Monetary Incentives, Effort and Payoff Feedback: Differential Effects on Individuals' Effort Choices in a Group

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Abstract

This study experimentally examines how effort and payoff feedback promote or suppress an individual effort in a group varying the size of monetary incentives, especially using bonuses as a reward and punishment simultaneously. Based on agency theory, equity theory, and loss aversion of prospect theory, I conducted a 2×2 between-subjects design with four experimental conditions, and participants were randomly assigned to four-member groups. Results show that under a large monetary reward scheme, providing feedback information about group members' effort levels and payoffs motivates individuals to exert higher levels of effort to increase profits and earn a bonus, whereas such feedback information is ineffective under a small monetary reward scheme, and demotivates individuals to exert lower levels of effort. The findings highlight the importance of taking the concerns of group members' bonuses into account under a small monetary reward scheme, rewarding an equal bonus to group members who meet the average effort of the group may do more harm than good, especially in a full feedback condition.

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1. Introduction

Working in groups is a common part of the competitive business environment, and monetary incentives and feedback are commonly used by organizations as incentive motivators. Agency theory assumes individuals as agents in organizations act in their own self-interest and are work-averse, and they often face conflicting incentives to shrink rather than cooperate in a group. If the level of effort provided by the individual is unobservable to the group, the individual is likely to provide far less than the optimal amount of effort. To encourage group members to strive for the best outcome of the group as a whole, members are often rewarded based on the group's total output; yet, this arrangement might influence an individual to shirk and exert lower levels of effort (Holmstrom, 1982; Kelly and Tan, 2010). Clark, Masclet, and Villeval's (2010) study on effort and comparison income indicates that receiving information on work income relative to that of others leads to significantly higher levels of effort compared with not receiving the information. According to equity theory, individuals are inequity-averse and perceive their treatment to be fair related to others. Individuals judge the fairness of their payoffs based on how other members in a group like them are treated. When the payoffs differ for the same degree of effort, individuals view the payoffs as inequitable. Therefore, payoff feedback may not be as effective as it appears to be; this could be, for example, due to the type of incentive contracts (Hannan, Krishnan, and Newman, 2008), the size of incentive contracts, or individual interpretation of payoff feedback (Kelly and Tan, 2010). My research question is whether the presence of effort and payoff feedback promotes or suppresses individual cooperation (high effort contribution) in a group varying the size of monetary incentives.

Van Iddekinge, et al. (2022) conduct a conceptual and meta-analytic review of work effort. They note that how hard a person exerts effort is different from how well a person works efficiently, but the effort is a direct antecedent of performance, and suggest that effort is a stronger predictor of outcomes. An individual's reaction to monetary incentives and feedback information can have economic and psychological effects. Based on agency theory and equity theory, the purpose of this study is to examine how the feedback information varying the size of monetary incentives affects individuals' effort choices in a group. Participants are randomly assigned to four-member groups and are told that they work for a firm and act as a sales group to conduct market analyses and solve marketing problems when launching a new product or service. The four participants of a group simultaneously choose how much effort to contribute to the sales project in each period for 30 periods and the period payoff depends on their effort choices. The cost of effort is a convex function that reflected an increasing marginal disutility for effort. Treatments vary along two dimensions: feedback information (Full vs. Own Feedback) and monetary incentives (Large vs. Small Incentives).

Promoting the efficiency of sales relies on the full distribution of contributions rather than just the minimum (Brandts and Cooper, 2006; Devetag and Ortmann, 2007; Bortolotti, Devetag, and Ortmann, 2016). I assume sales profits are contributed by the average effort level of the group rather than the minimum effort level provided by the member of a group. In addition, rather than solely

rewarding exceptional individual performance, I manipulate monetary rewards to be shared equally by each member of the group to allow all members to feel like recognition even those that perform at an average level. However, monetary rewards shared equally by each member of the group may suffer from the well-known free-rider problems (often identified as the 1/n problem) (Cornelissen, Heywood, and Jirjahn, 2014). To reduce free-rider problems, those who contribute to meeting the average effort level of the group can earn their own monetary reward (1/n group reward), while those who contribute below the average effort level are not rewarded. Failing to earn his/her monetary reward may be perceived as punishment (Guillen, Merrett, and Slonim, 2015).

