Rejections, Incentives, and Employee Creativity: When Chocolate Is Better Than Cash

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December 2018

We thank Markus Arnold, Robert Bloomfield, Jeffrey Hales, Jason Kuang, Steven Salterio, Joseph Sarji, Shankar Venkataraman, Alan Webb, Michael Williamson, participants at the 2018 AAA Management Accounting Section Midyear Meeting, 2018 Accounting Behavior and Organizations Sections Research Conference, 2018 Swiss Winter Accounting Conference, 2018 Global Management Accounting Research Symposium, as well as workshop participants at Maastricht University, Martin Luther University of Halle-Wittenberg, Georgia Institute of Technology, Tilburg University, University of Bergen for their helpful comments. We gratefully acknowledge the financial support provided by Tilburg University.

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Abstract: We use an experiment to provide evidence on how a rejection of a creative idea and reward type influence future creative performance. We find that a rejection of creative idea leads to lower perceived competence and lower performance in a subsequent similar creativity task. Next, the performance difference between rejected and accepted participants only manifests when cash rewards are subsequently used to motivate future creativity, but not when tangible rewards are used. Our results are consistent with recent work in behavioral economics suggesting that tangible (cash) rewards will activate a "non-calculative" ("calculative") process in which experiences of success/failure are less (more) likely to be translated into future expected payoffs. Accordingly, the motivational effect of rewards will be less sensitive to changes in assessed probability of success when tangible rewards are provided compared to when cash rewards are provided. Our study extends the literature on creativity by bringing to the forefront the neglected role of rejections in firms' long-term innovation and the asymmetric effect of reward type for rejected versus accepted employees.

Keywords: *rejections; creativity; incentives; tangible rewards; intrinsic motivation*

I. Introduction

Management accounting research on creativity often investigates how particular incentives and controls motivate the *generation* of creative ideas. However, organizations, scientific institutions, and decision makers routinely *reject* creative ideas, even when creativity is espoused as a desired goal (Staw, 1995). Rejections are frequent, due to the limited capacity and resources, strong filtering processes, as well as potential biases in the selection processes in most organizations (Mueller et al., 2012). Rejections can be consequential and problematic, as employees often become disappointed as they do not receive the recognition they strive for. They may further perceive rejections as an embarrassing failure and refrain from future engagement in creativity work (Amabile, 1983a; Zhou, 1998). As a result, rather than fostering long-term innovativeness, firms' solicitation of creative ideas might rather frustrate the rejected majority and deplete their pool of potential contributors. It is thus crucial for firms to continuously motivate their employees whose ideas are initially rejected to be creative in the future. Hence, in this study, we explore the rejection effect in a setting where organizations solicit creative ideas from employees, and more importantly, how organizations can continuously motivate their rejected employees.

An investigation of rejections in a creativity setting is useful in that not only are rejections prevalent in creativity works, but also the inherent subjectivity in creativity works often leads to the most creative ideas getting rejected initially. For instance, scientific research has witnessed many award-winning papers struggle to be published and are initially rejected (Calcagno et al., 2012). Thus, firms' innovation process not only involves the search for the brilliant "accepted minority" but also a proper way to handle the potentially creative "rejected majority". While it is generally taken that strong incentives can always motivate what is desired, presumably also for rejected individuals, psychologists and behavioral economists suggest cases where cash incentives can often backfire (e.g. Fehr and Falk, 2002). Further, anecdotal accounts suggest considerable variation in

the type of rewards firms use to incentivize creativity. Apart from cash prizes, tangible rewards such as merchandise and gift vouchers are often employed in firms' solicitation of creative ideas (Gibbs et al., 2017; Sullivan, 2010). While prior accounting literature has focused on incentive contracts provided in the form of cash incentives in motivating creativity (e.g., Kachelmeier et al., 2008; Kachelmeier et al., 2018), the current work has not investigated the critical phase of employees' reactions to rejection/acceptance decisions and how different reward types affect their subsequent creativity. This study addresses this gap by examining (1) how rejections of creative ideas affect employees' future creativity and (2) how different reward types used to motivate future creativity (performance-based cash rewards vs. tangible rewards vs. fixed pay) mitigate the rejection effect.

We first predict that rejections will undermine employees' creative performance in future creativity work. Here, our experimental setting adopts the feature that no additional explanations or rationales are provided for the rejection/acceptance decisions, a setting consistent with real-world environments where constructive feedback is often costly and sometimes infeasible due to the subjective criteria in most creativity work (Dahlander and Piezunka, 2014; Amabile, 1983a). In this setting, rejections will make it difficult for individuals to maintain a high level of self-efficacy and confidence in a subsequent creativity task. Cognitive evaluation theory suggests that certain social-contextual events that thwart feelings of competence can undermine intrinsic motivation for that action (Deci, 1975; Vallerand and Reid, 1984). Accordingly, we expect that rejections will diminish employee's perceived competence, reduce intrinsic motivation in the creativity work, and consequently undermine their creative performance in future creativity tasks.

Next, we investigate whether the rejection effect is moderated by the type of rewards intended to motivate future creativity. We predict that the effect of rejections on future creative performance is mitigated when tangible rewards are used compared to when cash rewards are used. Recent work in behavioral economics advances the distinction in the psychological valuation of monetary versus

nonmonetary gambles (McGraw et al., 2010; Hsee and Rottenstreich, 2004). Specifically, McGraw et al. (2010) suggest that for monetary outcomes, the numeric amounts can be straightforwardly combined with probabilities to yield a measure of expected value; whereas nonmonetary outcomes typically involve nonnumeric amounts, which do not lend themselves an easy combination with probabilities. As a result, compared with monetary outcomes, the valuation of nonmonetary outcomes proves to be less sensitive to changes in probability. One consequence of rejections is that individuals will likely assess a lower probability of success in future attempts. Combined with the above argument, we propose that this lower assessed probability of getting the rewards will be fairly spontaneously incorporated into the valuation of rewards when cash rewards are provided. Consistent with a greater sensitivity to probabilities in the valuation of monetary outcomes, the motivational effect of cash rewards is expected to be more sensitive to the assessed probability of success compared to tangible rewards. As such, we expect that the rejection/acceptance decisions and the consequent changes in assessed probability of success will more likely affect future creative performance when cash rewards are provided compared to when tangible rewards are provided.

