



# An experimental examination of compensation schemes and level of effort in differentiated tasks



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## ABSTRACT

We examine the influence of different compensation schemes on the exertion of effort in completing differentiated tasks. The first task is assumed to be boring and has no intrinsic motivation, while the second is assumed to be interesting and has intrinsic motivation. The results are as follows: (1) for the first task, effort levels were lower for high fixed pay than low fixed pay and no payment and were higher for low incentive pay than high incentive pay and no payment. (2) Standard economic theory holds for the second task, which predicts that the higher the incentive, the more effort an individual will exert and the greater the performance, on an average.

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## 1. Introduction

According to standard economic theory, the greater the monetary incentive, the more effort an individual exerts in completing tasks, and the higher the performance achieved, on average. That is, an individual exerts more effort when higher performance is rewarded with higher compensation. Laboratory experiments (Dickinson, 1999) and field experiments (Banker, Lee, and Potter, 1996; Lazear, 2000) support this basic premise, and many topics such as principal agent theory, labor economics, and human resource management assume this premise.

However, in the field of social psychology, it has been pointed out that monetary incentives do not necessarily facilitate effort and, instead, undermine effort. The reason often cited for this effect is the crowding out of intrinsic motivation by monetary motivation (Deci, 1975; Frey and Jegen, 2001; Frey and Oberholzer-Gee, 1997; Gneezy, Meier, and Rey-Biel, 2011). Intrinsic motivation is motivation unrelated to extrinsic monetary motivation, such as pleasure in performing the activity or gratification from the sense that an individual's efforts have benefited others or society as a

whole. Monetary incentives may undermine intrinsic motivation. For example, Fehr and Gächter (2002) and Gneezy and Rustichini (2000a) showed that monetary incentives undermine prosocial behavior.<sup>1</sup>

In the context of tasks, if the crowding out effect is greater than the effect of effort promotion because of monetary compensation, monetary compensation undermines effort or degrades performance. Deci (1971) conducted experiments consisting of three stages and, in all stages, participants worked on puzzles. In the first and last stages, participants performed without pay and, in the second stage, they were paid according to their performance. Deci (1971) showed that participants exerted greater effort in the second stage than in the first and third stages. Particularly, participants exerted less effort in the third stage than in the first stage. This suggests that monetary compensation undermined the intrinsic motivation in the third stage. Other studies (e.g., Dessi and Rustichini, 2015; Gneezy and Rustichini, 2000b; Heyman and Ariely, 2004; Pokorny, 2008) also experimentally investigated this effect;

<sup>1</sup> Lacetera and Macis (2010) and Mellström and Johannesson (2008) showed that the crowding out effect is different between males and females. It is also reported that the monetary incentive undermines prosocial behavior for reasons other than the crowding out effect (Ariely, Bracha and Meier, 2009; Ariely et al., 2009; Fuster and Meier, 2010).

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however, their results showed that the direction of magnitude of monetary incentives on effort was mixed. See the detailed review in the next section.

The relationship between monetary incentives and effort or performance also depends on the level of interest the performer has in performing the task. For example, Fessler (2003) showed that when the task was originally perceived as attractive, piece-rate compensation worsened task performance compared to fixed-wage compensation. We also provide a detailed literature review on this subject. Research in this field mostly examines the relationship between task attractiveness and task performance under two monetary compensation schemes (i.e., fixed pay or piece-rate pay). The existing studies did not consider the magnitude of monetary incentives. In this paper, we conducted experiments in which the participants engaged in two types of real effort tasks with five different compensation schemes. One task involves clicking on circles, and the other task is solving a series of kanji puzzles. We assume that the former task is boring and has no intrinsic motivation, while the latter task is interesting and has substantial intrinsic motivation.<sup>2</sup> The five compensation schemes were no payment, low incentive pay, high incentive pay, low fixed pay, and high fixed pay. From these experiments, we examine the relationship between the level of exertion in completing the task and the magnitude and nature of compensation received.

The contribution of this current paper to the existing literature is two-fold. First, we apply both fixed pay and incentive pay compensation schemes to provide a systematic investigation of the relationship between the level of exertion and monetary incentives. The compensation schemes applied in previous studies were different (e.g., fixed pay in Heyman and Ariely, 2004 versus performance-based pay in Gneezy and Rustichini, 2000b and Pokorny, 2008), and the results obtained from these studies were mixed. Second, in our experiments, participants were asked to do both boring and interesting tasks. Thus, we also examine the influence of task content on the relationship between effort level and compensation schemes. We believe that this experimental design can provide fresh insight into the related literature.

