

What Motivates You: Monetary and Metacognitive Aspects



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Submission: April 04, 2022; **Published:** April 11, 2022

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Abstract

The aim of the present research was to investigate the effect of monetary incentives and metacognitive thinking on people's intrinsic motivation, concentration (task engagement), interest, boredom, and extrinsic motivation. Although monetary incentives have frequently been the focus of motivation studies, people's thinking from a metacognitive perspective has not been sufficiently studied. Thus, the present study has focused on how monetary incentives and people's thinking affect their motivations and other dimensions. It was hypothesised that people would overestimate their motivation and that monetary incentives would not have any striking effect on this estimation. To examine this, participants were allocated into two main conditions involving two sub-conditions each, namely Forecast (prediction vs. performance) and Incentive (money vs. no-money). The findings demonstrated that whereas subjects overestimated their intrinsic motivation, concentration, interest, boredom, and extrinsic motivation, incentives did not work to increase their intrinsic motivation, concentration, interest, or boredom but incentives boosted participants' extrinsic motivation. Two-way interaction was found only in the participants' extrinsic motivation.

Keywords: Motivation; Incentive; Metacognition; Meta-motivation

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Motivation has been defined as being moved to do something [1]. Ryan and Deci described a motivated person as feeling energy or fervour to do something, whilst unmotivated person does not have any impulse or inspiration. "Levels of motivation" and "orientation of motivation" were defined by Deci and Ryan [2] in the self-determination theory. Level of motivation indicates that while some people are more willing to do a particular task, others feel less motivated to do the same. Thus, people can be distinguished as being more or less motivated. Additionally, actions are driven by people's goals and attitudes. For instance, a student works harder to get the approval of his/her parents or teacher. This has been described as the so-called "orientation of motivation". Moreover, there are types of motivation that represent the main elements of the self-determination theory: intrinsic vs. extrinsic motivation. Whereas extrinsic motivation usually occurs when one would like to gain a profit or avoid sanctions, intrinsic motivation is generated quintessentially when doing a task they consider joyful or interesting [1].

Can people accurately predict their motivation about future events? Sometimes people overestimate or underestimate their motivation for future tasks. For example, the Sydney opera house was planned to be completed in 1963 at a cost of \$7 million. However, it was finally completed ten years later at a cost of \$102 million [3]. To take another example, the Channel Tunnel between France and Britain was intended to open in 1993 at a cost of £4.9 million, but finally did so in 1994 at a cost of £10 million. From a psychological perspective, we can observe this in people's daily activities. For instance, some people plan to complete their work overnight or at the weekend. Past experience, however, suggests that work planned in this manner cannot be completed, but people will nevertheless believe that their forecast is realistic [4]. To measure this phenomenon, one needs to look at metacognitive studies. Metacognition was first defined by Flavel [5], in pointing out that metacognition is "thought about thought". Metacognition in itself includes thinking, appraising, controlling, and monitoring processes [5]. More recently, metacognition was studied for the treatment of psychological disorders [6,7]. According to recent

studies, if a psychological disorder such as depression is linked to the occurrence of biased thinking, it is likely that the associated problems originate from metacognition, which controls thinking. The distinguishing point between metacognition and cognition is that metacognition regulates and monitors the activities of cognition. Thus, regulating and monitoring are clarified as important processes of metacognition [5]. Metacognition is usually mentioned as being a confidence judgement about what we know. Despite the fact that people are good at making judgements regarding their own knowledge, they may have a tendency to be overconfident [8-10].

Do incentives or external events enhance people's motivation? In light of cognitive neuroscience studies, it was found that incentives have an enhancing role during the learning process, since stimulates the hippocampal function in the brain [11,12]. However, when we look at the effect of incentives from a social psychology perspective, as Murayama pointed out (2018), external regulators like rewards, incentives [13,14], prizes [15], deadlines [16], and surveillance [17] undermine intrinsic motivation as they were known controlling stimuli. Also, has been found that artistic creativity amongst children which is related to intrinsic motivation can be decreased by prizes [18]. Recent studies shows that if people engage with the interesting task, the effects of external regulators do not work [19-21].

