Do Mixed Incentives Interact with the Explicit Communication of Organizational Priority?

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Abstract:

As organizational structures and job responsibilities have evolved, employees increasingly find themselves responsible for tasks that must be completed individually and for tasks that must be completed in groups. This raises the question of how to appropriately motivate effort towards both types of tasks. In these circumstances, organizations can motivate employees’ effort by explicitly communicating their specific expectations to employees and/or using mixed incentives (i.e., a combination of both group and individual incentives). In this study, we experimentally examine the interactive effects of explicit communication of organizational priority and mixed incentives on effort allocations to group and individual tasks. We find that, in the absence of mixed incentives, communicating organizational priority can activate the social norm of cooperation and lead to greater increases in effort allocation to group tasks but not individual tasks. However, we find opposite results when mixed incentives are present. That is, explicitly communicating organizational priority leads to greater increases in effort on individual tasks compared to group tasks. Our results have practical implications to organizations about the use of these two approaches to influence employees’ effort decisions and add to the growing stream of literature on communication and incentives.

Keywords: priority communication, mixed incentives, social norm, group and individual tasks, effort

Data availability: Available upon request
I. INTRODUCTION

Monetary incentives are one of the most common features of management control systems, used to motivate and improve employees’ performance. As a result, monetary incentives have received a great deal of attention in the management accounting literature (Bonner and Sprinkle 2002). As organizational structure and job responsibilities have evolved, fewer and fewer employees are only responsible for completing individual tasks and rather operate in a complex environment consisting of both individual and group tasks. This raises questions of how to appropriately motivate effort towards both types of tasks. In these circumstances, organizations may either explicitly communicate their expectations with employees and/or use a combination of both group and individual incentives (hereafter, mixed incentives) to motivate employees’ effort. In this study, we examine the potential interactive effect of management’s explicit communication of organizational priority and mixed incentives on effort allocations towards group and individual tasks.

There is substantial evidence that a mix of group and individual incentives are often used in practice (Hwang et al. 2009; Libby and Thorne 2009; Lawler and Mohrman 2003; Sisk 2005; Parker et al. 2000). However, prior research asserts that mixed incentives compensating both group and individual performance may create a social dilemma where group members are faced with a conflict between individual and collective interests (Barnes et al. 2011) and may also send confusing signals to individuals as to where to direct their effort resulting in negative synergy (Libby and Thorne 2009). In tasks without groups, Christ et al. (2016) find that monetary incentives on both dimensions of speed and accuracy are inferior to monetary incentives on a single dimension and a feedback control on the other. Kachelmeier et al. (2015) demonstrate that adding a value statement negates the productivity gains from piece-rate incentives, relative to
fixed pay. However, while Christ et al. (2016) examines incentives on multiple dimensions of a single task and Kachelmeier et al. (2015) examine communication of values, neither of these studies involves group tasks or compare the effectiveness between group and individual tasks. Group tasks are unique because of the interdependence on others’ actions. Therefore, in this study, we investigate when both group and individual responsibilities exist, how management’s explicit communication of organizational priority can change employees’ effort when mixed incentives are present as compared to absent.

When mixed incentives are absent (i.e., only fixed compensation is offered), employees lack economic incentives to influence their effort level. However, in this case, we expect that an explicit communication from management prioritizing the group task can help employees identify that the group task/objective is more important and thus allocate more of their effort to group tasks. This is because, according to Bicchieri’s (2006) model of social norms, individuals are likely to act in the interest of a group (even with a sacrifice of personal monetary benefits) representing a cooperation norm that is activated by the explicit communication of an organizational priority on group tasks. However, we do not expect the communication of an organizational priority on individual tasks will lead to a symmetric increase in effort allocation to individual tasks in the absence of mixed incentives (i.e., when only fixed compensation is provided). Given that the fixed compensation offers no additional wealth, we do not anticipate the self-interested employee will allocate additional effort to the individual tasks because

1 We acknowledge that Christ et al. (2016) and Kachelmeier et al. (2015) can both represent a broader construct of mixed incentives that includes a situation in which compensation is based on more than a single action or outcome. The discussion of mixed incentives in this study, unless otherwise noted, refers to the more specific case of mixed incentives of a combination group and individual incentives.

2 The cooperation norm is activated, according to the model, because of the establishment of empirical and normative expectations. Empirical expectations are the belief that others will conform to the norm, and normative expectations are the belief that others expect you to conform to the norm.
individual tasks are already aligned with self-interest (in the terms of Bicchieri’s model self-interest is always activated).

In the presence of mixed incentives, however, different predictions arise. Since mixed incentives offer incentives on both group and individual tasks, adding an organizational priority that is aligned with one incentive would offer more clarity to employees, which can motivate employees to allocate more effort to that particular task. However, when mixed incentives are present, a common social dilemma is created that employees face a conflict between group and individual tasks. Thus, under mixed incentives, individuals in a group setting can feel less certain about the activation of the cooperation norm in others and are motivated to free ride. Taken together, we expect that when mixed incentives exist, the communication of an organizational priority on individual tasks is better aligned with self-interest, and although communicating an organizational priority on group tasks is aligned with social norm activation, this latter alignment is less salient due to mixed incentives creating a social dilemma. Thus we predict a reversal of the effectiveness from communication of an organizational priority under mixed incentives compared to the fixed compensation conditions.

