Competition and prosociality: A field experiment in Ghana

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Abstract

Competitive payment mechanisms are commonly used to promote higher productivity in the workplace. Yet, these types of incentives could reduce workers' willingness to cooperate in subsequent tasks. In this paper, we explore this question by conducting a lab-in-the-field experiment with workers from an agribusiness in Ghana where teamwork matters and a competitive but obscure bonus is in place. To investigate how prosociality towards a co-worker evolves, we use a between-subjects design where participants complete a real-effort task under a competitive, threshold, or random payment. We measure prosocialty before and after this task through (1) a public goods and (2) a social-value orientation game. We find the effect of competition on changes in prosociality to be context-specific. Competition reduces prosociality when the dispersion of payments is high, an effect that is driven by those who (1) win the competition, (2) believe the payment scheme is fairer, and (3) are less pre-exposed to competition in the day-to-day workplace. However, when there is less at stake, competition increases prosociality in a relative sense. This effect seems to be driven by subjects who are less reluctant to cooperate in the threshold (relative to the competitive) environment. Effort/output appears to be similar across payment schemes. Our findings suggest some issues that managers should keep in mind as they consider implementing relative performance schemes in the workplace.

JEL Codes: C93, D03, J33

Keywords: competitive payment, wage differences, prosociality, field experiment

1 Introduction

Competing for a prize is a very common instrument to enhance labor productivity in the workplace (consider for example merit pay in the form of bonuses). In fact, both theoretical and empirical literatures have argued that tournament-style payment schemes can increase effort and productivity (for example Lazear and Rosen, 1981; Erev et al., 1993; van Dijk et al., 2001; Irlenbusch and Ruchala, 2008; Bandiera et al., 2011). However, theoretical and in particular lab-experimental evidence also suggests that competition can crowd-out prosociality, as people are willing to sacrifice prosociality in order to win a competition (for example Lazear, 1989; Dirks and Ferrin, 2003; Chen, 2011; Harbring and Irlenbusch, 2011; Keck and Karelaia, 2012; Gill et al., 2013; Buser and Dreber, 2016). This has led to a tangential research agenda exploring the 'thin line' between competition and prosociality (for example Savikhin and Sheremeta, 2013; Milkman et al., 2014), as tends to be the case in most naturally-occurring workplace environments.

In this paper, we revisit the potential impact of a competitive payment scheme on subsequent prosociality and to some extent, effort/output. Our main novelties relative to previous literature are (1) the pre- and post-elicitation of measures of prosociality, which enables us to control for baseline differences that may confound the treatment estimates, (2) experimental variation in the strength of competition by having high and low dispersion conditions, and (3) the field context, which allows us to assess how relevant pre-characteristics or -conditions outside of 'the lab' might impact response to treatment. We thus seek to understand underlying mechanisms that previous literature has not, particularly in a context that might immediately impact workplace and development policy.

We recruit one third of the workers (619 out of 2044) from a banana-producing agribusiness in Ghana to participate in a lab-in-the-field experiment (artefactual field experiment in the terminology of Harrison and List, 2004) that tests the effect of a relative performance scheme on subsequent prosociality. The field context is one where teamwork (prosociality) matters for 50% of tasks (such as bunchcare, harvesting, and quality control in packing) and an obscure competitive bonus is currently in place (about one third of employees report being unaware of the workings of the bonus system).

We randomly and confidentially match two participants for the duration of a three-stage experiment.[1] In the first stage, subjects play a one-shot public goods game (PGG) and social value orientation (SVO) game (Murphy et al., 2011). In the second stage, they participate in a real-effort/output task that takes the form of individually assembling ballpoint pens. Each subject is randomly allocated to either a competitive, a threshold, or a random payment scheme that is further interacted with the difference between the winner's and loser's payoffs (dispersion) being high or low; thus, giving rise to a 3×2-design. In the competitive scheme, the participant who assembles most pens correctly wins; in the threshold scheme, every participant who correctly assembles more than a given number pens wins; and in the random scheme, the winner is determined by chance. In the high (low) dispersion conditions, the winner's payoff is 3 (1.5) times the loser's. Finally, in the third stage, subjects repeat the PGG and the SVO. We thus compare prosociality (PGG or SVO) in the third stage relative to the first stage, across the payment schemes and dispersion.

[1] This is comparable to van Dijk et al. (2002).

We find the following. When there is much is at stake, i.e. when the dispersion between the winner's and loser's payoffs is high, we confirm prior lab findings: Competition crowds out prosociality. This effect seems to mainly be driven by (1) those who win the competition (comparable to Erkal et al., 2011), (2) those who perceive the result of the competition to be fairer (comparable to Hoffman et al., 1994; Chen, 2011; Gee et al., 2016), and (3) lack of pre-exposure to competition in the day-to-day workplace (as proxied by bonus unawareness).

However, when there is less at stake, we find quite the opposite: Competition seems to increase prosociality. Closer analysis indicates that this result is due to the following: When the level of competition is low, subjects' willingness to be prosocial seems to be unaffected. However, when subjects are paid individually for their performance in the threshold treatment, they are less reluctant to cooperate with others and thus, appear less prosocial than in the competitive environment. This result could behaviorally be related to Schurr and Ritov (2016) who find that subjects's (dis)honesty is impacted by exposure to competitive environments.

Overall, our findings suggest that the impact of competitive schemes (such as bonuses and merit pay based on relative performance) on workplace cooperation is likely to be context-specific. So, managers should keep these issues in mind as they consider implementing relative performance schemes in the workplace.

The remainder of the paper proceeds as follows. Section 2 discusses the field context and study design. Section 3 presents the main findings. Finally, Section 4 concludes with some discussion and potential policy implications.

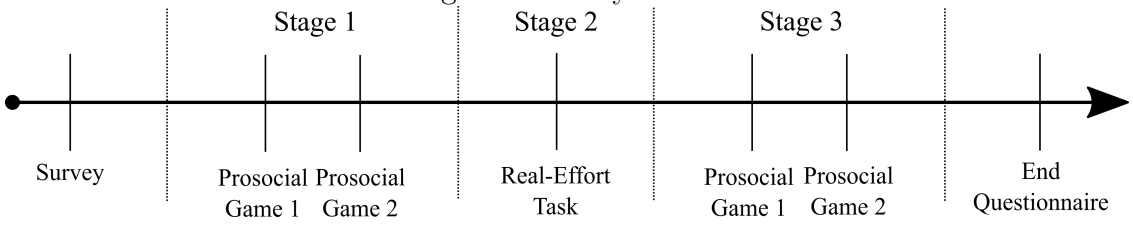
2 Study design

2.1 Field context

We recruit workers from a major banana-producing agribusiness in Ghana. The company is fair-trade certified and exports all of its produce, which constitutes 95% of Ghana's national production of bananas. Its workforce comprises approximately 1814 men and 230 women, all of whom are employed full-time. 97% of the employees work at the lowest level of the organizational hierarchy completing jobs such as harvesting and packaging. They report to about 60 supervisors (who on a day-to-day basis give guidance and direction) who in turn report to a handful of managers at the top of the organizational structure.