Additionally, we try to explore the mechanism underlying the proposed effect. In a related work, Hsee and Rottenstreich (2004) propose two psychological processes by which people assess values: valuation by calculation and valuation by feeling, with the former determining preferences on the basis of some algorithm and the latter on one's feelings toward the target. McGraw et al. (2010) report in their experiments that participants evaluating monetary gambles are more likely to engage in a "calculation" process than those evaluating nonmonetary gambles. Drawing on their findings, we expect that cash rewards will likely engender more valuation by calculation where people engage in a calculative mindset of expected payoff; whereas tangible rewards will elicit a more "feeling" process toward the outcome. To the extent that individuals do not readily engage in a calculation of final outcome when tangible rewards are provided, we expect them to show a greater

tendency to perform and enjoy the creativity task for its own sake, as opposed to a speculation of external rewards (Amabile et al., 1986). Thus, we explore whether intrinsic motivation, the extent to which individuals enjoy the task itself, can potentially mediate the proposed effect.

To test our predictions, we conduct a laboratory experiment where participants are required to complete two creativity tasks involving developing creative solutions for real-world problems. Participants are informed at the beginning of the study that they will be randomly paired with another participant of the same session; an independent rater will evaluate each pair of solutions and select the more (less) creative one to give acceptance (rejection) decisions. The independent rater is randomly chosen in each session and is not involved in developing creative ideas. Participants have 8 minutes to draft creative ideas and 2 minutes to select one for evaluation. To elicit rejection effects without any incentive effects, participants are provided a fixed wage of 4 EUR for the first creativity task. After participants are informed of the decisions for the first task, they move on to the second creativity task, which is similar in nature as the first task. However, in the second creativity task, participants are incentivized with either fixed wage, performance-based cash rewards or performance-based tangible rewards. Participants in the cash rewards condition receive a cash compensation of 6 EUR if their creative idea is accepted in the second task and 2 EUR if it is rejected. Participants in the tangible rewards condition are compensated in the form of a box of Belgian chocolates (a monetary value of 6 EUR) if their creative idea is accepted and a packet of M&Ms (a monetary value of 2 EUR) if it is rejected. Last, those in the fixed wage condition receive 4 EUR for the second task irrespective of how they perform in developing creative ideas.

Our results show that rejections undermine participants' perceived competence and lead to lower creative performance in the second creativity task, after controlling for the performance in the first task. In line with the theory of the different psychological valuation of cash versus tangible rewards, the significant difference in the creative performance between accepted and rejected

participants only manifests when cash rewards are used to incentivize creativity in the second task. When participants are provided with tangible rewards, we do not observe a significant difference in the creative performance between rejected and accepted participants in the second task. Hence, the effect of rejections on future creative performance depends on the reward type firms use to motivate future creativity after employees receive the acceptance/rejection decisions. Further, we test the process underlying this finding. To the extent that people do not rely on a calculation of outcome in a "feeling" process, the task itself is less likely to be perceived as a means to its end (Amabile et al., 1986). Results show that participants' interest and enjoyment in the task, a measure capturing their intrinsic motivation in the task, mediates the rejection/reward type effect on creative performance among the participants for whom acceptance/rejections likely have the strongest effect. Thus, tangible rewards and the corresponding "non-calculative" process can potentially foster employees' intrinsic motivation in a task, a factor that is especially important in creativity settings (Amabile, 1983a, 1983b). Additionally, it is worth noting that we attribute the results to the different psychological processes that individuals are engaged in when provided with different reward types. Hence, while affective characteristics of rewards generally influence valuation (Shaffer and Arkes, 2009; Jeffrey, 2009), we predict that the pattern of results is independent of participants' affective responses. Additional analyses support this prediction, as the same pattern of results holds in the subgroup of participants that differ in the extent to which they like or value the tangible rewards.

The results of our study have important practical implications for firms that rely on creativity. Despite the prevalence of rejections in creativity works, minimal research has examined how firms can continue to motivate their rejected employees. Our results provide insights for firms' incentive design in their solicitation of creativity over multiple periods. While it is generally presumed that cash incentives also work for rejected individuals, our results suggest that cash must be employed with caution, as a combination of cash rewards and rejections produces the worst outcome among

all scenarios. Thus, while incentives can motivate desired behavior most of the times, our study draws the caution that incentives can sometimes backfire if they are not provided in the right form.

Our study contributes to the accounting literature on creativity. While there is a growing body of research on how appropriately designed incentive contracts and controls motivate creativity (e.g. Kachelmeier et al., 2008; Chen et al., 2012; Bruggen et al., 2017), the current literature does not speak to how employees can be motivated to be creative after receiving acceptance/rejections in an initial creativity work. We address this gap by venturing beyond the point at which creative ideas are generated and shed light on the critical phase in which employees respond to firms' decisions. Second, we extend the limited literature on the interaction between incentives and feedback (Sprinkle, 2003). Our study suggests that the effect of feedback on future creative performance depends on the reward types employees receive. The commonly held wisdom that rewards will improve performance does not seem to hold among rejected participants incentivized with cash rewards. Further, we contribute to the literature on tangible rewards by demonstrating that reward type can have a profound influence on the psychological processes that is invoked and hence on the motivation of employees to engage in the tasks. While prior work draws on mental accounting theory in explaining the performance effect of tangible rewards (e.g. Presslee et al., 2013; Kelly et al., 2017), our study suggests a new mechanism through which reward type might have an influence on performance. Finally, while prior literature generally suggests that cash rewards motivate higher performance (e.g. Presslee et al., 2013; Kachelmeier et al., 2018), it cannot explain the rationale for the wide use of tangible rewards in practices. This study provides one potential rationale for the use of tangible rewards as we show that tangible rewards tend to be more effective in sustaining creative performance when employees' initial creative ideas are rejected, a finding that is particularly relevant for firms that rely on the creative endeavors of their employees.

II. Background and Hypothesis Development

Background

Firms often look to their employees to provide creative solutions as a way to address problems and gain access to innovation. It is often beneficial to solicit ideas from numerous employees as a large pool of ideas increases the chances of finding the most creative ideas. However, one neglected fact is that firms can only act upon a small subset of solicited ideas, meaning that the majority of ideas are rejected for implementation. Deichmann and van den Ende (2014) report in a field study that the average success rate of the submitted proposals was only 10%, suggesting the prevalence of rejections in most organizations. Once rejected, employees often feel disappointed and frustrated, and they might hold a pessimistic view about their chances of having future ideas selected. Such feelings can potentially harm employees' future creativity (Amabile, 1983a; Zhou, 1998).