This study extends previous research on monetary incentives and feedback (eg., Meidinger, Rullière, and Villeval, 2003; Kelly and Tan 2010) by: (1) focusing on intragroup cooperation rather than intragroup or intergroup competition, and (2) employing incentive schemes linked to meeting standards in a group to develop a spirit of intragroup cooperation. A contribution not found in prior research on cooperation in a group is to examine how effort and payoff feedback promote or suppress cooperation in a group by varying the size of monetary incentives, especially using bonuses as a reward and punishment simultaneously.

2. Hypothesis Development

2.1. Small Monetary Rewards and Feedback

Agency theory predicts that an individual will exert effort until the disutility from the effort exceeds the expected utility of the outcome. Under a small monetary reward scheme, choosing a higher effort level is risky because it entails more to lose than gain if not everybody in the group makes the same choice (Meidinger et al., 2003; Bortolotti, et al., 2016). According to equity theory, pay rewards for high performance must be substantially higher than those for poor performance. If individuals perceive their outcomes (e.g., pay, promotions) are lower than their inputs (e.g., effort, performance) relative to other members of the group, they will become demotivated and adjust their inputs downwards to make fair.

Abeler, Kube, Altmann, and Wibral (2010) find that subjects who exert higher levels of effort and subsequently earn a lower payoff than their co-workers meaningfully decrease their effort in the next period. Aguinis, Joo, and Gottfredson (2013) indicate that a small amount of supplemental pay for higher performance will fail to motivate employees to exert added effort. In addition, Brink, Kuang, and Majerczyk (2021) find that when the wage increases but with a smaller premium than before, employees decrease effort. Similarly, when there is a small difference in pay between high performance and low performance, employees are less likely to exert greater effort (Aguinis et al., 2013). Zhang (2008) notes that agents form more collusive agreements with each other when they receive a low wage than when they receive a high wage. When the cost of effort is high relative to the benefit of monetary rewards, an individual exerts a lower level of effort.

Feedback information can reduce strategic uncertainty. The self-interested individual chooses an effort level that maximizes their utilities by taking into account the effort contributions of the other members in a group. If feedback indicates that enough co-workers have provided lower levels of effort than him/her, an individual revises his/her effort downwards. However, without feedback information about the other members, individuals may be difficult to compare the other members' level of effort with their own. Therefore, under a small monetary scheme, an effort level is more likely to be revised downwards when individuals are informed about the other members' level of effort than when they are uninformed (Thoni and Gächter, 2015).

Based on the foregoing discussion, I expect a small monetary reward with full feedback elicits lower levels of effort than with own feedback. The first hypothesis is as follows.

H1: Under a small monetary reward scheme, an individual in a group provides a lower level of effort in a full feedback condition than in an own feedback condition.

2.2. *Large Monetary Rewards and Feedback*

Based on expectancy theory, individuals' effort and performance will be expected to increase when they feel that rewards are contingent upon good performance. Under a large monetary reward scheme, choosing a higher effort level has more to gain than loss (Meidinger et al., 2003; Bortolotti, et al., 2016). In addition, prior research indicates that in the high wages condition, an agent becomes more likely to choose a high level of effort when observing a high level of effort also provided by her/his co-workers (Gächter, Nosenzo, and Sefton, 2012; Bolton and Werner, 2016; Chennells and Michael, 2018).

In this study, those who meet the average effort level of the group can receive their own monetary reward (1/n group reward), while those who contribute below the average effort level are not rewarded. Loss aversion of prospect theory predicts that individuals will incur greater disutility than an equally sized monetary gain (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992; Fehr and Gächter, 2000; Guillen, Merrett, and Slonim, 2015). The potential for losing a large bonus may be perceived as punishment and can be effective in increasing effort contribution. If feedback indicates that individual effort contribution lags to a level where additional payment is not possible, individuals will increase their effort contribution and be more likely to use feedback information as an anchor for their own to receive the desired rewards (Rosen, Levy, and Hall, 2006).