We employ an experimental methodology to address our research question. Ninety-two upper division students at a large university participated in an experiment with a multi-period 3 × 2 design. The independent between-subject factors were Communication of Organizational Priority (no priority, group priority, and individual priority) and Mixed Incentives (absent versus present). In the absence of mixed incentives, participants are provided fixed compensation. In the presence of mixed incentives, we implement monetary incentives on group and individual tasks such that the top half of those (groups or individuals) contributing effort receive a bonus whereas the bottom half do not. In all conditions, participants were asked to assume they were working in
a normal work environment in which they decide how much costly effort to allocate to group and/or individual tasks. In the presence of mixed incentives, these effort allocations determine who will be awarded the bonuses.

As predicted, we find that when fixed compensation is provided, communication of an organizational priority on group tasks produces greater effort towards group tasks but communicating an organizational priority on individual tasks does not affect effort allocation towards individual tasks. Also as expected, we find the opposite results hold when mixed incentives are present, which demonstrates an interaction effect on effort changes between mixed incentives and explicit communication of organizational priority. That is, mixed incentives have the largest benefit when individual tasks are prioritized consistent with motivating employees through self-interest. However, in the absence of mixed incentives, based on the activation of a cooperation norm, prioritizing group tasks offers a larger benefit.

This study extends the prior literature on mixed incentives related to group and individual incentives by adding management’s explicit communication of an organizational priority. Arguably, given that mixed incentives can send confusing signals, explicit communication of organizational priority is likely to influence employees’ effort. Our results suggest that mixed incentives do not seem to give a clear signal about where to focus effort, which allows for gains to be achieved by explicitly communicating an organizational priority. However, we find that the level of employees’ effort contribution is contingent on which type of task is prioritized. Thus our understanding of potential benefits from explicit communication of an organizational priority on mixed incentives is incomplete with respect to this key contextual factor. Our findings demonstrate an asymmetric effect of communication of an organizational priority on effort in the presence versus absence of mixed incentives.
The results of this study also add to the literature on management’s communication of organizational priorities by demonstrating that explicit organizational communication can induce effort towards both individual and group tasks. While standard agency theory predicts that the communication of an organizational priority alone (i.e., in the absence of a monetary incentive such as mixed incentives) will not increase effort in group tasks based on assumptions of self-interest and effort aversion, we demonstrate that communication consistent with a social norm of cooperation (i.e., explicit communication of an organizational priority on group tasks) can achieve efficiency gains and induce effort. However, we find that explicit communication of an organizational priority on individual tasks induces effort only in the presence of mixed incentives.

The findings of this study also have practical implications. Our results provide insights to organizations about a potentially less expensive approach (i.e., communication of organizational priority) to a relatively more expensive approach (i.e., formal incentive systems) to help motivate and influence allocations of effort. Specifically, if organizations want employees to focus on group tasks, management can clearly communicate an organizational priority on group tasks to employees and do not necessarily need to introduce incentive systems, though the incentive would add incremental benefit, resulting in a cost/benefit analysis. On the other hand, if organizations would like their employees to increase effort allocation to individual tasks, it is important to introduce monetary incentives in order to receive incremental gains.

The remainder of this paper is organized as follows. The following section develops the hypotheses. Section III describes the methodology and Section IV presents the results. The final section summarizes and concludes the paper.

II. THEORY AND HYPOTHESES
Background

Many organizational tasks require different expertise, knowledge, and skills. Thus, groups are desirable because they can increase application of specialized knowledge, improve processes and increase flexibility to change, so that the collective performance of the group is greater than it would be if each employee were to act alone (e.g., Merchant and Van der Stede 2007; Zimmerman 2006). With groups becoming increasingly important in the U.S. and foreign workplace, organizations have been exploring using different incentive systems to motivate employees’ effort in group environments (e.g., Merchant and Van der Stede 2007; Procter et al. 2004). However, employees are often expected to still complete many tasks individually. As a result, employees are left with a decision of where to allocate effort.

Accordingly, when organizations design their incentive systems, they need to consider how these incentives affect employees’ effort towards the various functions/tasks. Organizations can incentivize employees individually, as a group, or a combination of both, referred to as mixed incentives (Libby and Thorne 2009). Organizations often employ mixed incentives in order to motivate and direct employees’ effort towards both individual and group tasks (e.g., Merchant and Van der Stede 2007; Procter et al. 2004).

Substantial evidence exists that mixed incentives are used in practice (Hwang et al. 2009; Libby and Thorne 2009). For example, in their study of 1,780 U.S. manufacturing plants, Hwang et al. (2009) find that about one third of the plants use a combination of group and individual-based performance measures. A survey conducted by the Center for Effective Organizations at the University of Southern California (Lawler and Mohrman 2003) suggests an increasing use of mixed incentives in Fortune 1,000 corporations. Sisk (2005) also shows that more firms now use

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3 While the term, “mixed incentives”, is potentially applicable to other settings, we limit our attention to the combination of incentives on group and individual tasks.
a combination of incentives for compensating employees. For instance, Pfizer Pharmaceutical Group Canada ties all bonuses to the overall performance of Pfizer Canada, the performance of each person’s team, and each individual’s performance. Further, in Ameritech’s Internal Audit Services group members of audit teams are compensated not only for their individual performance rankings within their team but also for their team performance ranking among other teams; and in the Wilson North Carolina, pharmaceutical plant of Merck, employees can receive rewards based on individual performance, their team’s performance, and the plant’s overall performance (Parker et al. 2000).