Despite the prevalence of rejections in creativity works, minimal research has examined the effect of rejections on employees' future creativity and how firms can motivate rejected employees. The general wisdom is that cash incentives can motivate the desired behavior, and prior research has focused on incentives provided in the form of cash rewards in motivating creativity, output or both (Kachelmeier et al., 2008; Kachelmeier et al., 2018). Anecdotal accounts, however, suggest that there is considerable variation in the type of rewards firms award to the most creative ideas and it is worth noting that next to cash, tangible rewards are also commonly employed in firms' creativity settings. For instance, individuals having their ideas selected by Dell's Idea Storm platform do not receive cash rewards but are awarded with only a pen in an engraved box (Sullivan, 2010); whereas Samsung's crowdsourcing contest offers more than $10,000 cash prizes for those that come up with the best ideas (Haynes, 2013). In the next section, we develop our predictions about the effect of rejections on employees' future creative performance and develop theory on how cash rewards may not work well, relative to tangible rewards, in mitigating the effect of rejections on future creativity.

Hypotheses Development

Effects of Rejections on Future Creative Performance

Self-determination theory suggests that satisfaction of the psychological needs of competence, autonomy, and relatedness can yield enhanced self-motivation (Deci and Ryan, 1985). Relatedly, cognitive evaluation theory, a subtheory within self-determination theory, establishes that positive performance feedback will enhance intrinsic motivation, whereas negative feedback will diminish it, and these effects are mediated by perceived competence (Vallerand and Reid, 1984). Further, prior psychology research establishes a strong link between intrinsic motivation and creativity. Creativity is seen as "uninhabited exploration and playful combination of old elements into new patterns" (Amabile et al., 1986). Thus, according to the intrinsic motivation hypothesis, intrinsic interest is a key element conducive to creativity (Amabile, 1983a, 1983b). We predict that rejections will undermine employees' perceived competence and intrinsic motivation in future creativity work. Employees may become disappointed as their efforts to help the firm innovate are wasted and they do not receive the recognition they strive for. They may also take rejections as an embarrassing failure on their part and refrain from future engagement. As a result, rejections will make it difficult for employees to maintain a high level of self-efficacy and confidence when engaged in another creativity work. Hence, we expect that rejections will reduce employees' inherent propensity to seek out novelty and undermine creative performance in future creativity tasks (Deci and Ryan, 1991).

There may also be some countervailing forces that induce rejected employees to perform better in future creativity tasks. First, research in organizational behavior points to the learning effect from unsuccessful interactions in the past (Deichmann and van den Ende, 2014). Rejections might foster learning when firms provide employees with feedback (e.g. Loftus and Tanlu, 2017), which draws employees' attention to the particular problems with the creative ideas they developed (Hammond et al., 2011). Second, the dual pathway to creativity model proposed by De Dreu et al. (2008) suggests

that both positive and negative moods can lead to creativity and negative moods enhance creativity through cognitive persistence and perseverance. Thus, rejections can potentially improve future creativity, if enough feedback is provided to employees and the environment offers opportunities to develop long-term persistence and perseverance.

While these countervailing forces suggest that rejections can be leveraged to improve future creativity, we expect them to be less influential in the context we examine. First, we examine a setting in which no additional content-based feedback is provided to employees. The absence of constructive feedback can be common in most organizations as developing appropriate explanations and rationales for rejected ideas is often costly and sometimes infeasible due to subjective criteria in most creativity work (Dahlander and Piezunka, 2014; Amabile, 1983a).[1] Second, our context pertains to individuals' relative short-term reactions to rejections. An investigation of employees' short-term reactions to negative experiences is important, as creativity tasks often come close to each other in companies and resources often flow to those who achieve initial success. Therefore, we expect that learning effect based on feedback and the long-term persistence and perseverance are less likely to manifest in the context we examine. This leads to the following hypothesis:

H1: *Employees whose creative ideas are rejected will have lower creative performance in a subsequent creativity task compared to employees whose creative ideas are accepted.*

Incentives and Creativity

The effect of financial incentives on creativity has been a topic of debate (e.g. Amabile, 1996; Hennessey, 2003; Grant and Berry, 2011; Kachelmeier et al., 2008). While the psychology and behavioral economics literature generally takes the perspective that extrinsic incentives such as financial rewards will crowd out intrinsic motivation for creativity (e.g. Amabile, 1996; Erat and Gneezy, 2016), the general theme within the accounting literature is that creativity and incentives

[1] Feedback in the creativity setting usually involves subjective criteria (Amabile, 1983a). As a results, employees may not engage in the same type of cognitive process to draw causal inferences as in Loftus and Tanlu (2017)'s setting.

can be compatible (e.g. Kachelmeier et al., 2008; Chen et al., 2012). The wide use of performance-based pay among creativity-dependent firms reported in Grabner (2014)'s survey supports the idea that creativity can be motivated via the use of incentives. Experimental studies in accounting also corroborate this finding (e.g., Kachelmeier et al., 2008; Kachelmeier et al., 2018; Chen et al., 2012).

In this study, we examine a situation in which firms solicit creative solutions from employees to address important problems. It is likely that the higher effort employees exert, the more ideas they come up with, the more likely they are to find the most creative ideas. Thus, in our setting, we assume a positive link between "trying hard" and creative performance. In other words, we assume that creativity can be motivated. While we establish it as a baseline assumption from which we examine the difference between performance-based cash versus tangible rewards, our experiment also includes fixed wage as a control condition to empirically test this assumption.

Reward Type and Performance

Prior studies that investigate the performance effects of tangible rewards have produced mixed results (Jeffrey, 2009; Presslee et al., 2013; Kelly et al., 2017). The literature draws on mental accounting theory and the hedonic attributes of tangible rewards to explain the performance effects observed in lab and field experiments (e.g., Choi and Presslee, 2016). Specifically, tangible rewards with hedonic attributes are categorized in a distinct mental account compared to cash rewards, which induces a different reference point in goal selection (Presslee et al., 2013) and stronger affective responses in motivating effort (Kelly et al., 2017).[2] Additionally, while prior literature

[2] Kelly et al. (2017) find in a repeated tournament that retailers incentivized with tangible rewards outperformed those with cash rewards in the second tournament, and this effect is driven by tournament one losers. While our study shares similarity with their findings, we note that our study differs in several important ways. First, while Kelly et al. draw on the affective nature of tangible rewards, we attribute the results to the mechanism of different information processing elicited by different reward types. Second, Kelly et al. examine a setting where retailers compete in sales tournament, whereas we study a setting of creative performance. We note that this difference is important as individuals' intrinsic interest and enjoyment in the task can be particularly relevant in the creativity setting, which can go above and beyond the affective responses to tangible rewards. Hence, the performance difference observed in sales tournaments may not be generalized to the creativity setting we examine.

generally finds cash rewards motivate better performance (Shaffer and Arkes, 2009; Presslee et al., 2013; Kachelmeier et al., 2018), the efficacy of cash rewards suggested in the literature is at odds with the wide use of tangible rewards in practice (Incentive Federation Inc., 2013). In the following section, we develop predictions about the performance effects of reward types based on the different psychological processes that is invoked, and we suggest an important setting where tangible rewards can be more useful than cash rewards.