Individuals who receive feedback from other members in their group will better understand the average effort level of the group and direct them toward this effort level; in this process, the potential to earn large monetary rewards or to fear of losing a large bonus induces individuals to exert higher levels of effort. Without feedback information, group members are uncertain about the common goal (DeShon, Kozlowski, Schmidt, and Milner, 2004), which will fail to motivate them to exert additional effort. Therefore, under a large monetary reward scheme, an effort level is more likely to be revised

upwards when individuals are informed about the other members' level of effort than when they are uninformed (Thoni and Gächter, 2015).

The above discussion supports the expectation that a large monetary reward scheme with full feedback elicits higher levels of effort than with own feedback. Thus, this leads to the second hypothesis as follows.

H2: Under a large monetary reward scheme, an individual in a group provides a higher level of effort in a full feedback condition than in an own feedback condition.

3. Experimental Design

The experiment has a 2×2 between-subjects design with four experimental conditions. The first factor is own feedback or full feedback information that reports effort contribution and payoffs of all four members in a group. The second factor, the size of monetary incentives, has two levels: a large versus small monetary reward scheme.

3.1. Participants

In total, 320 participants were recruited from a private university, forming 20 groups for each of the four conditions. I conducted a total of 12 sessions with between 24 and 32 participants per session (24 (5), 28 (6), 32 (1)). Sixty-seven percent of the participants were female.

3.2. Experimental Procedures and Game

Each experimental session was conducted in a computer laboratory on networked personal computers. Participants were randomly assigned to four-member groups. At the beginning of the study, participants were told they were four members of a group working for a firm and performing a sales project such as conducting market analyses and solving marketing problems when launching a new product or service. Group members were anonymous, and participants were never informed of others' identities. A researcher read the instructions aloud and briefly described the experimental setting. Participants were instructed not to talk to each other during the experimental session. Before the experiment began, participants had to correctly answer questions. They had two practice rounds to gain an understanding of the experimental task and procedures. The actual experiment started thereafter.

The game proceeded through the following steps: (1) The four participants of a group simultaneously chose an effort level to contribute to the sales project from a set of possible effort levels from 0.1 to 1.0 in each period for 30 periods. The cost of effort is a convex function that reflected an increasing marginal disutility for effort (see Table 1) and has been used in many recent experimental studies (Hannan, 2005; Kuang and Moser, 2009, 2011; Clark, Masclet, and Villeval, 2010; Brink et al., 2021). Sales profits are contributed by the average effort level of the group. Participants' effort decisions determine their monetary compensation under the incentive scheme

specified in the experiment, and one decision member's gain (or loss) does not necessarily result in other decision members' loss (or gain). (2) In the full feedback condition, participants are informed about the effort levels chosen by all four participants to contribute to the sales, the average effort contribution of the group, and payoffs of four participants in the previous and current periods. In the own feedback condition, participants are informed about their own effort contribution and payoff in the current period. (3) Participants in the group proceeded to the next period. (4) At the end of 30 periods, participants answered the post-experimental questionnaire.

Table 1: The Cost of Effort in the Experiment

Effort Level	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Cost of Effort (in NT$)	0	10	20	40	60	80	100	120	150	180

3.3. Monetary Incentives in the Game

Research has found that individuals perform better if the target is set as a collective group goal than if set as an individual goal (Matsui, Kakuyama, and Onglatco, 1987). Agency theory suggests that performance-based incentive contracts can induce effort, and in turn, reduce moral hazard. In this study, the monetary incentive was manipulated as a large versus small monetary reward scheme. Under the large (small) monetary reward scheme, the firm kept 40 percent or 80 percent of the project profit for itself, and the remaining 60 percent (large reward) or 20 percent (small reward) of the project profit was shared equally among the four members of the group, and only those who met the average effort of the group could earn his/her monetary reward. In the game, an individual was paid a basic salary plus bonuses as a reward if his/her effort met or exceeded the average effort contribution of the group (Equation 1), or paid a basic salary if his/her effort was below the average effort contribution of the group (Equation 2). An individual's net payoff was his/her payoff minus the cost of the effort level (Equation 3). Individuals' payoffs and net payoffs for each period of each condition are determined as follows.