The Present Study

In the present research, motivation was studied by considering participants' intrinsic motivation, concentration on the task, interest in the task, boredom, and extrinsic motivation. These five dimensions were the dependent variables of the study, whilst metacognitive forecast and incentive were taken as the independent variables. Participants faced a fairly dull experimental task called the "Flanker Task" during the study period. They were asked to make a judgement call about their motivation for the task immediately prior to the experiment, which is called "Meta-motivation". To be able to find the effect of incentives on meta-motivation, participants were rewarded in some specific conditions.

In spite of the fact that many studies have been conducted in the field of metacognition as a subfield of the cognition, there is no adequate research to date that has investigated motivation from the perspective of metacognition. Additionally, the influence of incentives on the participants' metacognitive forecast has not been sufficiently studied. It was thus hypothesized that participants' feelings about their motivation were overestimated. The additional hypothesis was that there was no significant difference between participants' forecast about their motivation regardless of being incentivised since it was claimed that when participants made a judgement about their future performance, they always think the best.

Methods

Participants

102 students were recruited from the Psychology Department of Bingol University, Turkey. Participation in the study was voluntarily, and whereas 76 subjects were given extra credit to complete the course, 26 students were incentivised by 10 Turkish Liras, as an external regulator, to take part in the experiment, which was about one hour in duration.

Design

Forecast (prediction vs. performance) and incentive (money vs. no-money) were both manipulated between subjects, via a 2 x 2 factorial design. Intrinsic motivation, concentration on the task, interest in the task, boredom, and external regulation were the dependent variables of the study. Random allocation was applied between conditions: prediction-no money (1), prediction-money (2), performance-no money (3), and performance-money (4), respectively.

Materials

Demographic Form

Participants' ages, gender, and current stress levels were determined to prevent the effects of high stress biasing the experiment. Female participants also indicated the remaining time until their menstrual period due to the fact that menstruation is known to have a distinct effect on stress levels [22]. Additionally, subjects were told to indicate their level of concentration during the experiment after its completion.

Experimental Task

The Flanker task was used as the main task, which consists of five arrows at the centre of the computer screen. The subject makes a judgement with the left and right keys about the direction of the centre arrow. The Flanker task is comprised of two stages, the practise session and the main session, including 20 and 3000 trials, respectively. The duration of each trial was approximately 1 second, so the experiment thus lasted around an hour for each of the subjects. The experimental task was set up and run using Matlab's Cogent Toolbox [23].

Task Motivation Scale

The measurement tool was developed and validated by Kose and Aytimur [24] to assess five dimensions involving intrinsic motivation, concentration on the task, interest in the task, boredom, and external regulation. Participants indicated their feelings on a seven-point Likert scale.

Procedure

When participants came to the testing room, they first signed a consent form. After that, they experienced the practise

sessions, including 20 trials lasting around 20 seconds. In the first condition (prediction-no money), participants were given a Task Motivation Scale to demonstrate their feelings about the experiment prior to performing the task for an hour. The second condition (prediction-money) was identical to the first with the difference that participants told after the practise trials that they would earn 10 Turkish Lira every hour they performed the task, and they then indicated their feelings about the task. In the third condition (performance-no money), participants performed the practise task but were not told about any incentive, and after the practise session they performed the main task. At the end of the experiment, they were asked to complete the task motivation scale. The fourth condition (prediction-money) was identical to the third condition, the only difference being that participants were told that they would earn 10 Turkish Lira after the experiment. When task had been completed in all conditions, the participants completed a demographics form.

Result

The effect of the incentive and participants' forecast was

measured via the Task Motivation Scale, which itself consists of five subscales.

Intrinsic Motivation

Participants showed their feelings of intrinsic motivation for three items. 2 (prediction vs. performance) x 2 (money vs. no-money) ANOVA illustrated that the main effect was related to Forecast, $F(1, 96) = 14.09, p < .05$, but not for incentive $F(1, 96) = .17, p > .05$. ANOVA revealed that there was no apparent interaction effect between forecast and incentive $F(1, 96) = .02, p > .05$. Independent t-test results illustrated that participants overestimated their motivation between prediction and performance for the money and no-money conditions (see Figure 1), $t(49) = 2.57, p < .05$ ($M = 4.47$ for prediction and $M = 3.36$ for performance), $t(49) = 2.51, p < .05$ ($M = 4.35$ for prediction and $M = 3.40$ for performance), respectively. In the prediction condition, participants were not to differ significantly even when incentivised, $t(49) = .34, p > .05$ ($M = 4.47$ and $M = 4.35$). Participants who performed the main task also did not differ under the incentive condition, $t(49) = .08, p > .05$ ($M = 3.40$ and $M = 3.36$).