Banana production is divided into eight sectors. All sectors have the same structure: a farmland with banana trees and a cableway system moving the banana bunches to one of eight packing houses. The majority of employees are specialized in a specific job and work in a specific sector. Sectors 1-7 employ 200 to 250 people every day from Monday to Friday. About 45 people are employed on sector 8, where organic bananas are cultivated. The remaining workers are not attached to a specific sector and get assigned based on need every morning. Apart from being assigned to a sector, workers also specialize in a certain type of job such as caring for and harvesting of banana bunches, cutting leafs off the banana trees, and packaging bananas for transport. Workers in several of these jobs – bunchcare, harvesting, and quality control of packaging – report that they regularly work in teams.

Figure 1: Study session



Approximately one third of these workers also report being unaware of how the existing bonus system works.

2.2 Experiments and surveys

A study session comprised a pre-survey, a three-stage experiment (the crux of the session), and a post-questionnaire as shown in Figure 1. At the beginning of a session, we randomly and confidentially matched two participants (i and $-i$) who remained fixed throughout. Sessions lasted approximately three hours and paid 26.31 Ghanaian cedi/GHC (USD 7), relative to a daily wage equivalent of GHS 18. In what follows, we first discuss the experiments and then elaborate on the surveys. Complete instructions and survey instruments are available at the authors' websites as online appendices.

The experiment comprised three stages:

Stage 1 Prosociality was measured through two games, the order of which was randomized:

(a) A one-shot public goods game (PGG; Figure 2).
Subjects received an endowment of GHC 10 (represented by 10 paper coins during the task) and had to decide how much to invest in an individual or a joint account (represented by two envelopes). The return on investment in the private account was normalized to 1 while the marginal per-capita return from the joint account was 0.7. Subsequently, each subject i was asked to guess the amount the other person $-i$ in her/his group contributed. Correct guesses earned GHC 2; guesses that deviated by one unit earned GHS 1; and guesses that deviated by two units earned GHS 0.5.

(b) A social value orientation game (SVO; Figure 3).
We adapted Murphy et al. (2011) by dividing the original amounts by 12.5 such that incentives were similar across SVO and PGG. Due to time constraints, we used the reduced version in which subjects had to choose six money allocations for themselves (i) and their partners ($-i$). The preferred amounts across the six decision sets are summed up for i and $-i$. Then, the inverse tangent of the proportion of the sums is used to calculate an (SVO) angle, which categorizes a subject as altruistic, prosocial, individualistic, or competitive. Altruistic persons always maximize the other person's earnings. Very prosocial persons maximize the sum of the earnings. Individualistic persons always maximize their own earnings. Competitive persons maximize the difference between the earnings. This game was played via the strategy method.

Table 1: Experiment treatments

	Competition (C)	Threshold (T)	Random (R)
High (H)	most pens earns 15 other earns 5	≥ 40 pens earns 15 < 40 earns 5	random earns 15 other earns 5
Low (L)	most pens earns 12 other earns 8	≥ 40 pens earns 12 < 40 earns 8	random earns 12 other earns 8

Stage 2 Subjects completed a real-effort (RE) task that took the form of individual assembly of ballpoint pens for eight minutes. Each participant received components for up to 65 pens. Only properly functioning pens were counted for purposes of payment (more on the schemes further below). This task was chosen, since it allows for a simple assessment of quality: A properly functioning (high-quality) pen was one that was able to eject/retract; anything else was of low quality.[2]

We implemented a 3×2 between-subjects design with three different payment schemes (competitive, threshold, and random) and two different dispersion levels between winners and losers (high and low; see Table 1). Subjects were randomly assigned to one of the resulting six treatments.

In the competitive scheme (C), participants were paid relative to the other person in the group. The person who assembled most pens correctly won and earned 15 (12) in the high (low) dispersion condition. The loser earned 5 (8) in the high (low) dispersion condition. In the threshold scheme (T), any participant who assembled 40 or more pens correctly won and earned 15 (12). Those who did not, earned 5 (8). The threshold of 40 was based on the median output level observed during pilot sessions of the competition/high-treatment (CH). Finally, in the random scheme (R), the winner and loser were determined by luck of the draw. As in the other conditions, the winner earned 15 (12) and the loser earned 5 (8).

C is intended as our main competitive treatment as one's stage 2 payoffs are determined relative to the other person in contrast to T or R. Instead of implementing a piece-rate payment scheme, we conduct a threshold treatment in order to ensure that winners (losers) in T have the same stage 2 payoffs as winners (losers) in C and R. In other words, we want to ensure that differences in behavior across treatments are not driven by differential payoffs, conditional on being a winner or loser. Finally, R is intended to isolate a pure endowment effect of receiving stage payoffs (whatever one's exerted effort) on prosociality.[3]

Stage 3 Prosociality was measured again through the games in stage 1. Here too, the order was randomized. The decision sets for the SVO game were presented in a different order than stage 1 to mitigate mere replication of decisions made previously.

[2]We did not choose a RE task that entails teamwork. While this could have enabled us to study prosociality during the main task in the presence of competition (simultaneously, if you will), we wanted to disentangle the two for ease of interpretation. It is in this sense that the experiments test the impact of a competitive payment scheme on prosociality in a *subsequent* task.

[3]This type of treatment has also been compared to "murky" bonus schemes (e.g. Buser and Dreber, 2016).