The Combined Effects of Rejection and Reward Type on Subsequent Creative Performance

When considering whether to exert higher effort, employees will assess an expected value of payoff, i.e., employees will evaluate both the amount of a reward and the probability that the effort will eventually lead to a reward. The normative economics theory of decision-making predicts that outcomes and probabilities are independently evaluated and then combined to yield an expected value. Recent experimental research, however, provides evidence showing the violation of the independence assumption in which probability and outcome interact to affect valuation (Gneezy et al., 2006; Hsee and Rottenstreich, 2004; Rottenstreich and Hsee, 2001). Hsee and Rottenstreich (2004) advances the distinction between valuation by calculation and valuation by feeling in which monetary stimuli lead people to engage in a calculation of expected outcome, whereas nonmonetary outcomes generate "feelings" toward the stimuli rather than a precise measure of expected value.

McGraw et al. (2010) refers to differences in individuals' information processing when outcomes are monetary as opposed to nonmonetary. Specifically, for monetary outcomes, as both the valuation and payoffs are in monetary units, the numeric amount is straightforwardly combined with probabilities to yield a measure of expected value. Whereas for nonmonetary outcomes, the non-compatibility between input and response mode requires additional mental operations that convert nonnumeric units into monetary worth before they can be combined with probabilities to yield an expected value (Slovic et al., 1990). Such conversions do not occur naturally but require

additional mental effort (Tversky et al., 1988). As such, to the extent that individuals spontaneously combine monetary outcomes with probability assessment to yield an approximate "expectation" of value, the valuation of monetary outcomes proves to be more sensitive to changes in probability, compared to nonmonetary outcomes (McGraw et al., 2010).

These recent work suggests the above distinction in the psychological valuation of monetary versus nonmonetary outcomes can offer useful insights for individuals' different information processing when provided with cash versus tangible rewards. Specifically, cash rewards will likely elicit a "calculative" mindset where the combination of monetary amounts with probabilities is straightforward to generate an expected payoff. On the contrary, individuals will likely engage in a "feeling" process when provided with tangible rewards where the nonmonetary rewards are not readily converted into monetary units and the valuation is less sensitive to changes in probabilities.[3]

One consequence of rejections is that employees will likely assess a lower probability that their efforts in future attempts will lead to rewards. Combined with the above argument, this lower assessed probability of obtaining the rewards will be fairly spontaneously incorporated into the valuation of expected payoff when employees are provided with cash rewards, resulting in less attractiveness and motivational effect of cash rewards. Similarly, in cases of acceptance, the higher assessed probability of success will be straightforwardly incorporated into the valuation of rewards, resulting in a higher expected payoff and stronger incentive under cash rewards. On the contrary, when employees are provided with tangible rewards, the combination of a nonmonetary payoff and probability assessment is less forthcoming, such that the valuation is less affected by the lower (higher) probability assessment induced by rejections (acceptance). Therefore, we expect that the

[3] We notice that in practice tangible rewards in the form of merchandise or gift cards often have their monetary values stated. However, prior research suggests that even when people are capable of converting nonmonetary outcomes to monetary worth, they do not readily do so (Hsee and Rottenstreich, 2004). Kahneman and Tversky (1979) brings the notion of "acceptance" where people tend to accept the frame provided by a problem. The experimental results from McGraw et al. (2010) show that the preference reversal persists even when monetary values are made available. Hence, our theory can potentially extend to situations where the monetary values of tangible rewards are provided.

rejection/acceptance decisions and the consequent changes in assessed probability of success will less likely influence future creative performance when tangible rewards are provided compared to when cash rewards are provided. Overall, we propose the following hypothesis:

H2: *The negative effect of rejections on employee's subsequent creative performance will be mitigated when performance-based tangible rewards are provided compared to when performance-based cash rewards are provided.*

Taken together, H1 and H2 combined predict that under the performance-based cash rewards condition, employees' subsequent creative performance will be high when there is an initial acceptance of creative idea and low when there is a rejection, whereas future creative performance differs less between rejected and accepted employees when they receive tangible rewards.

III. Method

Participants

We recruited 188 student participants, including 12 independent raters in 12 sessions (one rater per session), to participate in a compensated lab experiment. Participants either volunteered to participate (recruited via the university's lab participant pool) or received course credits for an accounting course in addition to their compensation in the experiment.[4] Sessions varied between 13 to 17 participants per session and lasted about 70 minutes. Participants received an average compensation of 8 EUR for participation in the experiment. 61% of the participants are male, with an average age of 22.3 years old. They have an average working experience of 34 months (including part-time jobs).[5] All interactions took place via the z-Tree program (Fischbacher, 1998).

[4] Different participant types are randomly assigned to different conditions throughout the sessions. The same pattern of results are found when we exclude participants receiving course credit (36 observations). However, reward type seems to have stronger effects on participants volunteered to participate, as we find a significant interaction effect of rejection and reward type after excluding participants receiving course credit, which does not show up in the full sample.

[5] Participants have diverse background including Business Administration, Economics, Law, Information and Communication Science, and Liberal Arts. As our experimental task does not require specific knowledge in a particular field, the diverse educational background allows us to draw more general implications about creativity.

Experimental Procedures

In each experimental session, participants read a set of instructions about the experimental task on their computer screens. Participants were required to complete two creativity tasks related to developing creative solutions for two real-world problems. Following prior psychology and management accounting literature on creativity (Amabile, 1996; Chen et al., 2012), we define a creative solution as one that is "original, innovative, and potentially implementable from the perspective of the organization". The first creativity task involves creative solutions to help people aged over 50 to find a job, and the second task is about how to help children under 7 to move more. Thus, although we change the content of the two tasks, we try to keep other dimensions such as the difficulty and familiarity level similar across the two tasks.