$$\text{Payoff}_{ij} = 150 + (B \times P_j) / 4 \qquad (1)$$
$$= 150 \qquad (2)$$
$$\text{Net payoff}_{ij} = \text{Payoff}_{ij} - C_{ij} \qquad (3)$$

Where:

150 = a basic salary;

B = a percentage of profit sharing;

P_j = the profit earned by the j group, j=1,2,3…20;

4 = the number of individuals in a group;

C_{ij} = the cost of effort level chosen by the ith individual in the j group, j=1,2,3…20.

I assume if the sales is implemented, it generates a profit of NT$2,000 multiplied by the average effort level of the group. Laboratory dollars were converted to NT dollars by setting conversion rates at NT$0.02 for a laboratory dollar at the end of the experiment. In each session, the participants were paid NT$200 for showing up to the study, plus their earnings from the experiment. The average payment was NT$286.01, and each session was approximately 60 minutes.

The sample screens in the large monetary reward scheme and full feedback condition, and the small monetary reward scheme and own feedback condition, are illustrated in Figure 1 and Figure 2, respectively.

Participant A01		Round number	**2**			**1**	
Please choose an effort level to contribute to the joint project			0.9			0.7	
The effort level of the other three members contributes			**B01**	0.9		**B01**	0.9
			C01	0.8		**C01**	0.6
			D01	0.8		**D01**	0.8
The average effort level of the group			0.85			0.75	
The profit earned in the group			1,700			1,500	
Payoff			405			150	
-Effort cost			150			100	
Your net payoff			255			50	
The net payoffs of the other three members			**B01**	255		**B01**	225
			C01	30		**C01**	70
			D01	30		**D01**	255

Note: Current period-Round number 2

A01and B01: individual effort contribution > the average effort level of the group:

Payoff = 150 + (0.6 × 1,700)/4 = 405

Net payoff = payoff − effort cost = 405 − 150 = 255

C01 and D01: individual effort contribution < the average effort level of the group:

Payoff = 150,

Net payoff = payoff − effort cost = 150 −120 = 30

Figure 1: Sample Screen in Condition 1: Large Monetary Reward Scheme and Full Feedback

Participant NA41	**Current period**
Round number	**2**
Please choose an effort level to contribute to the joint project	0.4
Payoff	150
-Effort cost	40
Your net payoff	110

Note: Current period

A01: individual effort contribution< the average effort level of the group:

Payoff = 150

Net payoff = payoff − effort cost = 150 − 40 =110

Figure 2: Sample Screen in Condition 4: Small Monetary Reward Scheme and Own Feedback

3.4. *Measures*

The dependent variable is an effort level chosen by an individual to contribute to the sales in the group. Previous studies indicate that personal norms are a key driver in a person's internal motivation to behave appropriately (e.g., Harland, Staats, and Wilke, 2007; Tayler and Bloomfield, 2011). Therefore, the personal norm was used as covariates to control for the effects of self-regulation to examine the effect of feedback varying the size of monetary incentives on the contribution of individual effort in the group. The independent variable (feedback) and a control variable (personal norm) are as follows.

3.4.1. *Feedback*

Feedback was manipulated as a full feedback condition versus an own feedback condition. In the full feedback condition, participants received their own effort and payoff information as well as additional feedback about the other three members' effort, payoff, and the average effort of the group in the previous and current periods after they made their choices. In the own feedback condition, participants received their own effort and payoff information in the current period. Feedback was coded as 1 when an individual was in the full feedback condition and 0 when in the own feedback condition.