Table 2: Number of observations

Treatment	Sessions	Individuals	Winner	Loser
CH	8	94	48 (51%)	46 (49%)
CL	9	107	50 (47%)	57 (53%)
TH	10	117	66 (56%)	51 (44%)
TL	10	105	69 (66%)	36 (34%)
RH	7	93	46 (49%)	47 (51%)
RL	7	103	54 (52%)	49 (48%)
Total	51	619	333 (54%)	286 (46%)

While participants knew that the experiment had three different stages, information revelation occurred in a specific way. Feedback on stage 2 only was provided after the RE task was complete, to mitigate reputation/repeated play considerations. In addition, subjects were informed that either stage 1 or 3 and only one of the games (PGG or SVO) would be selected for payment. These earnings were paid with certainty (unlike the tasks in stages 1 and 3) to enhance the salience of the main treatments. If the SVO were selected, the role of payoff-allocator (dictator) would randomly be determined (since the strategy method was used) and one of the six decisions would be selected for payment.

Upon arrival to the session, subjects completed a pre-survey. It included (1) basic socioeconomic characteristics, (2) work-related measures such as job satisfaction, and (3) behavioral measures such as social preferences (including inequality aversion), risk and time preferences (à la Charness and Viceisza, 2015), competitive preferences (à la Gneezy et al., 2009), Schwartz-values (à la Schwartz, 1992), and self-esteem.

Prior to departure, subjects also completed a post-questionnaire, which included perceptions on (1) fairness of the payment scheme, (2) feelings of rivalry, and (3) attachment to one's partner. As previously mentioned, the exact survey questions/modules are available from the authors' websites.

2.3 Sample

The company provided a listing of the 97% of employees who operate at the lowest level of the organizational hierarchy. This list included employee names and ids, sector numbers, and the type of job. While employees were randomly selected and assigned to experimental sessions, there was imperfect compliance in terms of actual attendance. Employees had to be released by their sector supervisors, some of whom were less cooperative. In addition, due to the nature of the tasks, packing house employees tended to be available during the morning. So, our sample is not necessarily representative of all sectors and job types across the company. We are thus cautious when discussing implications for workplace policy.

In total, we conducted 51 sessions, one in the morning and one in the afternoon of Monday through Friday, over the course of five weeks. The sessions were announced as "workshops" and supervisors were informed of selected employees a week in advance in order to release them at a given time. Table 2 shows the number of sessions, individuals, winners, and losers across treatment conditions. A total of 619 individuals (589 of whom were men) showed up.

For purposes of internal validity, we run balancing tests across a wide range of pre-

characteristics as well as baseline levels of the outcome variables, PGG and SVO. Table 3 contains a select set of variables, in particular those that are significantly different at the 5% level and below. As expected, subjects appear to be significantly different based on some company/work-related variables such as length of employment, bonus awareness, and the number of people they are "close to" during the experiment. In addition, subjects appear to be different on age, education, and preferences for risk and competition. Finally, subjects contribute differently to the PGG at baseline across treatments. In the following section, we will discuss how our estimation strategy deals with this unbalancedness.

Overall, the average participant is 31 years old, lives in a household with 5 persons (including children), has been employed by the company for 43 months, and reports being close to 1 person in the experiment session.

2.4 Empirical strategy

Given we collected measures of prosociality in Stages 1 and 3 (i.e. at baseline/pre- and follow-up/post-treatment) and there is evidence of baseline imbalances, we estimate our treatment effects according to the following random effects panel specification:

$$Y_{it} = \beta_0 + \beta_1 C_i + \beta_2 R_i + \tau_t + \beta_C C_i \tau_t + \beta_R R_i \tau_t + \beta_Z Z_i + \epsilon_{it}, \tag{1}$$

where Y_{it} is PGG at the individual level i in period t; C and R are dummies for individual-level exposure to treatment, competition and random (threshold is thus taken as the control); τ_t is a period dummy; Z_i is a set of (particularly unbalanced) covariates at the individual level; and ϵ_{it} is a well behaved error term.[4]

To further tease apart mechanisms, we introduce third-order interactions between the treatment dummies (C_i and R_i), non-experimental (survey) covariates of interest X_i, and the period dummy (τ_t) by running the following specification:

$$\begin{aligned} Y_{it} = \beta_0 + \beta_1 C_i + \beta_2 R_i + \tau_t + \beta_C C_i \tau_t + \beta_R R_i \tau_t + \beta_{CX} C_i \tau_t X_i + \beta_{RX} R_i \tau_t X_i + \\ \beta_X X_i + \beta_Z Z_i + \epsilon_{it}. \end{aligned} \tag{2}$$

We are primarily interested in the linear combination of (1) β_C and β_{CX} which sheds light on heterogeneous effects across C and T and (2) β_R and β_{RX} which compares R and T.

2.5 Hypotheses

Given we take threshold as our control, we might expect the coefficient on β_C to be negative, since competition should reduce subjects' willingness to cooperate in Stage 3 relative to Stage 1. This would also be in line with prior literature such as Buser and Dreber (2016). The sign of the random coefficient, β_R, could point in either direction since it is likely to depend on subjects' perceptions of good versus bad luck relative to a context where they had more control over the "fruits of their labor" (i.e. the threshold treatment). However, it

[4]While we run all specifications for both PGG and SVO, we find limited impacts on SVO as an outcome for prosociality. So, to economize on space, we only present results for PGG. All SVO specifications are available from the authors upon request.

is an empirical question whether and if so, how these coefficients are impacted by (high and low) dispersion and whether or not a subject is a high earner (i.e. wins in C; has good luck in R; or surpasses the threshold in T).

For example, prior literature (such as Erkal et al., 2011) finds that more self-regarding (i.e. less prosocial) types tend to provide more effort in a (stronger) competition and thus, end up winning. As a result, they contribute less after the competition relative to their more other-regarding (more prosocial) counterparts. If such mechanisms are at play here, we would expect the high-dispersion condition to give rise to stronger incentives to compete and in turn, less prosociality after the competition (since less prosocial types would end up winning these competitions). To explore whether these aspects are at play, we run specifications 1 and 2 separately for high and low dispersion. We also introduce "winner" (our term for high earners regardless of their treatment condition: C, R, or T) as one of the third-order-interactions X_i in specification 2. The latter is also supported by the work of Schurr and Ritov (2016) who find that winners behave in a more dishonest manner than losers after a competition. In particular, winning against another person triggers such an effect while surpassing an individual goal does not. So, we might expect winners to be even less prosocial in C versus T.

When running specification 2, we also introduce other covariates X_i (some of which are guided by prior literature) to test for potential mechanisms. Among these are: (1) typical behavioral measures such as trust, risk, and time; (2) fairness (see for example Hoffman et al., 1994; Chen, 2011); (3) preferences for competition (see for example Brandts et al., 2009; Gneezy et al., 2009); and (4) potentially relevant external variables such as (a) whether the subject engages in teamwork (cooperation) and (b) whether the subject is aware of the so-called attendance bonus in the day-to-day workplace.