Participants were informed that only a limited number of creative solutions will be selected to advise the organization that seeks the creative solutions. To determine the creative solutions that will be selected, each participant was randomly paired with another participant of the same session. An independent rater was randomly chosen to evaluate each pair of creative solutions and select the more creative one of each pair.[6] The independent rater was instructed to select the solutions based on creativity alone and was not involved in developing creative solutions. The experimental task consists of two phases. During Phase I, participants have 8 minutes to draft up to 10 creative solutions; during Phase II, participants have 2 minutes to select one of the creative solutions they have developed to submit for evaluation. It is important to mention that participants are allowed to stop working in Phase I at any moment, which allows us to observe any giving up behavior.[7]

[6] Our experimental design adopts a 50% rejection rate. Although rejection rates can be much higher in practice, we note that this design choice facilitates raters' comparison of creative ideas and their on-site decisions in the lab, and reaches an equal cell size across conditions. Previous literature suggests that in repeated tournaments participants reduce effort to a greater extent under smaller proportions of winners (Knauer et al., 2017; Berger et al., 2017). Thus, tangible rewards can be more beneficial under scenarios with a smaller proportion of winners. Nonetheless, we acknowledge it as a boundary condition and future research can extend our baseline results to settings with different rejection rates.

[7] If participants quit the task early, they cannot leave the experiment but have to wait until all other participants finish the task. This design avoids that participants who want to quit earlier influence the behavior of other participants.

During the 10-minute period that participants used to draft and submit creative solutions, the independent rater was asked to read two news articles on the socially important problem.

During the time the independent rater evaluated the creative solutions, participants were asked to answer a short questionnaire intended to capture their intrinsic motivation in the creativity task (Intrinsic Motivation Inventory, Ryan 1982).[8] After participants finished the questionnaire, they were informed of the acceptance/rejection decisions. Appendix A provides the instructions used to inform the decisions. Before participants moved on to the second creativity task, they were asked to respond to a questionnaire designed to elicit their perceived competence (IMI scale, Ryan 1982), attribution of the outcome, and affect (PANAS scale, Watson et al. 1988) after they received the acceptance/rejection decisions. Then they started the second task, which is similar in nature as the first one, except that we manipulate the incentive scheme between subjects in the second task (instructions for the incentive schemes are provided in Appendix B). Participants were informed that they will be randomly re-matched to a new participant in the second task, who could be either rejected or accepted in the first task. After participants completed the second creativity task, they finished a questionnaire including their intrinsic motivation in the second task, the extent to which they like/value the tangible rewards, manipulation checks and demographics. Before participants left the experiment, they were informed of the decisions for the second task and received rewards corresponding to their incentive scheme and the acceptance/rejection decisions.

Experimental Design

In order to elicit rejection effect without any confounding incentive effect, participants are provided with a fixed wage of 4 EUR in the first creativity task. As we are interested in how firms can motivate rejected employees to be creative in future works, we test our theory and provide

[8] The independent rater received a fixed payment of 8 EUR for evaluating the creative solutions. This evaluation process takes 5 minutes. All the raters finished the evaluation within the 5-minute assigned period.

incentives in the second task after the acceptance/rejection decisions.[9] While we keep the average payment for the second task the same as in the first task (4 EUR), we manipulate the incentive schemes between subjects in the second creativity task and randomly assign participants to one of the three experimental conditions: fixed wage, performance-based cash rewards, and performance-based tangible rewards. Participants in each pair are in the same incentive condition, and the independent raters do not know how the participants are rewarded.

Incentive Schemes in the Second Task. We manipulate the incentive schemes offered to the participants in the second task. In the fixed wage condition, participants are informed that they will receive 4 EUR for the second creativity task, irrespective of how they perform in developing the creative solutions. Participants in the performance-based cash rewards condition are informed that they will receive 6 EUR for the second creativity task if their creative solution is selected by the independent rater or 2 EUR if their creative solution is *not* selected. In the performance-based tangible rewards condition, participants will receive a box of Belgian chocolates (worth on average 6 EUR) if their creative solution is selected by the rater, or a packet of M&M's (worth on average 2 EUR) if their creative solution is *not* selected.

Acceptance vs. Rejection in the First Task. As described above, the treatment of acceptance or rejection is not manipulated randomly in our experiment, but determined as a function of participants' performance plus some random errors such as raters' preference or judgment. While the treatment is not exogenously determined, we note that this design choice reflects the selection process in most organizations, which involves comparison and selection biases. Further, a decision that is based on the evaluation of another person, rather than random assignment, increases the

[9] To have a clean test of the rejection effect, we start with fixed wage. While we make this choice for experimental control purposes, we acknowledge that firms usually start out tournaments with incentives. However, we also note that it is important to study the rejection effect in a setting absent incentives, as employees often take initiatives to propose creative ideas out of intrinsic interest and without incentives initially attached. Hence, question remains as to how firms can continue to motivate the group of rejected employees when no incentive is attached initially.

credibility of the decisions to the participants and thus increases the power of our treatment.

Measure of Creative Performance. To obtain the measure of the creative performance of participants, we follow prior literature (e.g. Kachelmeier et al., 2008; Chen et al., 2012) and conduct additional rating sessions by recruiting another group of participants to rate all the creative solutions (i.e., both the submitted and un-submitted creative solutions). 28 raters were recruited from the university's lab participant pool and participated in one of the 4 compensated rating sessions. Each creative solution was evaluated by 5 to 8 raters, depending on the specific session in which the evaluation was carried out.[10] Each rating session lasted one and half hour, and the raters received 15 EUR for the evaluation of the creative solutions. Being blind to our experimental conditions, the raters first read through the instructions of their task and were informed that the creative solutions were developed by other students of the university as part of a research study. The raters were instructed that the evaluation should be based on creativity alone. Working independently, the raters evaluated each creative solution using a full scale from 1 (=not at all creative) to 10 (=very creative). Cronbach's alpha for the ratings in each session varies from 0.69 to 0.72, indicating a reasonable level of consistency in the ratings (Peterson, 1994). We averaged the ratings from all the raters to obtain our measure of the creativity level for each creative solution.

IV. Results

We examine the effects of acceptance/rejections and reward types on participants' subsequent creative performance. The analyses in this section are conducted on participants' submitted creative ideas. In our tests, we control for participants' creative performance in the first task to alleviate endogenity concerns and the impact of any ex-ante differences in the creative ability across cells.[11]

[10] There are a total of 1192 creative solutions generated for the two tasks. We divide the creative solutions into 2 parts for both of the two tasks, resulting in 4 rating sessions. The 4 rating sessions recruited 7, 8, 8, 5 raters respectively.

[11] Untabulated tests indicate there is no significant difference in gender and age across treatment conditions, suggesting successful randomization. We also detect no significant difference in the KAI measure that captures individuals' general creativity potential (Kirton, 1978), alleviating concerns for any ex-ante differences in the creative ability across cells.

