally control for an interaction of cooperative attitudes and age. It can be seen that in these regressions, Net-Takers and Matchers earn less than Net-Takers but that this effect decreases with age. This is likely related to the explanations mentioned by us in the main text such as in-/outflux of employees and leveling effects of collective bargaining agreements.

	(1) Ln(Wage) 2016	(2) Ln(Wage) 2017	(3) Ln(Wage) 2018	(4) Ln(Wage) 2016	(5) Ln(Wage) 2017	(6) Ln(Wage) 2018
Net-Takers	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Matchers	-0.00136	-0.000917	-0.0217	-0.0360	-0.123	-0.402**
	(0.0288)	(0.0188)	(0.0244)	(0.120)	(0.0950)	(0.177)
Net-Givers	0.0161	0.00706	-0.0123	-0.0167	-0.154*	-0.300*
	(0.0276)	(0.0156)	(0.0218)	(0.112)	(0.0911)	(0.174)
Age	0.0101***	0.0108***	0.0128***	0.00956***	0.00840***	0.00758***
	(0.00197)	(0.00123)	(0.00161)	(0.00271)	(0.00188)	(0.00287)
Net-Takers × Age				0	0	0
				(.)	(.)	(.)
Matchers × Age				0.000810	0.00276	0.00812**
				(0.00278)	(0.00202)	(0.00353)
Net-Givers × Age				0.000758	0.00358*	0.00618*
				(0.00253)	(0.00199)	(0.00355)
Constant	10.49***	10.40***	9.965***	10.51***	10.51***	10.24***
	(0.107)	(0.0788)	(0.213)	(0.130)	(0.0934)	(0.218)
b[Matchers] -b[Net-Givers]	p=0.378	p=0.604	p=0.655	p=0.853	p=0.719	p=0.507
b[Matchers | Age] -b[Net-Givers | Age]	.	.	.	p=0.983	p=0.647	p=0.516
Socio Demographics	✓***	✓***	✓***	✓***	✓***	✓***
Company Controls	✓***	✓***	✓***	✓***	✓***	✓***
Career Dummies	✓***	✓***	✓***	✓***	✓***	✓***
Dep. Dummies	✓***	✓***	✓***	✓***	✓***	✓***
Observations	367	857	467	367	857	467
R^2	0.785	0.752	0.746	0.785	0.752	0.749
Reg. Model	Linear	Linear	Linear	Linear	Linear	Linear

Table 12: Regressions of Wage Levels on Cooperative Attitudes

Notes: Standard errors clustered on team-level in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; For wage increases, we use data from 2016/2017 for participants in 2017 and data from 2017/2018 for participants in 2019. We use the value of financial award payments received in 2017 in percent of the 2017-wage level. Asterisks for the control variables show the test result from an F-Test, testing the joint difference from zero.

I Survey Outcomes and Cooperative Attitudes

In Table 13, we show OLS regression models of both variables on the share of Net-Takers, Matchers, and Net-Givers in a work team, estimated using regressions with analytical weights to account for team-specific participation rates . We detect no statistically relevant relationship to the perception of team stability as shown in column (1). However, in column (2), we find that members of teams that perceive themselves as being in a more cohesive team tend to be more cooperative in the experiment.

	(1) Team Stability	(2) Team Cohesion
Net-Taker Share	-0.0438	-0.192
	(0.423)	(0.397)
Matcher Share	-0.0709	-0.103
	(0.299)	(0.285)
Net-Giver Share	-0.282	0.651**
	(0.338)	(0.272)
Constant	2.950***	4.333***
	(0.258)	(0.255)
Socio-Demographics	✓	✓**
Company Controls	✓***	✓
Career Dummies	X	X
Department Dummies	X	X
Observations	299	299
R^2	0.076	0.046
Estimator	WLS	WLS

Table 13: Regressions of Team Cohesion on Team Composition

Notes: Robust standard errors in parentheses; * $p < 0.10, **p < 0.05$, *** $p < 0.01$; We use OLS with analytical weights that emphasize averages of teams that participated with a higher share of team members. We control for gender and age composition as well as average seniority. We do not control for career levels or function compositions because of the large number of different categories.