3 Results

3.1 Descriptives

To get a sense of potential treatment effects, we start with some graphs. Figures 4 and **??** look at the difference in PGG contributions between Stages 1 and 3 across threshold (T), competition (C), and random (R); low (L) and high (H) dispersion; and losers and winners (panels B and C in both figures). A few aspects are striking:

1. The bars for T and C point in opposite directions. Evidence is somewhat mixed for R.

2. Dispersion seems to matter. The bars for H point in the expected direction, specifically contributions in C are lower in stage 3 than stage 1 relative to contributions in T. However, the bars for L show the opposite.

3. The bars for H resemble those for winners (right-hand side of panel C) and the bars for L resemble those for losers (left-hand side of panel B).

Collectively, these findings suggest that competition reduces prosociality, but only when the difference between the winner's and loser's payoff is high (i.e. when there is much at

stake). However, when such difference is low, competition increases prosociality. Additionally, the effects mainly seem to be driven by whether or not one wins the competition. Indeed, statistical tests confirm these findings.

Figure 5 shows the distribution of effort across treatments. On average, subjects assembled about 40 pens. Both on average and over the whole distribution, there are limited statistical impacts. So, effort appears to be unaffected by the type of payment scheme, regardless of dispersion.

The above effects/figures are unconditional. As stated in Section 2.3, there are some baseline imbalances across treatments. So, we now turn to conditional impacts according to the specifications in Section 2.4.

3.2 Treatment effects

Table 4 presents treatment effects on PGG contributions as a measure of prosociality. In the first column, we pool observations across high and low dispersion under the different payment schemes: C, R, and T. Looking at the pooled data, competition seems to have no effect on prosociality. However, once we run separate regressions for high and low dispersion, the treatment effects become significant. In particular, since the effects for high and low dispersion are in opposite directions, they cancel each other out when the data are pooled.

Specifically, columns (2) and (4) suggest that under high dispersion prosociality decreases by approximately 5% ($p < 0.05$) in C relative to T. For the sake of brevity, the table does not explicitly report the coefficients for the Z covariates.

On the other hand, under low dispersion columns (3) and (5) suggest that prosociality *increases* by approximately 7% ($p < 0.05$) in C relative to T. This was an unexpected effect. Revisiting the descriptives and Figure 4 more closely, we realize that this effect should be put slightly differently: When the level of competition is low, subjects' willingness to cooperate seem to be unaffected. However, when they are paid individually for their performance in T, they are less reluctant to cooperate with others and thus, reduce their contributions by approximately 7% more than in C.

One explanation could be that initial contributions in PGG are different under TL (53%) and CL (46%; rank-sum test with $p = 0.04$). As such, there is less room to decrease contributions under CL relative to TL. An alternative, plausibly more behavioral, explanation is related to Schurr and Ritov (2016) who find that subjects behave less prosocially (in a more dishonest way) when winning in a competitive versus an individual task. So, conversely subjects might behave more prosocially (in a more honest way) when losing in a competitive versus an individual task. There is no direct (significant) evidence of the latter, as discussed in the next section.

3.3 Mechanisms

To investigate potential mechanisms beyond those that are feasible using only our experimental variations, we explore specification 2. Table 5 summarizes these findings/coefficients, which are the linear combinations explained in Section 2.4.

We find that:

1. Under high dispersion:

   (a) Winners: Consistent with Erkal et al. (2011), those who win the competition are less likely to be prosocial after having been exposed to the competition. This could indeed be due to selection on types, although this specification controls for all of the X and Z variables discussed previously.

   (b) Fairness: Consistent with Hoffman et al. (1994), those who believe in fairness are less likely to be prosocial after having been exposed to the competition. This is likely because these subjects feel more entitled and thus, believe they deserved their payments more so than had they been in the threshold treatment. This also relates to Gee et al. (2016) who find that when income is earned through performance, individuals use income differences as a heuristic to infer relative deservingness.

   (c) Preferences for competition: Those who dislike competition are less likely to be prosocial after having been exposed to a forced competition due to their lack of preference to begin with.

   (d) Lack of bonus awareness: Those who are less pre-exposed to competition (as proxied by their unawareness of an existing work bonus) are less likely to be prosocial after having been exposed to competition. This is consistent with the fact that subjects' pre-exposure to comparable institutions outside of the experiment interacts with their behavior in the experiment. Those who are unaware of the bonus might perceive competition in the experiment as more divisive and thus respond more negatively.

   (e) Finally, other variables such as lack of trust and inequality aversion also correlate with reduced prosociality across competition and threshold.

2. Under low dispersion, none of the covariates significantly predict differential behavior across C versus T. That said, losers do have a greater (positive) point estimate (albeit statistically insignificant) than winners, possibly suggesting an effect à la Schurr and Ritov (2016) as mentioned previously.

4 Conclusion

In this study, we conduct lab-in-the-field experiments with workers from an agribusiness in Ghana to test whether competitive (relative to individual threshold) payment schemes crowd out prosociality (cooperation) in subsequent tasks. We thus revisit a question that has been addressed in pure lab environments (e.g. Buser and Dreber, 2016), in a context where the findings have the potential to immediately inform workplace and development policy. We seek to understand underlying mechanisms by (1) experimentally varying the strength of the competition through the dispersion between the winner's and loser's payoffs and (2) interacting treatment variation with survey covariates as well as external, work-related variables.

When there is much is at stake, i.e. when the dispersion between the winner's and loser's payoffs is high, we confirm prior lab findings: Competition crowds out prosociality. This effect seems to mainly be driven by (1) those who win the competition (comparable to Erkal et al., 2011), (2) those who perceive the result of the competition to be fairer (comparable to Hoffman et al., 1994), and (3) lack of pre-exposure to competition in the day-to-day workplace (as proxied by bonus unawareness).

However, when there is less at stake, we find quite the opposite: Competition seems to increase prosociality. Closer analysis indicates that this result is due to the following: When the level of competition is low, subjects' willingness to be prosocial seems to be unaffected. However, when subjects are paid individually for their performance in the threshold treatment, they are less reluctant to cooperate with others and thus, appear less prosocial than in the competitive environment. This result could behaviorally be related to Schurr and Ritov (2016) who find that subjects's (dis)honesty is impacted by exposure to competitive environments.