Descriptive Statistics: Creative Performance in Task 2 and Task 1

Panel A of Table 1 provides descriptive statistics for the creativity ratings of participants' submitted creative ideas in the second task. Consistent with H1, rejected participants perform worse in the second creativity task (6.10) compared to accepted participants (6.36). This difference is consistent with our directional prediction at the 10% one-tailed significance level (t = -1.47, one-tailed p = 0.07). Untabulated descriptives also lends partial support to our baseline assumption that incentives motivate creativity, as performance-based incentives elicit higher creative performance than fixed wage, but only for the accepted participants (6.11 vs. 6.48, two-tailed p = 0.08, cash and tangible rewards conditions combined). For rejected participants, there is no significant difference in performance between performance-based and fixed wage conditions (6.10 vs. 6.09, two-tailed p = 0.98, cash and tangible rewards conditions combined). Overall, the descriptives indicate that the same rewards that motivate accepted participants may not necessarily work for rejected participants.

Additionally, consistent with our hypotheses, results in Panel A of Table 1 suggest that while there is a significant performance discrepancy between accepted and rejected participants in the cash rewards condition (6.55 vs. 5.94, t = 2.10, two-tailed p = 0.04), tangible rewards seem to mitigate the detrimental effect of rejections in the subsequent creativity task (6.41 vs. 6.24, t = 0.57, two-tailed p = 0.57).[12] Thus, the descriptive statistics for the creative performance in Task 2 support the idea that cell means are in line with our pattern of prediction (see Figure 1 for a graphical representation of the observed pattern of results for Task 2). For illustration of creative ideas, Appendix C provides examples of creative ideas that receive high and low creativity ratings.[13]

[12] Descriptive statistics reveals similar pattern of results when we use change in creative performance as the outcome measure. Untabulated results suggest larger discrepancy in the change measure between rejected and accepted participants in the cash rewards condition (-0.19 vs. 0.29, t = -1.50, two-tailed p = 0.14) than in the tangible rewards condition (0.24 vs. 0.08, t = 0.41, two-tailed p = 0.68).

[13] It is worth noting that the creativity ratings are not entirely driven by participants' language proficiency. Ideas short in length can be rated highly creative (examples in Panel C of Appendix C), whereas ideas relatively long are rated low once it is not feasible or does not address the problem in question (Example 2 in Panel B of Appendix C).

To alleviate concerns for the level effect from Task 1, Panel B of Table 1 also presents the descriptive statistics for participants' creative performance in the first creativity task. First, creative performance in Task 1 is lower for rejected participants but only significant at a level that borders on the conventional significance levels (t = -1.28, one-tailed p = 0.10), reflecting independent raters' selection of ideas based on creativity. Second, we do not detect any systematic difference in Task 1 performance across the incentive conditions for both accepted and rejected participants, neither is there any significant difference between accepted and rejected participants within each incentive condition. Thus, the pattern of results for the first creativity task mitigates the concern that ex-ante differences in the creativity potential lead to the performance difference in the second creativity task (see Figure 2 for the observed pattern of results for Task 1).

--- Insert Table 1, Figure 1 and Figure 2 about here ---

Hypotheses Testing: Performance Effect – H1 and H2

H1 and H2 predict an ordinal interaction such that acceptance will lead to higher creative performance than rejection when participants are provided with performance-based cash rewards, but the rejection effect will be mitigated when performance-based tangible rewards are provided.[14] We use a planned contrast to test whether creative performance falls into the pattern predicted.[15] As conventional ANOVA tests for a disordinal interaction (Buckless and Ravenscroft, 1990), it is more appropriate to examine the results of the planned contrast test for hypotheses testing, given the predictions in H1 and H2 (Kadous et al., 2003). We use contrast weights of –3 for the rejection/cash rewards condition, –1 for the rejection/tangible rewards condition, +1 for acceptance/tangible

[14] The control condition of fixed wage is excluded from the main tests, as H2 is mainly concerned with the difference between cash rewards and tangible rewards. Given the divergent views in prior literature, we do not make directional predictions for the performance effect of fixed wage versus cash or tangible rewards, nor do we make predictions of its interaction effect with acceptance/rejection on creative performance.

[15] Similar contrast test is also used in prior accounting literature (e.g. Kadous et al., 2003; Lambert and Agoglia, 2011). Prior literature indicates a limitation of ANOVA that "it only detects significant differences among cell means, but does not indicate the functional form of the relationship among cell means" and proposes contrast coding as a refinement of ANOVA (Buckless and Ravenscroft, 1990). Because we hypothesize an ordinal interaction, we perform hypothesis testing with planned contrast tests and present the results of the traditional ANOVA for completeness.

rewards condition, and +3 for acceptance/cash rewards condition. With these contrast codes, we test both a main effect of rejection on creative performance (H1), and an interaction effect of rejection and reward type (H2). Specifically, the weights predict higher creative performance for participants receiving acceptance than those receiving rejection, as contrast codes for acceptance conditions are greater than those for rejection conditions. Meanwhile, given that we expect tangible rewards to mitigate the rejection effect, the weights specify smaller discrepancy in performance between accepted and rejected participants for tangible rewards (+1 for acceptance/tangible vs. –1 for rejection/tangible) than cash rewards conditions (+3 for acceptance/cash vs. –3 for rejection/cash).

Table 2 Panel A presents the traditional ANCOVA results with rejection/acceptance and reward type for Task 2 as our independent variables, and creative performance in Task 1 as a covariate. Consistent with H1, the ANCOVA results yield a significant main effect of rejection ($F = 2.88$, two-tailed $p = 0.09$).[16, 17] Table 2 Panel B presents the planned contrast test. Results show support for the pattern of results predicted by H1 and H2 at a significance level of $p = 0.05$.[18] Follow-up analyses of simple main effects, reported in Table 2 Panel C, provide further support for the predictions of H2. Rejected participants produce lower creative performance than accepted participants when offered cash rewards ($F = 4.17$, $p = 0.05$), but not when offered tangible rewards ($F = 0.34$, $p = 0.67$). Collectively, these results support our hypotheses that tangible rewards can mitigate the negative impact of rejections on creative performance in a subsequent creativity task.

--- Insert Table 2 about here ---

As noted earlier, the rejection/acceptance decision is a function of participants' performance

[16] Similar results are obtained when we use covariates such as number of ideas in Task 2, time spent in Task 2, performance difference between rejected and accepted participants in each pair in Task 1, or number of ideas in Task 1. The main effect of rejection remains significant in all specifications (all two-tailed $p < 0.10$).