However, prior research suggests that there are potential problems resulting from mixed incentives that include group and individual incentives. For instance, Libby and Thorne (2009) speculate that negative synergies may exist between group and individual incentives because mixed incentives can send confusing signals to individuals about where to direct their effort. Mixed incentives may also create a social dilemma where group members are faced with a conflict between individual and collective interests (Barnes et al. 2011). Given that group and individual tasks are both valued but may have different priorities in organizations, it is important to understand how organizations can help motivate and direct employees’ effort. In practice, in addition to mixed incentives, organizations may use communication to influence employees’ behaviors and choices (e.g., Tuttle and Harrell 2001). For instance, organizations often communicate values to supplement the formal management control system (Kachelmeier et al. 2015). Prior research suggests that communication of organizational values or preferences tend to influence employees’ behaviors and performance (Kachelmeier et al. 2015; Newman 2014). In

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4 Management’s explicit communication of organizational priorities is usually conducted in a formal way among their employees, but the communication itself is often regarded as a type of informal control in organizations, compared to the formal control system associated with contracts such as incentive systems.
this study, we examine the joint effect of management’s explicit communication of organizational priorities and mixed incentives on employees’ effort decisions.

**Hypotheses**

When establishing predictions of employees’ behavior, standard economic models assume that employees are effort averse. This suggests that in the absence of management control systems such as contracts that include incentives contingent on effort or performance, employees will not exert any effort towards either individual responsibilities or group responsibilities. However, a wide variety of behavioral studies in economics have found individuals often do not act consistent with pure economic predictions (see Camerer 2003 for an extensive review). For example, in the presence of incomplete contracts or even without contingent compensation, employees commonly exert greater than minimum effort. This effort level reveals intrinsic and other motivations employees have towards a task or responsibility. Employment agreements or organizational environments can invoke feelings such as fairness, reciprocity, and trust which are part of the social norms that have been shown to affect employees’ behaviors and choices (e.g., Fehr and Schmidt 2006; Cox, Friedman and Gjerstad 2007).

The effort aversion in standard economic models reflects the assumption of pure (or narrow) self-interest. Social norms often go against these more standard, recognizable definitions of self-interest. Bicchieri (2006) outlines a theory of social norms that provides insight into when social norms are likely to invoke behavior that appears inconsistent with standard assumptions of self-interest. It is important to note that Bicchieri (2006) does not remove the assumption of self-interested behavior. Instead, Bicchieri (2006) proposes a model in which social norms are context-dependent and contingently activated, with the decision to follow social norms often
arising through subconscious processing (Blay et al. 2016). Biel and Thogersen (2007) echo this point and argue that social norms need to be activated and such an activation process is often unconscious.

Bicchieri’s (2006) model suggests that for a social norm to be activated, individuals must know that the social norm exists and that it is relevant in the setting. The recognition of the existence of the norm is the contingency condition. Once the contingency condition is satisfied, whether the individual will conform to the norm is dependent on empirical and normative expectations (Blay et al. 2016). Empirical expectations represent the extent to which an individual believes other individuals in a similar situation will conform to the norm, while normative expectations represent the belief that others expect the individual to conform to the norm in similar types of situations (Abdel-Rahim 2016; Bicchieri 2006; Blay et al. 2016; Douthit and Stevens 2015; Huddart and Qu 2014).

Within organizations that assign group tasks and responsibilities, one social norm that can be activated is a cooperation norm. Falk and Fischbacher (2004) argue that even legal mechanisms that enforce cooperation must be backed by broad consensus that comes from social norms. In the economics literature the most common means to explore cooperation is through social dilemma experiments including public good games. In a review, Chaudhuri (2011) identifies that the majority of experimental participants are identified as cooperators, whether conditional or unconditional. The literature review by Biel and Thogersen (2007) provides evidence that social norms can be activated in social dilemmas so that people cooperate. Further evidence of the cooperation norm is demonstrated by the willingness of individuals in experiments to sanction or punish those who do not cooperate, even at a personal cost to the
sanctioning individual (e.g., Fehr and Gachter 2000; Rockenbach and Milinski 2006; Gachter et al. 2008).

By their nature, group tasks create a social setting in which a cooperation norm can be established. However, while this meets the contingency condition for social norm activation it does not necessarily satisfy the remaining conditions. Employees may understand that group tasks are part of their responsibilities but may not believe that it is a priority given their overall job description. They may not believe that other employees will conform to the cooperate norm and contribute to group tasks (empirical expectations condition) or they may not feel others will expect themselves to conform to the norm (normative expectations condition), thus they are less likely to conform to the norm. This can result in free-riding behavior which is one of the most frequently discussed collective moral hazard problems (Holmstrom 1982; Milgrom and Roberts 1992; Prendergast 1999). When they specifically assert group tasks are a priority, organizations clarify that the norm is to contribute to group tasks to achieve higher group performance and that all employees are expected to comply with the norm. Thus, organizations can satisfy the conditions of norm activation. That is, the communication of an organizational priority on group tasks helps to activate the social norm of cooperation. Therefore, even in the absence of incentive systems, organizations can increase effort towards group tasks by explicitly communicating that group tasks are an organizational priority, as compared to when no priority is communicated.