Overall, our findings suggest that the impact of competitive schemes (such as bonuses and merit pay based on relative performance) on workplace cooperation is likely to be context-specific. When there is much to gain from the competition, prosociality tends to be crowded out. However, when there is little to gain, prosociality need not be crowded out. These effects seem to be mediated by related factors such as (1) winners of the competition, (2) workers' types (such as preferences for fairness, competition, and trust attitudes), and (3) pre-exposure to competitive schemes/environments. So, managers should keep these indicators in mind as they consider implementing such policies in the workplace.

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A Figures

Figure 2: PGG poster

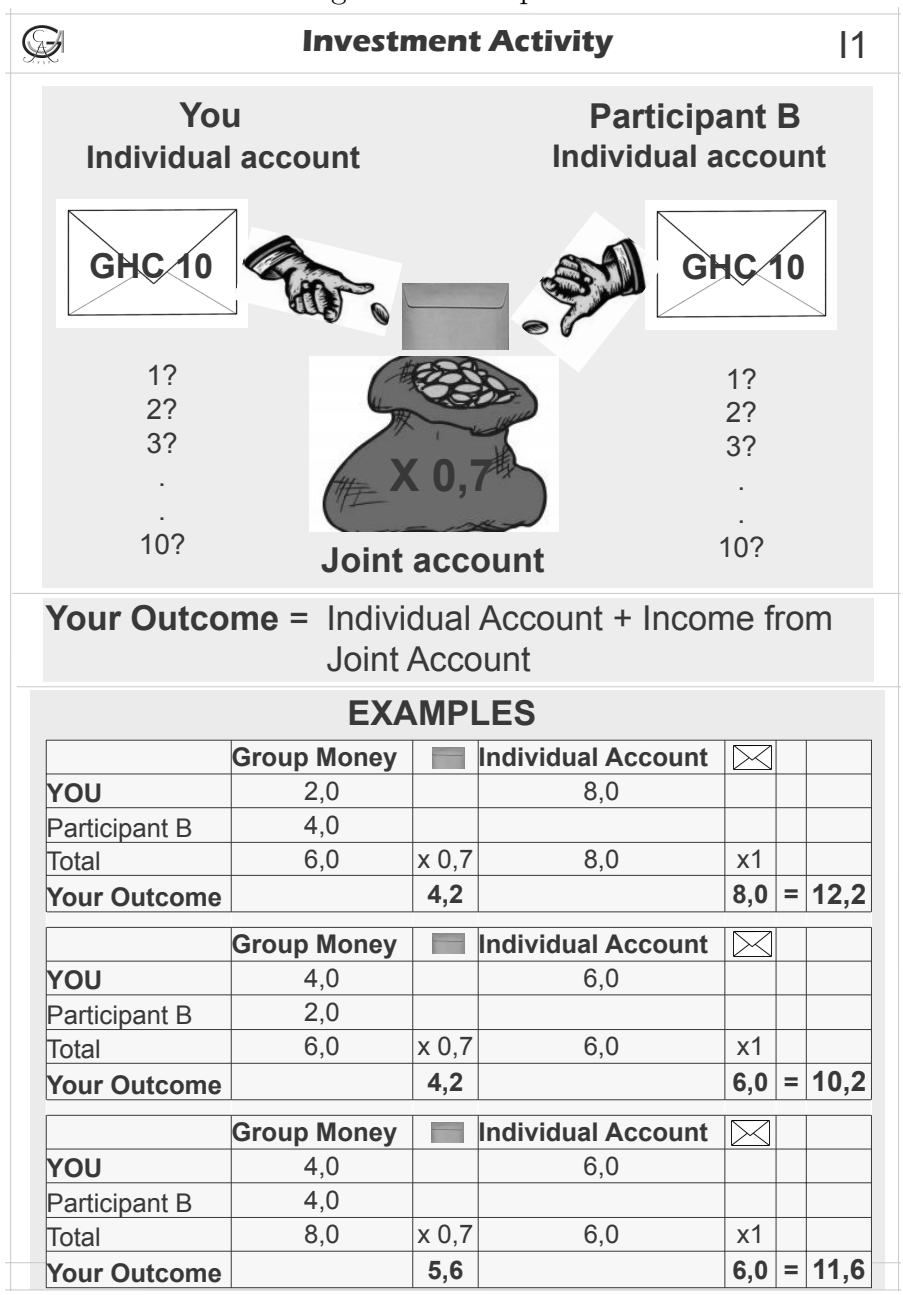


Figure 3: SVO poster

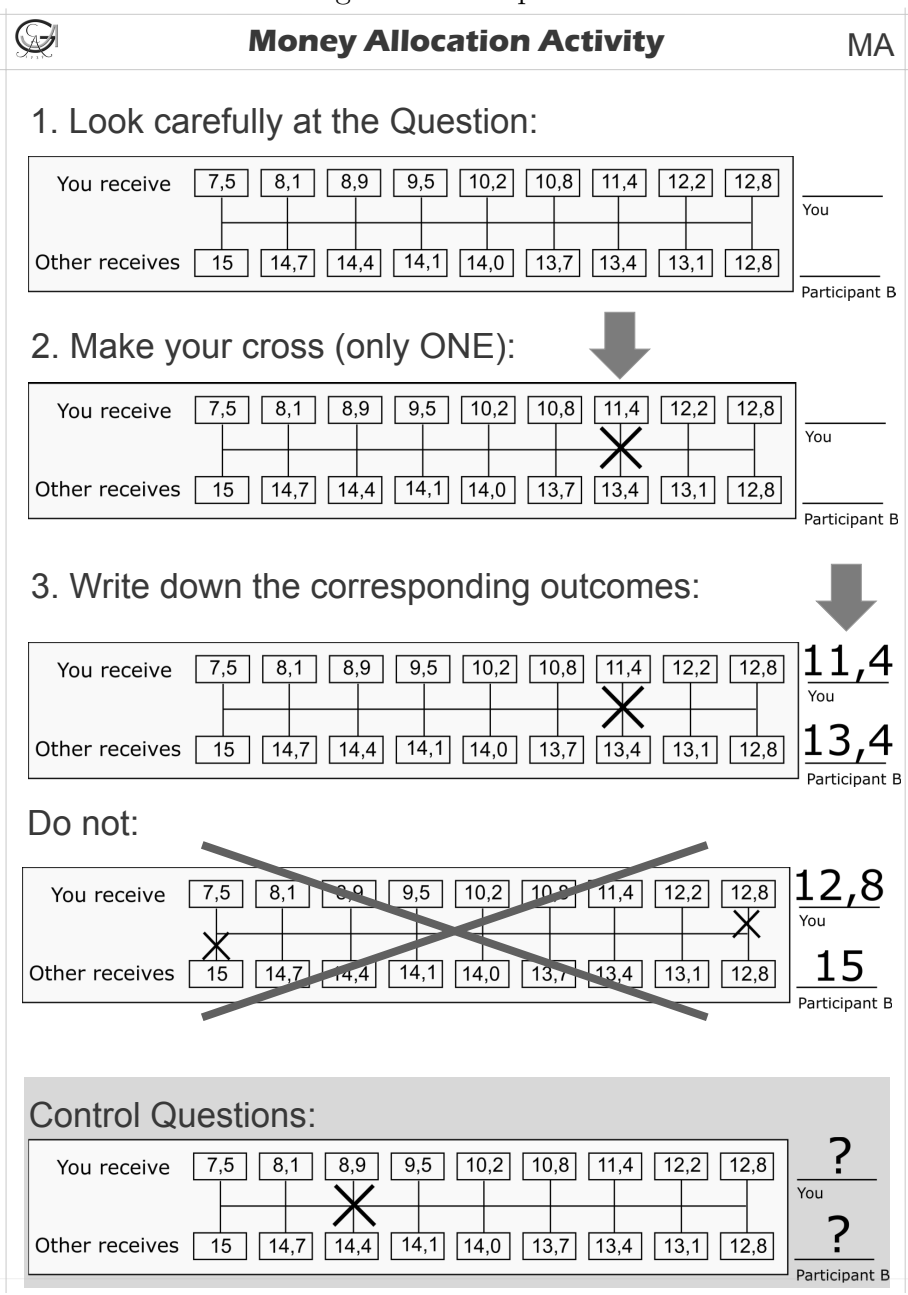
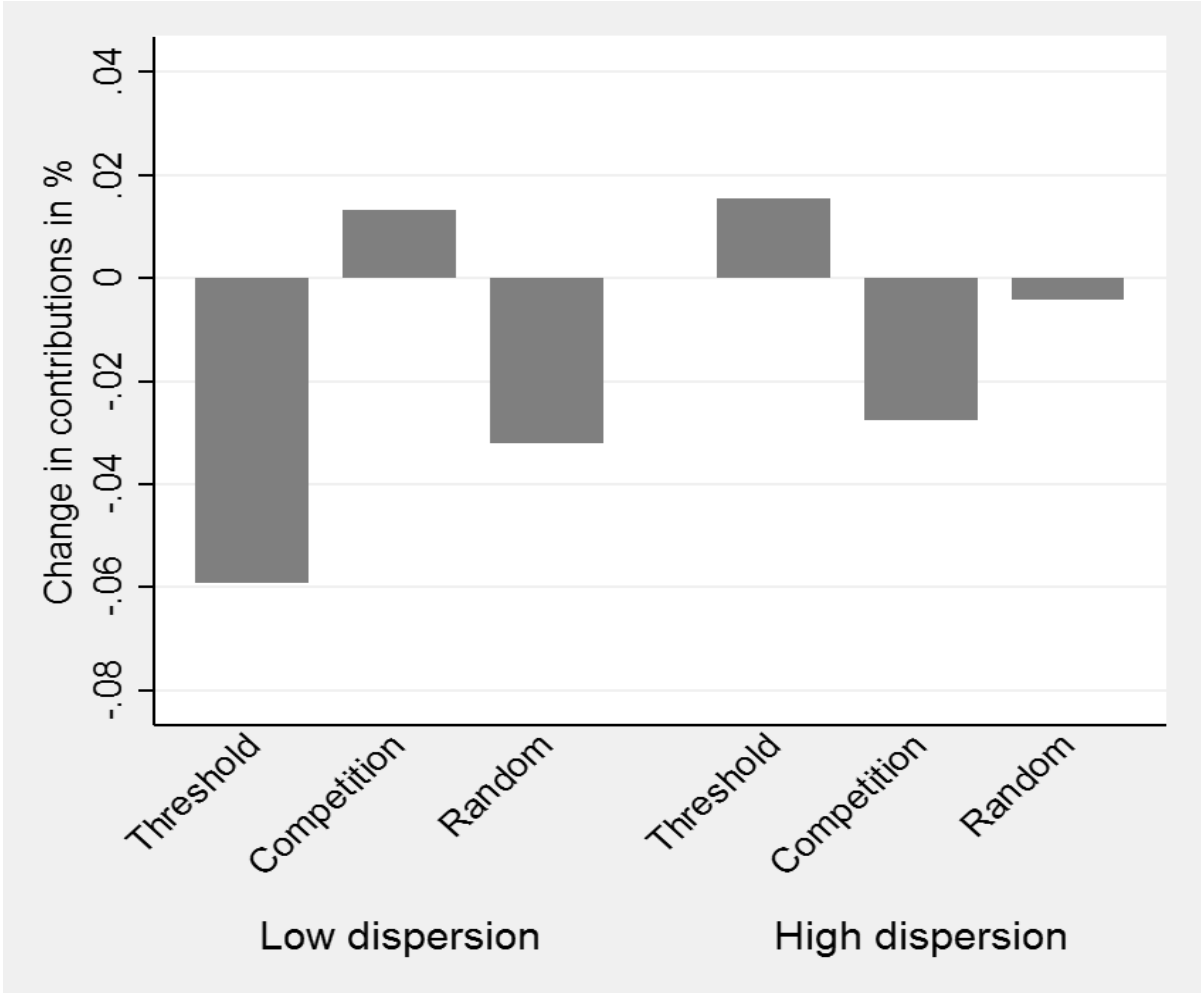