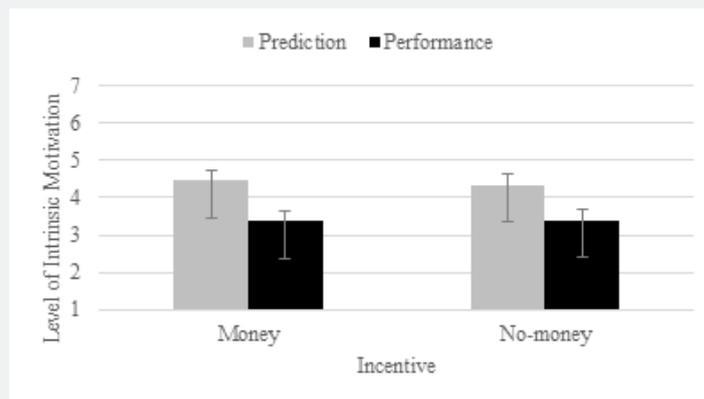


Figure 1: Mean difference for intrinsic motivation. Standard errors are represented in the figure by the error bars attached to each column.

Concentration

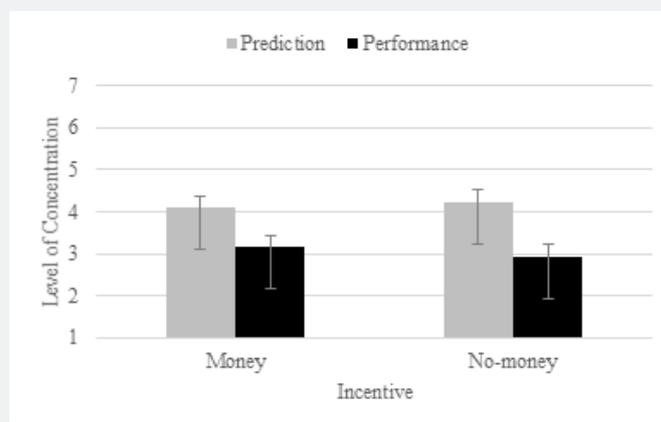


Figure 2: Mean difference for concentration (task engagement). Standard errors are represented in the figure by the error bars attached to each column.

The main effect was found only under forecast conditions, $F(1,96) = 16.61 p < .05$. However, forecast and incentive did not appear to interact with each other, $F(1,96) = .88 p > .05$. Participants were also overconfident with regard to their concentration, and there was a statistically significant difference between the prediction and performance conditions for the no-money condition (see Figure 2), $t(49) = 2.15 p < .05$ for money ($M = 4.09$ and $M = 3.15$) and $t(49) = 3.17 p < .05$ for no-money ($M = 4.24$ and $M = 2.92$), respectively. Moreover, participants did not show any significant difference between their predictions when they were incentivised, and indeed their actual performance was almost identical.

Interest

Participants' interest in the task had main effect for forecast but not for incentive, $F(1,96) = 7.54 p < .05$. Again, we could not find any interaction between forecast and incentive, $F(1,96) = .63 p > .05$. Participants thought that they would be able to maintain their interest over an hour experience; however, they again overestimated their interest in the flanker task under both money and no-money conditions (see Figure 3), $t(46) = 2.32 p < .05$ ($M = 4.29$ and $M = 3.32$ for money) and $t(47) = 2.17 p < .05$ ($M = 4.43$ and $M = 3.53$ for no-money). The incentive also did not work for participants' predicted and actual performances, separately.