It is important to note that, although organizations have group tasks, employees may still believe it is more important to provide greater effort towards their individual tasks consistent with acting in their own self-interest. The ubiquitous problem of free riding in groups is a primary example of where the mere presence of group tasks may not be sufficient to activate the cooperation norm. Since employees, however, have a responsibility to group tasks, Bicchieri’s
model on social norms still applies here (i.e., the potential for activation of the social norm is present). Bicchieri (2006) suggests that when empirical and normative expectations are absent, individuals are more likely to ignore or violate social norms and instead act out of self-interest; Bicchieri (2006) refers to this as norm evasion. According to Bicchieri’s (2006) model, it is norms, not self-interest, that need to be activated. Thus, when organizations communicate that individual tasks are a priority, we do not expect to see a symmetric increase in effort allocated towards individual tasks compared to when group tasks are prioritized. That is because individual tasks are already consistent with self-interest and a lack of communication concerning an organizational priority on group tasks means social norms may be evaded or not be activated. Indeed, prioritizing individual tasks is likely to decrease effort allocated towards group tasks more than it increases effort towards the individual task because employees feel justified evading the norm of cooperative behavior. This leads to asymmetric predictions, formally stated in the first hypothesis (graphically presented in Figure 1), regarding the effect of explicitly stated organizational priority across group and individual tasks when there are no mixed incentive systems:

H1. In the absence of mixed incentives, explicit communication of an organizational priority on group tasks will lead to greater effort increases towards group tasks than any effort increase towards individual tasks produced by explicit communication of an organizational priority on individual tasks.

[Insert Figure 1 here]

To this point we have discussed motivation effects revolving around social norms in the absence of incentive systems. Monetary incentives work through appealing to the wealth-maximizing self-interest of employees. In the presence of incentive systems such as mixed incentives, we predict that the effect of explicit communication of an organizational priority on
employees’ effort choices will change, which creates an interactive effect between management’s explicit communication of an organizational priority and mixed incentives.

Theoretically, when incentives are available, management’s communication of an organizational priority alone is expected to have little marginal effect on employees’ effort decisions. This is because standard agency theory implies that incentives signal a priority to individuals and directly reward the performance or effort on that priority accordingly (e.g., Holmstrom and Milgrom 1991; Tuttle and Harrell 2001). On the other hand, and as discussed above, prior research suggests that mixed incentives themselves may create a social dilemma where individuals are faced with a conflict between group and individual interests (Barnes et al. 2011). Therefore, communication of an organizational priority on group (individual) tasks should help employees to increase their effort allocations to group (individual) tasks.

We predict that mixed incentives are likely to moderate the predicted effect stated in H1. This is because explicit communication of an organizational priority on group tasks possesses the capability of activating the social norm of cooperation while individual tasks are more clearly aligned with standard definitions of self-interest. Specifically, when mixed incentives are absent, communication of an organizational priority on individual tasks will not likely increase effort allocation to individual tasks because increases in effort on individual tasks usually require an appeal to standard self-interest through monetary incentives. However, when mixed incentives are present, employees are motivated to align the monetary incentives with wealth-maximizing self-interest when the organization communicates a priority on individual tasks and thus mixed incentives will likely motivate more effort allocation towards individual tasks. Therefore, when organizations communicate a priority on individual tasks, employees are more likely to increase
effort allocation to individual tasks in the presence of mixed incentives than in the absence of mixed incentives.

However, the effect of communication of an organizational priority on group tasks may not show a similar pattern on effort allocation to group tasks. As discussed in the development of H1, communication of an organizational priority on group tasks, in the absence of incentives, is likely to increase effort allocation to group tasks due to the potential for social norm activation. It is possible, however, that the presence of mixed incentives confuses the signal that normally would activate a cooperation norm among employees. By rewarding effort on individual tasks, mixed incentives can raise questions about where other employees within the group will allocate their effort. This will likely exacerbate the free-riding problem, in which individuals choose to focus on individual tasks rather than contribute to the output of the group. Also, in the presence of mixed incentives, employees may feel more control over the outcome of exerting effort towards earning an individual incentive whereas the group incentive relies on not only their personal effort but the effort of other group members as well. Further, as mentioned earlier, monetary incentives are consistent with employees’ wealth-maximizing self-interest and thus the presence of mixed incentives will likely motivate more effort allocation towards individual tasks and as a consequence effort allocation towards group tasks may be reduced. Thus, when mixed incentives are available, explicit communication of an organizational priority on group tasks will be less likely to increase the effort allocated to group tasks compared to the effect of communication of individual priority for individual tasks. In summary, we predict that mixed incentives will have different beneficial effects on increasing effort due to respective priority communication on group tasks versus individual tasks. This is opposite to the predicted effects of
organizational priority communication in the absence of mixed incentives. A formal statement of the asymmetric, interaction hypothesis based on the above arguments follows:

**H2:** Mixed incentives moderate the beneficial effect of explicit communication of organizational priority on effort allocations between group and individual tasks such that: in the absence of mixed incentives, there will be greater effort increase on group tasks (than individual tasks), whereas in the presence of mixed incentives, there will be greater effort increase on individual tasks (than group tasks).