Figure 4: Changes in PGG contributions across treatments



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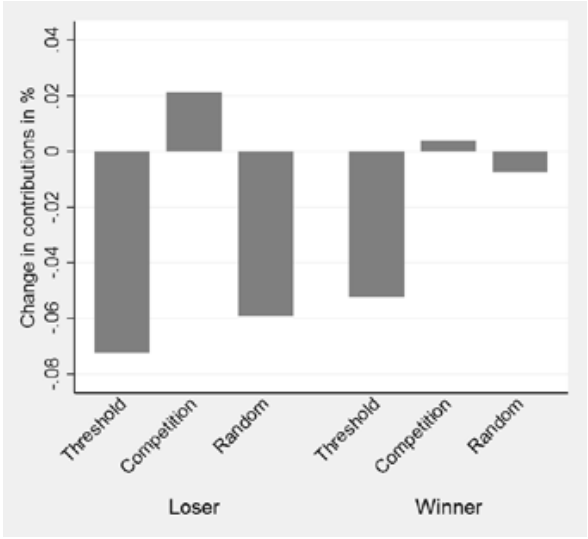
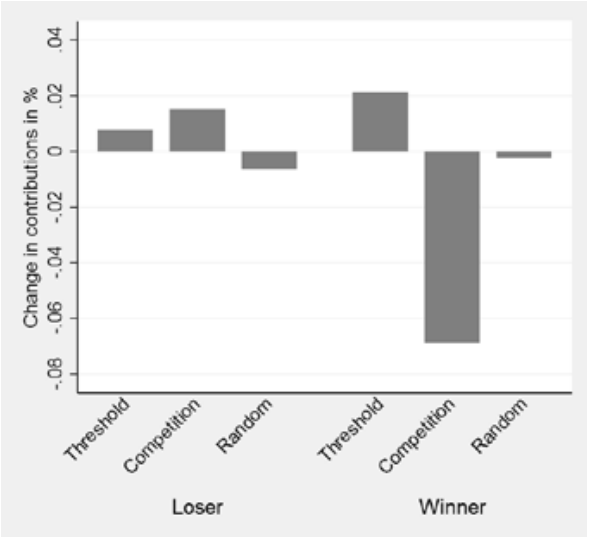
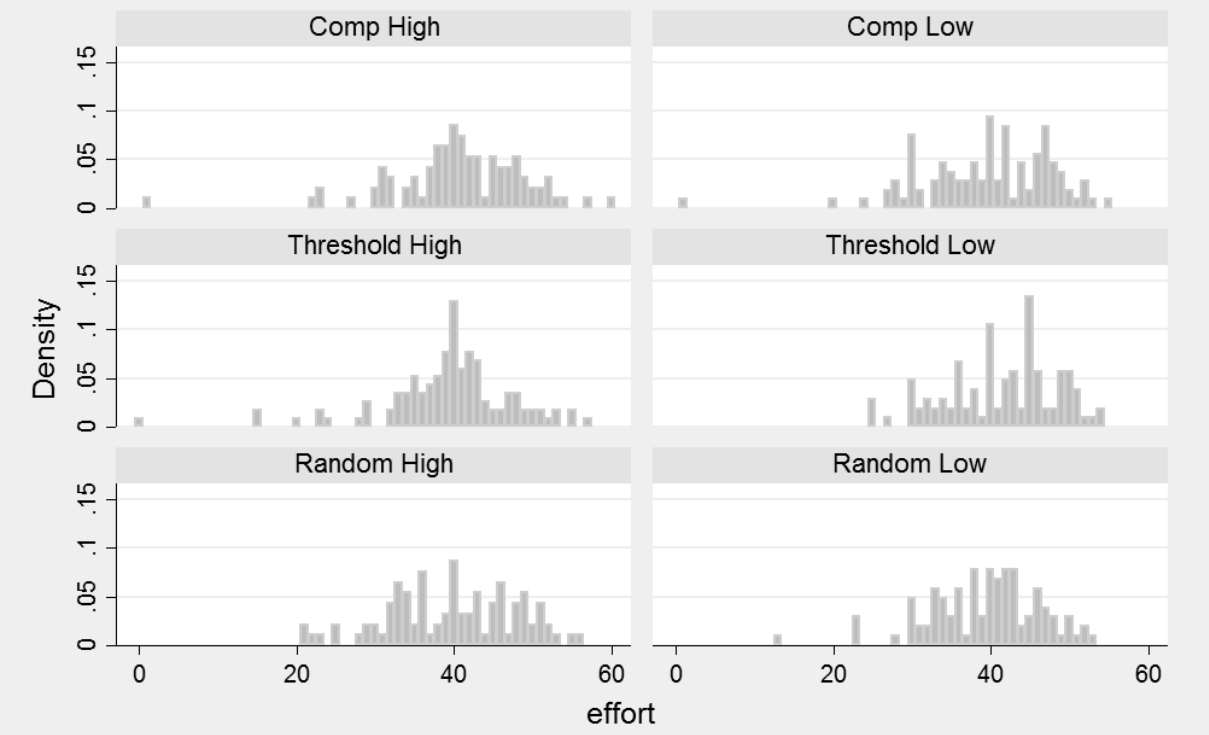


B: Low dispersion



C: High dispersion

Figure 5: Distribution of effort across treatments



B Tables

Table 3: Internal validity balancing tests

Variables	N_i	All	CH	CL	TH	TL	RH	RL	p-value
Demographics									
Age	618	31.26	31.94	30.80	32.92	32.13	29.88	29.62	0.03**
Female	617	0.05	0.10	0.05	0.05	0.07	0.01	0.00	0.02**
Years of schooling	586	9.98	10.07	10.21	9.19	9.80	10.47	10.29	0.00***
Ethnicity[a]	617	2.66	2.67	2.70	2.74	2.51	2.62	2.65	0.71
Marital Status[b]	610	1.52	1.56	1.54	1.46	1.52	1.48	1.53	0.85
HH size	603	5.20	5.91	4.82	5.56	4.92	4.74	5.23	0.06
Poverty[c]	601	1.34	1.40	1.49	1.49	1.32	1.26	1.31	0.40
Behavioral									
Trust[d]	619	0.89	0.95	0.87	0.92	0.89	0.86	0.85	0.22
Fairness[e]	618	0.39	0.34	0.38	0.37	0.40	0.39	0.46	0.67
Risk[f]	606	3.88	3.41	3.70	3.37	3.86	4.59	4.43	0.00**
Inequality averse[g]	619	2.51	2.70	2.35	2.75	2.44	2.37	2.42	0.18
Time[h]	605	202.20	191.68	186.75	157.57	192.07	184.13	300.70	0.26
Competition[i]	619	0.62	0.46	0.70	0.52	0.62	0.71	0.73	0.00**
Schwartz values[j]									
Benevolence	617	4.53	4.39	4.61	4.50	4.51	4.66	4.48	0.07
Conformity	618	4.57	4.54	4.64	4.60	4.55	4.53	4.51	0.67
Collectivism	619	0.73	0.62	0.73	0.71	0.78	0.75	0.76	0.15
Company-related									
Months employed	611	42.60	41.18	45.74	49.41	45.17	42.75	30.20	0.00***
Monthly wage	610	374.19	377.49	390.38	373.99	369.43	365.85	366.87	0.18
Aware of bonus	619	0.69	0.46	0.72	0.62	0.71	0.77	0.82	0.00***
Works in team	614	0.45	0.55	0.45	0.51	0.38	0.46	0.36	0.06
Job satisfaction[k]	615	4.50	4.33	4.60	4.51	4.38	4.64	4.56	0.00***
Job type	606	4.79	4.61	4.92	4.56	4.89	5.39	4.44	0.16
Sector	602	4.64	4.89	4.49	4.26	4.97	4.96	4.41	0.08
Close relations[l]	615	1.18	1.16	1.14	1.53	1.24	0.58	1.30	0.00***
Outcomes at baseline									
PGG	619	0.49	0.47	0.46	0.50	0.53	0.45	0.52	0.04**
SVO	619	21.82	20.95	22.78	22.57	22.76	18.67	22.62	0.09