3.4.2. *Personal Norm*

The personal norm was measured with three items used in previous studies (Vining and Ebreo, 1992; Harland, Staats, and Wilke, 2007) to represent beliefs about appropriate behavior in group work. In the post-experimental questionnaire, the three items were "I feel a strong personal obligation to work hard in the group," "I am willing to put extra effort into group work on a regular basis," and "I would feel guilty if I didn't work hard in the group." The items were rated on a 7-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"). Cronbach's alpha of the scales for the personal norm was 0.84. The mean of the scores on the three items was used to create the personal norm measure.

4. Results

The post-experimental questionnaire contained a number of statements designed to test the effectiveness of experimental controls and ensure that participants understood the task. Participants responded to these statements on a seven-point Likert scale from 1 ("strongly disagree") to 7 ("strongly agree"). The checks involved tests of mean differences from the neutral response of 4.

Responses indicate that reputation effects were effectively controlled, as participants agreed that group members remained the same throughout the session and were anonymous ($p < 0.01$). Responses also indicate that participants understood sales profit was related to the level of effort contributed by group members ($p < 0.01$). Further, responses indicate that a financial incentive to choose the minimum effort was effectively controlled, as participants understood that effort is costly and that the cost of effort increases with the level of effort ($p < 0.01$).

4.1. Tests of hypotheses

Table 2 presents descriptive statistics (means and standard deviations) and a t-test comparing the mean individual effort in 30 periods by treatments. The results show that the mean individual effort after the 4th period can be ranked as LF (Large monetary reward scheme with Full feedback) > LO (Large monetary reward scheme with Own feedback) > SO (Small monetary reward scheme with Own feedback) > SF (Small monetary reward scheme with Full feedback). The trends of individual effort in each period across four treatments are presented in Figure 3. Figure 3 illustrates that the mean individual effort in the large monetary reward scheme and full feedback condition (LF) was the highest in all 30 periods, and the mean individual effort in the small monetary reward scheme and full feedback condition (SF) was the lowest after the 4th period.

Table 2: Descriptive Statistics and Comparing Individual Effort between Full Feedback and Own Feedback Conditions by the Size of Monetary Incentives

	Large monetary reward scheme			Small monetary reward scheme		
	Full Feedback (n=80)	Own Feedback (n=80)		Full Feedback (n=80)	Own Feedback (n=80)	
Period	Mean (SD)	Mean (SD)	*P*	Mean (SD)	Mean (SD)	*P*
1	0.865(0.148)	0.790(0.209)	0.010	0.799(0.165)	0.780(0.211)	ns
2	0.871(0.192)	0.810(0.209)	ns	0.806(0.192)	0.754(0.215)	ns
3	0.874(0.189)	0.791(0.227)	0.014	0.773(0.218)	0.765(0.198)	ns
4	0.826(0.245)	0.794(0.240)	ns	0.751(0.238)	0.728(0.216)	ns
5	0.835(0.227)	0.774(0.269)	ns	0.636(0.283)	0.728(0.247)	0.031
6	0.820(0.225)	0.753(0.257)	ns	0.628(0.297)	0.691(0.253)	ns
7	0.826(0.208)	0.806(0.232)	ns	0.584(0.320)	0.703(0.267)	0.012
8	0.790(0.281)	0.749(0.295)	ns	0.600(0.306)	0.660(0.291)	ns
9	0.804(0.267)	0.758(0.273)	ns	0.576(0.316)	0.681(0.282)	0.028
10	0.824(0.212)	0.815(0.254)	ns	0.614(0.319)	0.630(0.299)	ns
11	0.833(0.215)	0.735(0.283)	0.015	0.558(0.323)	0.600(0.310)	ns
12	0.840(0.216)	0.806(0.230)	ns	0.536(0.313)	0.655(0.264)	0.010
13	0.836(0.222)	0.818(0.275)	ns	0.568(0.304)	0.651(0.271)	ns