**III. METHOD**

**Design**

The complete design of our experiment is a $3 \times 2$ between-subjects design and 8 periods serving as a repeated factor. As shown in Figure 2, the $3 \times 2$ manipulations consist of communication of an organizational priority (“no priority” where no communication of a priority is made, “group priority” where communication of an organizational priority on group tasks is made, “individual priority” where communication of an organizational priority on individual tasks is made) and mixed incentives (“absent” and “present”), with random assignment of participants to conditions. In the absent conditions, participants learn that a bonus will be shared equally regardless of their effort. In the present conditions, bonuses will be awarded based on their group and individual effort. Regarding the communication, all participants learn that “achieving satisfactory outcomes on primary goals are necessary to the strategic mission of the organization.” In the no priority conditions, participants are told, “In this regard, management has not communicated to you which projects are priority.” In the group priority conditions, “management has communicated to you that Team Projects are primary and Individual Projects are secondary,” and in the individual priority conditions, “management has communicated to you that Individual Projects are primary and Team Projects are secondary.” The experiment was
programmed and conducted with the z-Tree software (Fischbacher 2007) in a multi-period setting. A total of 92 upper division business students from a large university participated in the experiment.

[Insert Figure 2 here]

**Procedures and Tasks**

The experimental procedures are depicted in Figure 3. As participants arrived in the lab, each was assigned a computer. In each session, participants were randomly assigned to a group of four members and the group was randomly paired with another randomly formed group. After each period was completed, participants were informed that their existing group was disbanded and all participants were shuffled to form new groups. New groups were then randomly formed and the new group was randomly paired with another new group in the next period.

[Insert Figure 3 here]

At the beginning of each experimental session, participants were instructed to assume the role of employees working in groups within a company and that the company offers group and individual bonuses to its employees at the end of each period. In each period, every participant received an endowment of 100 tokens which they could spend on their individual projects at work, their group projects at work, or which they do not spend but keep for themselves. The tokens spent on group and individual projects serve as a proxy of participants’ effort to group and individual tasks and are consistent with agency theory’s three conditions to qualify as effort: (1) the agent controls the action, (2) an increase in the action results in greater output, and (3) the agent receives disutility from exerting effort (Baiman 1982; Rankin & Sayre 2000). Similar tasks

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5 All tokens are costly such that a token spent on projects is deducted from earnings in the participant’s payoff function.
to represent effort have been used in previous accounting and economic studies (e.g., Rankin & Sayre 2000; Sutter and Strassmair 2009; Nalbantian & Schotter 1997).

After reading the instructions, participants completed a quiz to verify their understanding of the instructions including the incentive and organizational priority condition to which they were assigned. Then the study administrator checked the answers to the quiz for each participant individually and explained each question in detail. These forced manipulation checks ensured that participants understood the task and the assigned incentive and organizational priority condition before beginning the first period. Next participants privately decided how much effort, expressed in tokens, to contribute to different projects or to keep for themselves. Participants kept any leftover endowment (tokens), thereby making their effort costly. In the absent conditions, there was no incentive to allocate any effort, and the wealth-maximizing self-interested behavior was to allocate zero tokens to both tasks. The parameters in the mixed incentives present conditions are consistent with a typical public good game from the economics literature such that free riding is possible.

Once all participants made their effort decisions in each period, they were notified of the amounts of their own effort contribution, group and/or individual bonuses received, unallocated tokens, and total earnings s/he received in the current period. In the absent conditions, each participant received the exact same amount of bonus no matter the individual/team effort. In the present conditions, the team bonus was awarded to the team which had a greater amount of total team effort, and the individual bonus was awarded to those whose individual effort was within the top half of his/her team. In the event of a tie, all tied individuals/teams shared the bonus equally. The earnings each participant received in each period are calculated as Endowed Tokens

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6 Prior research documents that feedback has an important effect on individuals’ behavior in multi-period studies on the effect of incentives (Hannan et al. 2008). Therefore, the format and categories of feedback information presented are held constant across the different incentive and goal priority conditions in this study.
plus Bonuses Received (Group and Individual Bonuses) minus Group/Individual Effort Contributed.

At the end of the experiment, participants completed a post-experimental questionnaire. Finally, one period was randomly selected for payment. Earnings were converted into U.S. dollars at the rate of 40 tokens to $1 and participants were paid in private. Sessions lasted about 35 minutes, and participants’ earnings ranged from a low of $0 to a high of $7.50 with average earnings of $4.36. The average age of participants is 23 years and about 60% of them are males. Participants have an average work experience of 4.14 years.

IV. RESULTS

Descriptive Statistics

Table 1 provides an overview of the average effort contribution to group and individual tasks and their respective standard deviations for each experimental condition. When mixed incentives are absent (present), the average effort to group tasks is 29.30 (45.96) for no goal priority, 40.82 (54.13) for group priority, and 14.85 (25.67) for individual priority conditions while the average effort to individual tasks is 26.47 (42.06) for no priority, 17.63 (34.10) for group priority, and 29.13 (56.65) for individual priority conditions, respectively. The results of the repeated measures general linear mixed model\(^7\) suggest that the main effects of organizational priority communication and mixed incentives on effort to group and individual tasks are all significant (all p-values < 0.0001, untabulated).