*** $p < 0.01$, ** $p < 0.05$. The last column is obtained by running a one-way ANOVA test. These values are also robust to running a seemingly unrelated regression model for continuous variables and a χ^2-test for categorical variables. The tests for baseline equivalence of outcomes (PGG and SVO) are additionally robust to a Wilcoxon rank-sum test.

Variable definitions (see questionnaires for additional detail): [a] 1=Akan, 2=Ewe, 3=Ga/Dangbe, 4=Krobo, 5=Hausa; [b] 1=married, 2=single, 3=separated, 4=divorced, 5=widowed; [c] number of adults per bedroom in the home; [d] 0=most people can be trusted, 1=need to be very careful trusting; [e] 0=most people take advantage, 1=most people try to be fair; [f] number of seeds out of 10 chosen that are risky; [g] based on payoff equalization or not (aka Fehr allocation activity); [h] average GHC needed in one month to sacrifice 100 GHC tomorrow; [i] based on choice to be paid relative to someone else (compete) in a marble activity; [j] based on Schwartz (1992); [k] 1=terrible, 2=unhappy, 3=mixed, 4=mostly satisfied, 5=pleased; [l] number of people known during experiment session.

Table 4: Treatment effects on PGG for specification 1 (pooled, high-low dispersion)

VARIABLES	(1)	(2)	(3)	(4)	(5)
τ	-0.0167	0.0165	-0.0506**	0.0165	-0.0506**
	(0.0163)	(0.0154)	(0.0221)	(0.0158)	(0.0226)
C	-0.0626**	-0.0483	-0.0744**	-0.0492	-0.101***
	(0.0244)	(0.0325)	(0.0348)	(0.0333)	(0.0275)
R	-0.0330	-0.0708***	5.91e-05	-0.0681***	-0.00855
	(0.0203)	(0.0213)	(0.0287)	(0.0223)	(0.0251)
$C * \tau$	0.0107	-0.0546**	0.0712**	-0.0546**	0.0712**
	(0.0250)	(0.0272)	(0.0335)	(0.0279)	(0.0343)
$R * \tau$	-0.0041	-0.0237	0.0179	-0.0237	0.0179
	(0.0223)	(0.0211)	(0.0336)	(0.0217)	(0.0344)
Constant	0.516***	0.515***	0.516***	0.534***	0.159
	(0.0109)	(0.0148)	(0.0165)	(0.160)	(0.166)
Observations	1,052	500	552	500	552
Number of id	526	250	276	250	276
Covariates	NO	NO	NO	YES	YES
Dispersion	Pooled	High	Low	High	Low

Robust standard errors clustered at the session level in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Covariates: age, female, years of schooling, household (HH) size, HH income equivalent, risk, inequality aversion, preference for competition, months employed, bonus awareness, job satisfaction, close relations, self-esteem, benevolence, order of PGG and SVO, day and time of the session.

Table 5: Heterogeneous effects on PGG for specification 2

	(1)	(2)	(3)	(4)
	C vs. T	C vs. T	R vs. T	R vs. T
VARIABLES	High Disp.	Low Disp.	High Disp.	Low Disp.
Income effect				
loser	-0.0599	0.1083	-0.0283	-0.0566
	(0.0598)	(0.1146)	(0.0431)	(0.1010)
winner	-0.1328**	0.0822	-0.0233	-0.0787
	(0.0579)	(0.1069)	(0.0515)	(0.1127)
Behavioral variables				
not trusting	-0.1290**	0.0464	-0.0126	-0.0623
	(0.0557)	(0.0706)	(0.0573)	(0.0700)
trusting	-0.0637	0.1442	-0.0390	-0.0730
	(0.0594)	(0.1643)	(0.0544)	(0.1546)
unfair	-0.0595	0.0778	0.0196	-0.0815
	(0.0677)	(0.1209)	(0.0481)	(0.1101)
fair	-0.1332***	0.1127	-0.0711	-0.0538
	(0.0472)	(0.1025)	(0.0478)	(0.1144)
not inequality averse	-0.0435	0.0558	0.0155	-0.0637
	(0.0501)	(0.1057)	(0.0425)	(0.1094)
inequality averse	-0.1492**	0.1347	-0.0671	-0.0715
	(0.0756)	(0.1205)	(0.0529)	(0.1131)
time	0.0000	-0.0001	0.0001	-0.0001
	(0.0000)	(0.0001)	(0.0001)	(0.0001)
risk	0.0109	0.0148	-0.0114	0.0204
	(0.0101)	(0.0133)	(0.0101)	(0.0150)
dislikes competition	-0.1200*	0.1197	-0.0322	-0.0013
	(0.0614)	(0.1129)	(0.0590)	(0.1097)
likes competition	-0.0727	0.0708	-0.0193	-0.1339
	(0.0560)	(0.1093)	(0.0426)	(0.1095)
Work-related variables				
does not work in teams	-0.0848	0.0167	-0.0786*	-0.0686
	(0.05270)	(0.0905)	(0.0455)	(0.0877)
works in teams	-0.1079	0.1739	0.0270	-0.0667
	(0.0692)	(0.1248)	(0.0712)	(0.1325)
is not aware of bonus	-0.1125**	0.0637	-0.0878**	-0.1705
	(0.0469)	(0.1195)	(0.0376)	(0.1180)
is aware of bonus	-0.0802	0.1268	0.0362	0.0352
	(0.0611)	(0.1111)	(0.0567)	(0.1210)

Robust standard errors clustered at the session level in parentheses.
*** p<0.01, ** p<0.05, * p<0.1