14	0.796(0.260)	0.793(0.262)	ns	0.503(0.282)	0.649(0.292)	0.002
15	0.841(0.233)	0.823(0.218)	ns	0.516(0.300)	0.623(0.286)	0.023
16	0.870(0.183)	0.816(0.265)	ns	0.489(0.279)	0.621(0.303)	0.005
17	0.838(0.223)	0.771(0.287)	ns	0.520(0.275)	0.579(0.310)	ns
18	0.839(0.227)	0.763(0.305)	ns	0.465(0.291)	0.645(0.284)	0.001
19	0.838(0.244)	0.768(0.292)	ns	0.470(0.297)	0.594(0.295)	0.009
20	0.854(0.219)	0.794(0.252)	ns	0.498(0.281)	0.601(0.272)	0.019
21	0.849(0.225)	0.763(0.294)	0.038	0.504(0.283)	0.609(0.284)	0.020
22	0.861(0.202)	0.768(0.273)	0.015	0.490(0.263)	0.603(0.309)	0.014
23	0.916 (0.110)	0.791(0.256)	0.001	0.523(0.277)	0.603(0.289)	ns
24	0.874(0.202)	0.795(0.280)	0.043	0.521(0.269)	0.591(0.281)	ns
25	0.879(0.161)	0.790(0.269)	0.012	0.535(0.296)	0.603(0.278)	ns
26	0.879(0.175)	0.791(0.276)	0.018	0.471(0.287)	0.636(0.300)	0.001
27	0.876(0.205)	0.801(0.246)	0.038	0.498(0.293)	0.574(0.306)	ns
28	0.890(0.164)	0.810(0.240)	0.015	0.458(0.310)	0.594(0.295)	0.005
29	0.900(0.168)	0.855(0.234)	ns	0.461(0.309)	0.583(0.301)	0.013
30	0.930(0.159)	0.818(0.278)	0.002	0.509(0.322)	0.575(0.306)	ns
First 15 periods	0.832(0.134)	0.788(0.166)	ns	0.630(0.206)	0.686(0.190)	ns
Last 15 periods	0.873(0.131)	0.793(0.184)	0.002	0.494(0.238)	0.601(0.243)	0.006
All 30 periods	0.852(0.124)	0.790(0.165)	0.008	0.562(0.205)	0.644(0.206)	0.013