[Insert Table 1 here]

Test of Hypothesis 1

\(^7\) We use a repeated measures general linear mixed model to analyze the data in this study unless otherwise noted.
We begin by examining the effects of organizational priority communication on effort allocations when mixed incentives are absent. Specifically, Hypothesis 1 predicts that in the absence of mixed incentives, explicit communication of an organizational priority on group tasks will produce greater effort increase towards group tasks than any effort increase towards individual tasks produced by explicit communication of an organizational priority on individual tasks. Referring to the data in Table 1, we compare the average effort allocation to group/individual tasks in the no priority condition with the average effort in the group priority and individual priority conditions. In the absence of mixed incentives, an explicit communication of an organizational priority on group tasks leads to greater effort allocation to group tasks by 11.52 compared to when no priority communication is provided (40.82 vs. 29.30, F = 15.86, p<0.0001, untabulated). However, in the absence of mixed incentives, explicit communication of an organizational priority on individual tasks leads to a greater effort increase to individual tasks by only 2.66 compared to when no priority communication is provided (29.13 vs. 26.47, F = 0.92, p = 0.3370, untabulated). Panel A of Table 2 presents the contrast result of these two increases, which suggests that the effect of a group priority on effort to group tasks is greater than the effect of an individual priority on effort to individual tasks (F = 7.44, p = 0.0066). Therefore, H1 is supported. This result is also graphically presented in Figure 4.

[Insert Table 2 here]

[Insert Figure 4 here]

Supplemental Analysis Related to H1

Our theoretical predictions for H1 are based on the theory of social norm activation (Bicchieri 2006). This theory suggests that since communication of a group priority will activate

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8 When mixed incentives are absent, the effort contribution to group or individual tasks in the no priority conditions can be regarded as the intrinsic motivation participants have towards a task and serve as the baseline level of effort. As noted later, some tests of effort changes in the treatment condition are scaled by these baseline levels of effort.
a social norm of cooperation, communication will lead to greater effort allocations to group tasks. However, communication of individual priority will fail to activate that norm and will not provide significant incentive to participants to lead to greater effort allocation to individual tasks. Our results provide evidence consistent with this theory. While, as Bicchieri (2006) and Biel and Thogersen (2007) suggest, social norm activation is often a subconscious or an unconscious process, the data suggests a cooperation norm was activated. For corroboration of the theory, we test whether communication of an individual priority allowed participants to more confidently evade the cooperation norm. According to Bicchieri (2006), norms are conditional on situational cues. In our case, when an organization explicitly communicates priority on individual tasks, it allows participants to evade the cooperation norm and act out of self-interest. We find that, when mixed incentives are absent, explicit communication of individual goal priority leads to less effort allocation to group tasks by 14.45 (29.3 vs. 14.85, F = 29.13, p < 0.0001, untabulated). Conversely, communication of group priority leads to less effort to individual tasks by 8.84 (26.47 vs. 17.63, F = 8.72, p=0.0033, untabulated). Panel B of Table 2 presents the results and suggests that in the absence of mixed incentives, explicit communication of individual priority will lead to a larger reduction in effort allocation to group tasks compared to the size of the reduction in effort to individual tasks from explicit communication of group priority (F = 5.69, p = 0.0174). Therefore, these results provide support to the underlying theory of H1.

Additionally, in the absence of mixed incentives, we compare the effects of priority communication on effort changes to the group and individual tasks to examine which effect (increase or reduction) is greater. We find that, when the individual priority is communicated (versus no priority communication), the average reduction in the effort allocated to group tasks (14.45) is significantly greater than the average increase of effort allocated to the individual task.
(2.66) \(t = 4.54, p < 0.0001\), untabulated). However, when the group priority is communicated (versus no priority communication), the average reduction in the effort allocated to individual tasks (8.84) is not significantly different from the average increase of effort allocated to the group tasks (11.52) \(t = -0.84, p = 0.4036\), untabulated). These results provide further support for norm evasion on the part of participants in the individual priority condition when mixed incentives are absent.

**Test of Hypothesis 2**

Hypothesis 2 suggests a moderating effect of mixed incentives on the effect of explicit communication of organizational priority on effort allocations between group and individual tasks. Specifically, H2 predicts that in the absence of mixed incentives, explicit communication of an organizational priority between group and individual tasks will lead to greater increases in effort allocated to group tasks (than individual tasks), whereas in the presence of mixed incentives, explicit communication of an organizational priority will lead to greater increases in effort allocated to individual tasks (than group tasks). Referring again to Table 1, in the present conditions, the average effort to group tasks in the group priority condition (54.13) increases by 8.16 compared to the no priority condition (45.97) \(F = 9.29, p = 0.0024\), untabulated), while the average effort to individual tasks in the individual priority condition (56.65) increases by 14.59 compared to the no priority condition (42.06) \(F = 27.66, p < 0.0001\), untabulated). In addition, the incremental effect of mixed incentives on increase in effort to group tasks in the group priority conditions is 13.31 (40.82 vs. 54.13, \(F = 21.17, p < 0.0001\), untabulated), while the incremental effect of mixed incentives on increase in effort to individual tasks in the individual priority conditions is 27.52 (29.13 vs. 56.65, \(F = 98.45, p < 0.0001\), untabulated). The difference
of these two incremental effects of mixed incentives is significant (F = 10.29, p = 0.0014, untabulated).