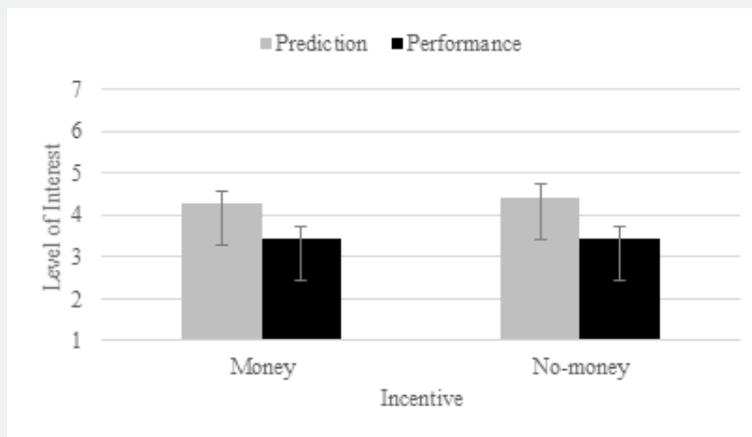


Figure 3: Mean difference for boredom. Standard errors are represented in the figure by the error bars attached to each column.

Boredom

As for the aforementioned dimensions, the main effect was for forecast not incentive, $F(1,96) = 7.35 p < .05$. 2×2 ANOVA revealed that variables did not interact with each other, the same as for previous dimensions, with $F(1,96) = .11 p > .05$. Independent

t-test results demonstrated that participants underestimated their boredom before the main task for the forecast condition (see Figure 4), $t(49) = -2.17 p < .05$ for only no-money ($M = 3.19$ and $M = 4.28$) and $t(49) = -2.15 p < .05$ for money ($M = 3.14$ and $M = 4.14$). There was no effect of incentive for the prediction and performance conditions.

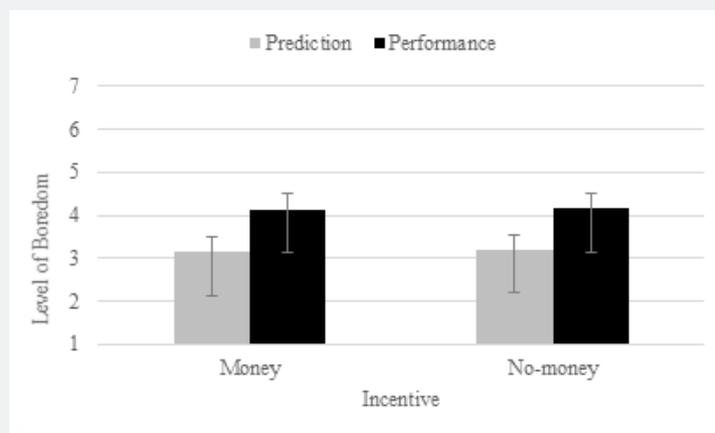


Figure 4: Mean difference for boredom. Standard errors are represented in the figure by the error bars attached to each column.

External Regulation

Unlike the other four dimensions, the main effect of external regulation was on incentive, $F(1,96) = 8.20 p < .05$, whilst there was no main effect for forecast, $F(1,96) = .08$. More importantly, we found an interaction effect for external regulation, $F(1,96) = 4.04 p < .05$. In the forecast for no-money condition, participants in the prediction felt that they less voluntarily went to the testing room, whereas performers felt as if their performance of the task

was compulsorily (see Figure 5), $t(44) = -2.19 p < .05$ ($M = 3.27$ and $M = 4.22$). For the money condition, participants predicted their feelings about the task as being one of compulsory work, as compared to the performance group who indicated voluntary participation in the experiment, $t(48) = 2.04 p < .05$ ($M = 3.20$ and $M = 2.42$). When incentivised, there was no statistically significant difference for the prediction condition $t(49) = .67 p > .05$ ($M = 3.42$ and $M = 3.12$) while performers differed from each other $t(49) = 3.40 p < .05$ ($M = 3.79$ and $M = 2.42$).