The remainder of the paper is organized as follows. A literature review is provided in the next section. Section 3 describes the issues related to the experiment. The results of the experiment are presented in Section 4. Finally, Section 5 discusses the results and suggests several possible directions for future studies.

## 2. Literature review

### 2.1. The relationship between effort and the magnitude of monetary incentives

Gneezy and Rustichini (2000b) found a U-shaped relationship between effort and the magnitude of incentive or performance-based pay. That is, the participants of low incentive compensation schemes performed worse in an IQ test than the participants in a high incentive scheme. However, the participants with low

incentive schemes performed worse than participants in the no-payment scheme. This result suggests that low monetary incentives contribute to the crowding out of intrinsic motivation.

Pokorny (2008) reported an inverse U-shaped relationship between effort and the magnitude of incentive pay. The level of effort increases in proportion to an increase in monetary incentives at low levels. However, the level of effort decreases with respect to monetary incentives when monetary incentives are higher than a certain level. This result contradicts the results of Gneezy and Rustichini (2000b). Pokorny (2008) explained the result of the reference-dependent preference and loss aversion (Kahneman and Tversky, 1979; Tversky and Kahneman, 1991).<sup>3</sup>

In economic experiments on rewards, the expectation of a reward before an experiment starts may be a reference point for rewards. If a show-up fee or incentive pay is small, the reward that a participant will receive is more likely to fall below the participant's reference point, and this causes the participant to work harder than if the show-up fee or incentive pay is larger because of the loss-aversion. The show-up fee in the experiment of Pokorny (2008) was much lower than that of Gneezy and Rustichini (2000b). The participants with a low incentive in Pokorny (2008) anticipated a lower reward than the reference point and worked harder because of the loss-aversion.

Heyman and Ariely (2004) and Yam (2013) examined whether the relationship between effort and the magnitude of compensation differs depending on the monetary or social market.<sup>4</sup> Heyman and Ariely (2004) found that, in the monetary market, the greater the compensation, the harder an individual works; however, effort is not sensitive to the magnitude of compensation in the social market. Moreover, the authors found that low payment in the monetary market decreased performance compared to performance in the social market with no payment. Fixed pay is controlled in Heyman and Ariely (2004) in contrast to Gneezy and Rustichini (2000b) and Pokorny (2008).<sup>5</sup> The result showed that the assertion by standard economic theory that effort is not sensitive to the magnitude of fixed pay is wrong.

### 2.2. Links among task attractiveness, monetary incentives, and task performance

Research in management accounting and elsewhere has found that monetary incentives affect individual task performance differently according to the appeal of the task. For example, Fessler (2003) reported the results of a laboratory experiment where subjects performed a complex task under two types of compensation schemes: fixed wage and piece rate. His results showed that when the task was originally perceived as attractive, piece-rate compensation worsened task performance relative to fixed-wage compensation. When the task was originally perceived as unattractive, the form of compensation scheme did not affect task performance. However, these results did not hold for a second group of subjects who performed a less complex task.

Dessi and Rustichini (2015) investigated whether the crowding out effect of monetary incentives persists when intrinsic motivation is strong and tested this hypothesis experimentally focusing on the motivation to undertake an interesting and challenging task (i.e., IQ test). The authors found that monetary incentives had no significant impact on performance. In a second experiment using

<sup>2</sup> After another experiment was completed at the Center of Experimental Economics, we conducted a questionnaire to determine the appeal of the two tasks for 100 undergraduate students at Kansai University. Sixty-three students estimated how interesting the two tasks were using a five-level scale (5: Interesting; 4: Interesting, if anything; 3: Not interesting and not boring; 2: Boring, if anything; and 1: Boring) after an explanation of the tasks and seeing the screen on which the tasks were conducted. Thirty-seven students provided estimates using the same five-level scale after an explanation and attempting the tasks. The average evaluation for the clicking circles task and the kanji puzzle task were 3.22 and 4.15, respectively. A *t*-test does not indicate that the average evaluation for the clicking circles task is significantly larger than three. On the other hand, a *t*-test indicates that the average evaluation for the kanji puzzle task is significantly larger than three. ( $p < 0.001$ ). Therefore, the implication is that, on average, the clicking circles task is not interesting and the kanji puzzle task is interesting.

<sup>3</sup> Camerer et al. (1997), Crawford and Meng (2011), Farber (2008) and Fehr and Goette (2007) found that higher wages reduced the effort or supply of labor in their field experiments or field studies. These results are consistent with loss aversion.

<sup>4</sup> Heyman and Ariely (2004) defined the case where monetary payments were used as a monetary market and the case where no monetary reward was involved or a gift reward was used as a social market.

<sup>5</sup> Squazzoni, Bravo, and Takács (2013) reported that fixed pay undermines cooperative behavior.

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