[17] We also test the main effect of rejection in the control condition of fixed wage. As the incentive remains the same in this condition, it represents a clean test of the rejection effect. Untabulated results indicate that there is no significant rejection effect for submitted creative ideas in this condition. However, further analyses show that when we capture creativity using participants' all developed ideas (including those non-submitted ideas), one-way ANOVA reveals a significant rejection effect (two-tailed $p = 0.055$), which lends support for the rejection effect in the main analyses.

[18] Alternative sets of contrast weights of -3, 0, 0, +3 or -2, -1, 1, 2 yield identical inferences (all two tailed $p \leq 0.05$).

plus some random errors such as raters' preference or judgment, which makes the selection decision a crude measure of initial performance. To the extent that participants have certain awareness of their own performance, we explore the possibility that reward type might have differential impacts on participants with different levels of Task 1 performance. In further analyses, instead of using the acceptance/rejection decisions, we more finely distinguish initial performance by splitting the sample into terciles, using participants' creative performance in the first task. We present our analysis in Table 3 and graphical representation in Figure 3. Similar to the main results, the difference in Task 2 performance between first-round top and bottom performers only manifests in the cash rewards condition but not in the tangible rewards condition (6.65 vs. 6.00, $t = 1.94$, two-tailed $p = 0.06$ for cash rewards; 6.39 vs. 6.34, $t = 0.15$, two-tailed $p = 0.88$ for tangible rewards). The tercile analysis also suggests a significant performance difference between cash and tangible rewards conditions for the first-round bottom performers (non-parametric Fisher's exact $p = 0.02$), a finding consistent with prior study that tangible rewards work especially well for tournament one losers (Kelly et al., 2017). Further ANCOVA results excluding the middle tercile group indicate an interaction effect between rejection and reward type at 10% one-tailed significance level ($F = 2.37$, one-tailed $p = 0.07$). These results lend support for the idea that different reward types can have differential effects for the initial top and bottom performers.

--- Insert Table 3 and Figure 3 about here ---

Controlling for Individual-Specific Factors

As our treatment of acceptance/rejection is not exogenously determined, our results may be susceptible to the potential confound of individual-specific factors (e.g. creative ability). To address this concern, we further employ multiple regression analysis to validate our main results. We regress participants' creative performance in Task 2 on our variables of interest, *Rejection* and *Reward Type*, controlling for participants' Task 1 performance and individual-specific factors. We include Task 1

performance discrepancy between accepted and rejected participants in each pair, participants' self-reported scores on perceived competence, interest and enjoyment, perceived effort in the creativity task (using change measure from the two tasks), the KAI measure that captures innate creativity potential (Kirton, 1978), and net affect after receiving the decisions (PANAS scale, Watson et al. 1988). Results are presented in Table 4. In the basic and full-model specifications, the coefficients on *Rejection* are statistically significant and negative (two-tailed p values < 0.1), indicating rejections deteriorate performance in a subsequent task. We further run the full-model regression in the subsample of cash and tangible rewards conditions. Consistent with the main results, regression analysis reveals that the rejection effect remains significant in the cash rewards condition (two-tailed $p = 0.089$) but becomes insignificant in the tangible rewards condition (two-tailed $p = 0.215$). Last, among the individual-specific variables, *Change in Interest/Enjoyment* has significant positive impact on Task 2 creative performance, but only in the tangible rewards condition, which lends support to the potential mechanism of intrinsic motivation in driving the main results.

--- Insert Table 4 about here ---

Overall, from the analyses above, we conclude that rejections of creative ideas lead to lower performance in future creativity tasks compared to acceptance. In addition, rejections induce greater performance discrepancy when cash rewards are provided to incentivize future creativity. While cash rewards are particularly successful with accepted individuals, the results suggest that rewards must be employed with caution and can often backfire: a combination of rejections with cash rewards produces the worst outcome among all conditions.[19] Interestingly, the worse performance in the rejection/cash rewards condition is not due to the giving up behavior of rejected participants. Untabulated results on the time spent in Task 2 indicate that rejected participants in the cash rewards

[19] It seems that people do not recognize this asymmetric effect of reward type for rejected and accepted employees. When asked about which reward type to choose to motivate employees if they are the supervisor, most people select the same rewards for both accepted and rejected employees. We asked this question in the post questionnaire in the rating sessions. 68% of the raters select the same rewards for both accepted and rejected employees.

condition actually spent more time than those in the fixed wage and tangible rewards conditions (both two-tailed $p < 0.10$), indicating that our results are not driven by the mere giving up behavior.

Additional Analyses

Test of Mediation Effect of Intrinsic Motivation

Our hypotheses suggests that reward type can have a profound influence on the psychological process that is elicited and hence on the motivation of employees to engage in the tasks. That is, cash rewards will likely invoke "valuation by calculation" where people engage in a calculative mindset of expected payoff, whereas tangible rewards elicit a "valuation by feeling" process toward the outcome (Hsee and Rottenstreich, 2004). To the extent that individuals do not spontaneously engage in a calculation of expected outcome, we expect the different psychological processes to have a corresponding impact on individuals' intrinsic motivation in the creativity task. Prior studies show that rewards will not undermine intrinsic interest in the task if they are not seen as an end for which task engagement is the means (Amabile et al., 1986). If individuals do not readily engage in a calculation of payoff, we expect that tangible rewards will less likely disrupt intrinsic motivation compared to cash rewards. We explicitly test for this potential mechanism in the mediation analysis.

Intrinsic motivation encapsulates people's interest/enjoyment, perceived effort, competence, value/usefulness, felt pressure and tension, perceived choice, and experience of relatedness while performing a given activity (Ryan, 1982). Using the Intrinsic Motivation Inventory (Ryan, 1982), we capture participants' intrinsic motivation using the items of the above subscales. Table 5 reports the descriptive statistics for each subscales for Task 2.[20, 21] We take the average score of all items within each subscale, resulting in seven subscale scores. The process measures reveal some

[20] Participants were asked to rate their agreement to the statements such as "I enjoyed working on the creative solutions very much" (interest/enjoyment), "I tried very hard to find out the creative solutions" (perceived effort). Participants responded to the 7-point Likert scale items with "1" labeled "Not at all true" and "7" labeled "Very true".

[21] The Cronbach's alphas on the items for each subscale are all above 0.70, which exceed typical reliability thresholds (Peterson, 1994). Untabulated factor analysis reveals that items load on one factor for each subscale.

interesting pattern of results. As shown in Table 5, rejections lead to significantly lower perceived competence compared to acceptance (t = -1.98, two-tailed p = 0.049), which corroborates the negative effect of rejections on participants' subsequent creative performance. Interestingly, cash rewards arouse significantly greater pressure and tension than tangible rewards (t = 3.27, two-tailed $p < 0.01$), which is suggestive of the possibility that cash rewards induce a calculative mindset of final payoff that in turn translates into a stronger sense of pressure in the minds of the participants.