Overall, our results suggest that mixed incentives significantly moderate the effect of priority communication on changes (increase or reduction) of effort. Figure 5 graphically shows this moderation effect, (i.e., the results of the effort changes in the mixed incentives present conditions compared to the absent conditions). We use the repeated measures analysis of variance (ANOVA) to test for a moderating effect of mixed incentives. The results are presented in Table 3. The ANOVA results show that, in the absence of mixed incentives, explicit communication of organizational priority between group and individual tasks will lead to greater increases in effort allocated to group tasks (than individual tasks), whereas in the presence of mixed incentives, the priority communication will lead to greater reduction in effort allocated to individual tasks (than group tasks) (Table 3 Panel C, F = 11.67, p = 0.0007). Therefore, H2 is supported. Similarly, a moderating effect of mixed incentives on the reduction of effort allocated to group (individual) tasks due to individual (group) priority communication is also observed (F = 5.67, p = 0.0177, untabulated).

We further analyze the data by examining the size of the incremental effect of mixed incentives on effort changes. For each of the following four treatment conditions: GroupAbsent, GroupPresent, IndividualAbsent, and IndividualPresent, we take the observation and deduct their respective average effort from the baseline (no priority) condition (i.e., 29.30, 45.97, 26.47, and 42.06), and thus we get the observations of effort scaled by their corresponding baseline means. As a result, the baseline (no priority) conditions are by default incorporated in the above
four treatment conditions, and we are allowed to compare effort changes across group and individual tasks in one model. Then we use contrast coding (1, -1, -1, 1 for GroupAbsent, GroupPresent, IndividualAbsent, and IndividualPresent) to compare the incremental effect of mixed incentives on the change of effort to group tasks with the incremental effect of mixed incentives on the change of effort to individual tasks. As presented in Panel C of Table 3, the contrast result shows that the incremental effect of mixed incentives on effort to individual tasks is significantly greater than the increment effect of mixed incentives on effort to group tasks, which suggests an asymmetric effect of mixed incentives on effort changes to group and individual tasks (F = 11.92, p = 0.0006) consistent with our predictions in H2.

V. CONCLUSION

This study examines the interactive effect on effort changes of mixed incentives and the explicit communication of an organizational priority amongst group and individual tasks. The results support our predictions based on the model of social norm activation outlined in Bicchieri (2006) and echoed by Biel and Thorgerson (2007). We find that in the absence of mixed incentives, explicit communication of an organizational priority induces greater effort on group but not individual tasks. Conversely, once mixed incentives are present, explicitly communicating an organizational priority is a much more powerful approach for individual than group tasks.

This paper adds to the literature on social norms and monetary incentives. We demonstrate that cooperation norms, and their activation, can have desirable control effects for organizations while not incurring costs that come with monetary incentives. We also highlight the synergistic relationship between the explicit communication of organizational priorities that
reinforce self-interested behavior and monetary incentives. In addition, our paper adds to the current literature on complex monetary incentives by focusing on incentive systems that are linked to both group and individual tasks, unlike prior research that has examined incentive systems linked to separate dimensions (such as accuracy, creativity, and speed) of individual tasks (e.g., Christ et al. 2015; Kachelmeier et al. 2015).

As with any experimental study care must be given when generalizing the conclusions. However, we note that in organizations consisting of direct interpersonal interaction, it is likely that the effect of the social norm activation will be stronger than what we observe in the lab. Future research could potentially test this effect using face-to-face interaction or in the field.
References


Huddart, S., and H. Qu. 2014. Rotten apples and sterling examples: Moral reasoning and peer influences on honesty in managerial reporting, working paper.


*Communication represents the corresponding priority with the measured task (i.e., when individual tasks are prioritizing, the measurement is effort allocated to the individual task).
Figure 2: Full-factorial Experimental Design (3 × 2)

<table>
<thead>
<tr>
<th>Priority Communication</th>
<th>Mixed Incentives</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absent</td>
<td>Present</td>
<td></td>
</tr>
<tr>
<td>No priority (Baseline)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Group priority</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Individual priority</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Priority Communication:
(1) No priority: Management does not communicate which projects are priority.
(2) Group priority: Management communicates that Team Projects are primary and Individual Projects are secondary.
(3) Individual priority: Management communicates that Individual Projects are primary and Team Projects are secondary.

Mixed Incentives:
(1) Mixed incentives absent (fixed bonus): All individuals receive the same amount of bonus.
(2) Mixed incentives present: Total bonus is split so that the top two individuals in each group (based on individual effort) are paid individual bonuses and each member in the top group (based on group effort) receives a group bonus. Individual and group bonuses are independent.
(Total bonus pool is held constant for all conditions.)
Figure 3: Experimental Procedures

1. Assign to one experimental condition

2. Randomly assign participants into groups

3. Instructions

4. Pre-experimental quiz

5. Individually make effort allocations to group project, individual project, or keep to self.

6. Notify individual feedback after each period

7. Participants are shuffled and randomly assigned to a new group (5-7 repeated for 8 periods).

8. Answer demographic questions

9. Calculate payoff and pay participants.
Figure 4: Effect of Explicit Communication (H1)

*Communication represents the corresponding priority with the measured task (i.e., when individual tasks are prioritizing, the measurement is effort allocated to the individual task).