ns = not significant.
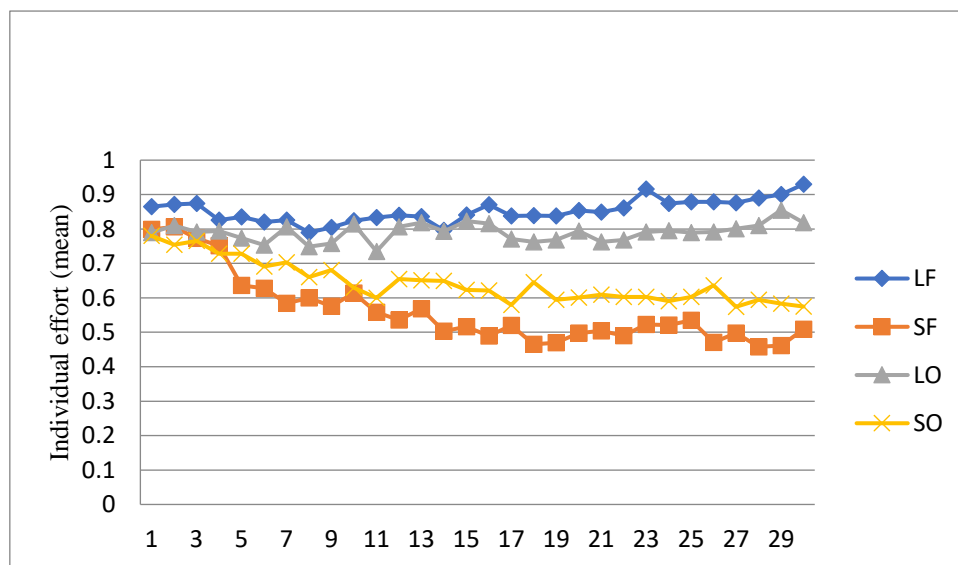
Period

LF: Large monetary reward scheme and Full feedback condition

LO: Large monetary reward scheme and Own feedback condition

SF: Small monetary reward scheme and Full feedback condition

SO: Small monetary reward scheme and Own feedback condition

Figure 3: Trends of Individuals' Effort Choices in a Group

As Table 2 presents, under a small monetary reward scheme, participants contributed lower levels of effort in a full feedback condition than in an own feedback condition in 15 of 30 periods; in 9 of the last 15 periods, the mean individual effort was significantly lower in a full feedback condition than in an own feedback condition. Under a small monetary reward scheme, the results of the last 15 periods (t=-2.799, p = 0.006), as well as all 30 periods (t=-2.511, p = 0.013) show that participants contributed lower levels of effort in a full feedback condition than in an own feedback condition.

As Table 2 shows, under a large monetary reward scheme, participants contributed higher levels of effort in a full feedback condition than in an own feedback condition in 12 of 30 periods; in 9 of the last 10 periods, the mean individual effort was significantly higher in a full feedback condition than in an own feedback condition. Under a large monetary reward scheme, the results of the last 15 periods (t=3.166, p = 0.002) and all 30 periods (t=2.689, p = 0.008) show that participants chose to contribute higher levels of effort in a full feedback condition than in an own feedback condition.

My hypotheses predict under a small monetary scheme, an individual in a group provides a lower level of effort in a full feedback condition than in an own feedback condition (H1), and under a large monetary reward scheme, an individual in a group provides a higher level of effort in a full feedback condition than in an own feedback condition (H2). To assess whether feedback information affects individual effort contribution in a group, I regress Individual Effort on Feedback (independent variable) and Personal Norm (control variable) varying the size of monetary incentives.

Table 3, Panel A provides the correlation matrix for the variables used in this study. As expected, under a small monetary reward scheme, Individual Effort in a group was negatively correlated with Feedback (r=-0.196; p<0.05) and positively correlated with Personal Norm (r=0.164; p<0.05), and Feedback was not correlated with Personal Norm (r=0.115; p=0.148). Under a large monetary reward scheme, Individual Effort was positively correlated with Feedback (r=0.209; p<0.01) and Personal Norm (r=0.344; p<0.01), and Feedback was not correlated with Personal Norm (r=0.123; p=0.120).

Table 3: Correlation Matrix and Regression on Individual Effort[a] by the Size of Monetary Incentives [b]

Panel A: Correlation Matrix

	Small Monetary Reward Scheme			Large Monetary Reward Scheme		
	1	2	3	1	2	3
1. Individual Effort	1			1		
2. Feedback[c]	-0.196**	1		0.209***	1	
3. Personal Norm[d]	0.164**	0.115	1	0.344***	0.123	1

, * Indicates p<0.05 and p<0.01, respectively, all p-values are two-tailed.

Individual Effort$_i$ = α_i + β_1 Feedback$_i$ + β_2 Personal Norm$_i$ + ε_i

Panel B: Small Monetary Reward Scheme (n=160)

Variable	β (Standardized Coefficient)	t-statistic	p-value
Feedback[c]	-0.218	-2.814	0.006
Personal Norm[d]	0.189	2.447	0.015
Adjust R^2 6.2%			

Panel C: Large Monetary Reward Scheme (n=160)

Variable	β (Standardized Coefficient)	t-statistic	p-value
Feedback[c]	0.169	2.279	0.024
Personal Norm[d]	0.323	4.346	<0.001
Adjust R^2 13.6%			

[a] Individual Effort in a group is the average contribution of individual effort in all 30 periods.

[b] The monetary incentive was manipulated as a large versus small monetary reward scheme. Under a large (small) monetary reward scheme, the firm kept 40 percent (80 percent) of the project profit for itself, and the remaining 60 percent (20 percent) of the project profit was shared equally among the four members of the group, and only those who met the average group members' effort could earn his/her monetary reward.