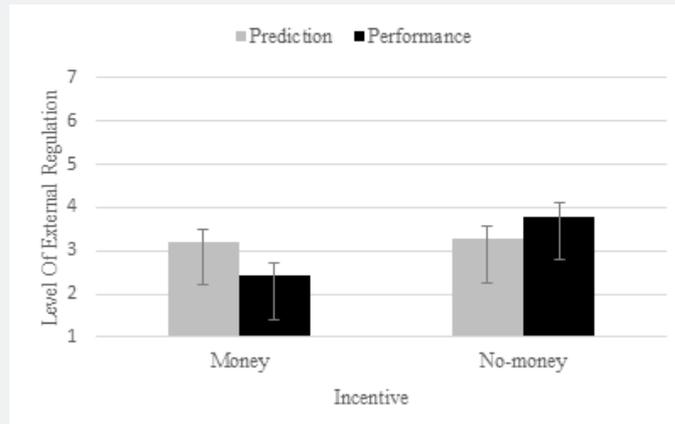


Figure 5: Mean difference for external regulation. Standard errors are represented in the figure by the error bars attached to each column.

Discussion

The present outcomes showed that people generally overestimate their intrinsic motivation, concentration, and interest, and underestimate their boredom with a boring task before doing the main task, whether they were either incentivised or not. Participants' predictions for money and no-money conditions and participants' performance in the money and no-money conditions did not differ significantly, and the mean average was fairly close for both. This shows that incentive had no effect on participants' predicted and actual performances. We could say that when participants made judgements about their motivation and other dimensions, they were taking the most optimistic interpretation under any condition. This is why money as an incentive did not work in the comparison of prediction groups. Also, the incentive as an external regulator led to participants underestimating their feelings about the experimental participation when they were not incentivised. However, people who took part in the experiment for money were overconfident when compared to their actual performance. Interestingly, although in the prediction with money and no-money, the feeling of participation did not differ, while people in the actual performance showed more voluntarily participation.

It was observed from the findings that incentives did not affect people's intrinsic motivation, which could be positively correlated with interest [2] and concentration (task engagement) [13,25]

and negatively correlated with boredom [2,26]. Previous studies have shown that if the task is interesting or enjoyable, money does not play an enhancing role in people's intrinsic feelings and indeed sometimes undermines people's intrinsic motivation in a cognitive task. In line with these findings, it was found that money played an enhancing role only for uninteresting tasks or materials [20,21]. Our findings were not consistent with these studies, since these monetary incentives did not enhance the participants' motivation, task engagement, interest, or decrease their boredom. However, giving incentive to participants in order to take part in the experiment illustrated that participants showed higher voluntarily feelings towards the experiment compared to the non-incentivised group. More importantly, giving a monetary incentive or compulsory participation for a boring work did not change the participants' intrinsic motivation or other correlated factors. Thus, this means that if there is someone being forced to doing boring work, there is no point giving any reward or incentive to another person to do the same task.

Despite the fact that motivation has not been studied as a field of metacognition, there are a number of studies that have been conducted in the subfield of cognition such as meta-memory, meta-comprehension, and the like. According to our results, people overestimated their motivation, concentration (task engagement), and interest, results that are entirely consistent with previous studies [27,28]. Furthermore, there was an underestimation of the boredom of participants when comparing their predictions

and actual performance, in which again is supported by results reported in the literature [29,30].

Limitations and Suggestions

In the present research, we applied a fairly dull task. An interesting or enjoyable task could have been applied as a third variable to see how an interesting task would affect people's motivation and metacognition. Additionally, participants of the money condition could have been paid more to increase the effect of money on their prediction and actual performance. However, we do not think that any other or additional incentives would have any statistically significant effect in such a study. Previously, it was mentioned that monetary incentives did not appear to play any real role in increasing people's motivation to perform a boring task. Participants could indeed be asked how much they need money at the moment, and such information could have been applied as a covariate. Moreover, the present research did not focus on the error rates (false responses), which have could be applied as a dependent variable. Since we expected that subjects would get bored of an hour-long experimental process, they would inevitably show higher error rates. Finally, this study was conducted for an hour, and participants illustrated their feelings on the dependent variables immediately before and after the experiment. In addition to this, subjects attended the experiment during specific periods as between subjects again. For instance, participants would be allocated to 20-, 40-, or 60-minute periods to determine the effect of time on the participants' feelings. Finally, a qualitative study could be conducted in conjunction with the quantitative work. A focus group interview would be one of the best applications to determine more about motivation and metacognition, especially in order to determine why participants' score of prediction under the money condition is not differentiated from the participants' score for prediction in the no-money condition.

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DOI: [10.19080/PBSIJ.2022.18.555993](https://doi.org/10.19080/PBSIJ.2022.18.555993)

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