The effect of a group priority communication on effort to group tasks is greater than the effect of an individual priority communication on effort to individual tasks \( (F = 7.44, p = 0.0066) \).
Figure 5: Moderating Effect of Mixed Incentives on Change of Effort (H2)

Analysis of variance interaction effect: $F = 11.67$, $p = 0.0007$
Table 1: Average Effort

Panel A: Average Effort to Group Tasks

<table>
<thead>
<tr>
<th>Priority Communication</th>
<th>Mixed Incentives</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absent</td>
<td>Present</td>
<td></td>
</tr>
<tr>
<td>No priority (Baseline)</td>
<td>29.30</td>
<td>45.96</td>
<td>(20.67)</td>
</tr>
<tr>
<td>Group priority</td>
<td>40.82</td>
<td>54.13</td>
<td>(25.17)</td>
</tr>
<tr>
<td>Individual priority</td>
<td>14.85</td>
<td>25.67</td>
<td>(12.40)</td>
</tr>
</tbody>
</table>

Panel B: Average Effort to Individual Tasks

<table>
<thead>
<tr>
<th>Priority Communication</th>
<th>Mixed Incentives</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absent</td>
<td>Present</td>
<td></td>
</tr>
<tr>
<td>No priority (Baseline)</td>
<td>26.47</td>
<td>42.06</td>
<td>(18.73)</td>
</tr>
<tr>
<td>Group priority</td>
<td>17.63</td>
<td>34.10</td>
<td>(12.23)</td>
</tr>
<tr>
<td>Individual priority</td>
<td>29.13</td>
<td>56.65</td>
<td>(20.48)</td>
</tr>
</tbody>
</table>
Table 2: Mixed Incentives – Absent (Test of H1)

Panel A: Effort Increases due to Priority Communication (Test of H1)

<table>
<thead>
<tr>
<th>Label</th>
<th>Contrast</th>
<th>Mean Difference</th>
<th>F Value</th>
<th>Pr &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effort increase</td>
<td>Change in effort to group tasks (11.52) (between “no priority” and “group priority”) vs. Change in effort to individual tasks (2.66) (between “no priority” and “individual priority”)</td>
<td>8.86</td>
<td>7.44</td>
<td>0.0066</td>
</tr>
</tbody>
</table>

Panel B: Effort Reductions due to Goal Priority (Supplemental Analysis of H1)

<table>
<thead>
<tr>
<th>Label</th>
<th>Contrast</th>
<th>Mean Difference</th>
<th>F Value</th>
<th>Pr &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effort reduction</td>
<td>Change in effort to individual tasks (8.84) (between “no priority” and “group priority”) vs. Change in effort to group tasks (14.45) (between “no priority” and “individual priority”)</td>
<td>-5.61</td>
<td>5.69</td>
<td>0.0174</td>
</tr>
</tbody>
</table>
**Table 3: The Moderating Effect of Mixed Incentives on Group/Individual Effort Change**

**Panel A: Mean**

<table>
<thead>
<tr>
<th>Mixed Incentives</th>
<th>Absent</th>
<th>Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increases of group effort when adding group priority*</td>
<td>11.52</td>
<td>8.16</td>
</tr>
<tr>
<td>‘GroupAbsent’</td>
<td>‘GroupPresent’</td>
<td></td>
</tr>
<tr>
<td>Increase of individual effort when adding individual priority**</td>
<td>2.66</td>
<td>14.59</td>
</tr>
<tr>
<td>‘IndividualAbsent’</td>
<td>‘IndividualPresent’</td>
<td></td>
</tr>
</tbody>
</table>

*: Increase of group effort is the difference between the effort to group tasks in the condition with explicit communication of group priority and the effort to group tasks in the baseline condition with no priority communication.

**: Increase of individual effort is the difference between the effort to individual tasks in the condition with explicit communication of individual priority and the effort to individual tasks in the baseline condition with no priority communication.

**Panel B: ANOVA results**

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>Mean Square</th>
<th>F Value</th>
<th>Pr &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed Incentives</td>
<td>1</td>
<td>2886.72</td>
<td>4.93</td>
<td>0.0269</td>
</tr>
<tr>
<td>Priority Communication</td>
<td>1</td>
<td>114.09</td>
<td>0.19</td>
<td>0.6591</td>
</tr>
<tr>
<td>Incentives*Goal</td>
<td>1</td>
<td>6834.75</td>
<td>11.67</td>
<td>0.0007</td>
</tr>
<tr>
<td>Period</td>
<td>7</td>
<td>146.81</td>
<td>0.25</td>
<td>0.9719</td>
</tr>
</tbody>
</table>

**Panel C: Test of H2**

<table>
<thead>
<tr>
<th>Label</th>
<th>Contrast</th>
<th>Mean Difference</th>
<th>F Value</th>
<th>Pr &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental effect of mixed incentives on change of effort</td>
<td>Change in effort to group tasks (between “no priority” and “group priority”) vs. Change in effort to individual tasks (between “no priority” and “individual priority”)</td>
<td>-15.29</td>
<td>11.92</td>
<td>0.0006</td>
</tr>
</tbody>
</table>

(The contrast coding in SAS is: 1, -1, -1, and 1 for the following conditions listed in Panel A: “GroupAbsent”, “GroupPresent”, “IndividualAbsent”, and “IndividualPresent”)