[c] Feedback is coded as 1 when an individual is in the full feedback condition, and 0 otherwise.

[d] Personal norm represents beliefs about appropriate behavior in a group, using a seven-point Liker scale that ranges from 1 ("strongly disagree") to 7 ("strongly agree").

As shown in Table 3, Panel B, under a small monetary reward scheme, the coefficient for feedback is negative and significant (β=-0.218; p=0.006), implying full feedback information leads to lower levels of effort. This result supports H1. An individual in a group provides a lower level of effort in a full feedback condition than in an own feedback condition.

As shown in Table 3, Panel C, under a large monetary reward scheme, the coefficient for feedback is positive and significant ($\beta=0.169$; $p=0.024$), implying full feedback information leads to higher levels of effort. This result supports H2. An individual in a group provides a higher level of effort in a full feedback condition than in an own feedback condition.

In addition, to look for gender effect on individual effort, results (not tabulated) show that no significant difference was found under a small monetary reward scheme ($p=0.592$) and a large monetary reward scheme ($p=0.162$).

5.   Discussion and Conclusion

This study examined how feedback information varying the size of monetary incentives affects individuals' effort choices in a group, especially using bonuses as a reward or punishment (taking bonuses away from those who contribute below the average effort level of the group). These results are consistent with prior research that shows when there is a small monetary reward scheme, an individual in a group provides a lower level of effort in a full feedback condition compared to an own feedback condition (Zhang, 2008; Abeler et al., 2010; Thoni and Gächter, 2015). Providing full feedback causes mean individual effort in a group to deteriorate under a small monetary reward scheme. This deterioration in effort may be caused by participants' responses to the content of the feedback that the cost of effort was large relative to the benefit of monetary rewards, and in turn, the ineffectiveness of feedback information motivates collusion to exert lower levels of effort (Zhang, 2008). Another explanation is that of fairness concerns (Abeler et al., 2010). Under a small monetary reward scheme, if individuals who exert higher levels of effort receive lower payoffs, then they reduce their subsequent effort. The findings highlight the importance of taking the concerns of group members' bonuses into account under a small monetary reward scheme, rewarding an equal bonus to group members who meet the average effort of the group may do more harm than good, especially in a full feedback condition.

In contrast, under a large monetary reward scheme, an individual in a group provides higher levels of effort in a full feedback condition compared to in an own feedback condition. Providing effort and payoff feedback of other members in a group plays a key role in motivating individuals to exert higher levels of effort to increase profits and earn a bonus. This result is consistent with prior research (Rosen et al., 2006; Gächter et al., 2012; Bolton and Werner, 2016) that an individual becomes more likely to choose higher levels of effort when observing higher effort levels also in her/his group members under a large monetary reward scheme.

My study has several implications for the design of monetary incentives and information feedback. Providing effort and payoff feedback of other members in a group improves individual effort under a large monetary reward scheme, whereas such effort and payoff feedback may deteriorate individual effort under a small monetary reward scheme. Small monetary rewards may be ineffective, especially in a full feedback condition. The results suggest that firms providing a large

monetary reward scheme and full feedback would induce intragroup members to exert higher levels of effort and direct intragroup members towards the common goal, but the outcome under the small monetary reward scheme should be taken into consideration.

This experiment has several limitations. First, the setting links individual monetary rewards to meet the group's standards, such that monetary rewards can be earned only if the standard is met. The results may not effectively apply to other settings. Second, a large monetary reward scheme is expected to induce individuals to exert higher levels of effort in a group, but increasing performance may involve many factors such as skill, performance curiosity, and specific characteristics of the task (Awasthi and Pratt, 1990; Bonner and Sprinkle, 2002; Alós-Ferrer, García-Segarra, and Ritschel, 2018). Finally, whether or not firms follow a policy of pay transparency depends largely on their business culture. The business culture effect is beyond the scope of this study, but it would certainly be a worthwhile question for future research.

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