We further explore whether intrinsic motivation in the task mediates the relation between rejection, reward type and future creative performance. We primarily focus on the subscale of interest/enjoyment in performing the creativity task as it is the subscale that directly reflects and assesses intrinsic motivation *per se* (Ryan, 1982). We use structural equations-based path analysis and summarize the results in Figure 4. For the mediation analysis, we omit the participants in the middle tercile of the creative performance in Task 1. Rejection/acceptance is expected to have a stronger impact on participants in the top and bottom terciles, as the evaluation decision tends to be a less noisy signal of their creative performance.[22] A conventional Chi-square test indicates that overall the model is a good fit for the data (χ^2 = 3.33, p = 0.505). Results suggest that the interaction between rejection and reward type has a positive effect on participants' interest/enjoyment in the task at one-tailed significance level (z = 1.43, one-tailed p = 0.08), which in turn positively influences creative performance (z = 2.32, two-tailed p = 0.021). Importantly, consistent with our hypotheses, the effect of rejection on participants' interest/enjoyment is moderated by reward type. When participants are provided with tangible rewards, rejection actually increases participants' subsequent interest and enjoyment (t = 1.32, one-tailed p = 0.098), whereas under cash rewards,

[22] Untabulated results show that the interaction does not show significant effect on intrinsic motivation measures when we conduct the SEM analysis in the whole sample. We conjecture that this might be due to the fact that rejection/ acceptance has a noisier effect on participants who are in the middle tercile of the initial performance, as the decision conveys a noisy signal of their performance. Nonetheless, we acknowledge it as a limitation of our mediation results.

rejection does not impact participants' interest and enjoyment (t = -0.57, one-tailed p = 0.286).[23] Overall, our path model lends support for the idea that the ordinal interaction effect described by H2 is driven by the proposed mechanism of intrinsic motivation in the task.[24]

--- Insert Table 5 and Figure 4 about here ---

Does Affect or Valuation of Tangible Rewards Drive the Results?

Prior literature that investigates the performance effect of cash versus tangible rewards has attributed the observed effects to people's affective responses to the hedonic attributes of tangible rewards (e.g. Shaffer and Arkes, 2009; Presslee et al., 2013). While we endorse the notion that affect can influence people's valuation and preferences for the tangible rewards, we note that we attribute the results to the different information processing that is elicited under different reward types. As such, we predict that the observed pattern of results is independent of participants' affective responses to the tangible rewards. In this section, we conduct additional analysis to test the alternative mechanism of affect or overvaluation of the tangible rewards in driving the results.

Specifically, in the ex-post questionnaire, we asked participants to indicate the extent to which they like the tangible rewards (i.e., chocolate box and packet of MM's) on a 5-point Likert scale with "1" labeled "Not like at all" and "5" labeled "Like very much". Participants were also asked to estimate the monetary value of the tangible rewards.[25] We re-conduct the main analysis in the subsample of participants that differ in the extent to which they like or value the chocolate box or

[23] We test this interaction using a nested model comparison (Rigdon et al. 1998). We compare two models: one where we allow the path from rejection to interest/enjoyment to vary across reward type (the unrestricted model) and one that restricts it to be the same under the two reward types (the restricted model). A comparison of the two models suggests that the unrestricted model provides a significantly better fit for the data than the restricted model (χ^2 = 9.48, p = 0.02).

[24] The same pattern of results holds in the mediation analysis when we use the factor score of all the seven subscales in the Intrinsic Motivation Inventory to capture participants' intrinsic motivation (overall model of fit: χ^2 = 6.28, p = 0.179; test of interaction effect: χ^2 = 10.36, p = 0.02; effect of intrinsic motivation on performance: z = 2.16, p = 0.03) .

[25] The mean (median) estimated value for the chocolate box is 5.045 (4) EUR, which is lower than the true monetary value of 6 EUR (two-tailed p = 0.007). The mean (median) estimated value for the MM's is 2.35 (2) EUR, which is not significantly different from the true value of 2 EUR (two-tailed p = 0.10). Overall, participants seems to have a good sense of the monetary values of the tangible rewards. While there is some undervaluation of the chocolate box, participants are unlikely to *overvalue* the tangible rewards.

MM's. Specifically, Table 6 Panel A (Panel B) reports the planned contrast results and follow-up simple effects for the participants who self-report they like the chocolate box less (more), i.e., a score below (above) "3" on the 5-point Likert scale.[26] Similarly, Table 6 Panel C (Panel D) presents the results for the subgroup of participants who assess lower (higher) monetary value for the chocolate box, i.e., a value below (above) the mean value assessment of 5 EUR.[27]

Across the four sets of results, the pattern of results that we observed in the main analysis also holds for the subsample of participants in the tangible rewards condition. Importantly, planned contrast and simple effects results suggest that the same pattern of results holds for the participants who like or value the chocolate box *less*.[28] In other words, for those who *dislike* or *undervalue* the chocolate box, tangible rewards still mitigate the rejection effect for this group of participants. Hence, the observed results in the main analysis cannot be solely attributed to the participants that like or overvalue the tangible rewards. Further, we also examine whether participants differentially like or value the tangible rewards.[29] Untabulated results show that even for the subgroup of participants who do not differentially like or value the chocolate box versus MM's, the same pattern of results persists. Thus, tangible rewards mitigate the rejection effects even when they appear to be less motivating for the participants. The fact that the same pattern of results holds for the different subgroups that differ on the extent to which they like or value the tangible rewards suggests that the results we find cannot be merely attributed to participants' affective responses, their overvaluation

[26] For brevity, we do not report conventional ANCOVA results for the additional tests in Table 6. Untabulated ANCOVA results suggest that for the subsample of participants that like/value chocolate box *less*, the main effect of rejection/acceptance remains significant ($p < 0.10$), with the same pattern of ANCOVA results as in the main analysis.

[27] For brevity, we do not present the results for the subsample of participants who like or value MM's less (below 3 on a 5-point scale for the "like" measure and below the median valuation of 2 EUR for the "value" measure). Untabulated tests show that the same pattern of results holds in this subgroup of participants that like or value MM's *less*.

[28] The only planned contrast test that is insignificant is for the subgroup that value the chocolate box *more*. Untabulated descriptives suggests that rejected and accepted participants produced same level of performance under the tangible rewards condition for this subgroup, which drives the insignificant planned contrast result. Thus, the performance effect resulting from overvaluation of tangible rewards (Presslee et al., 2013) also manifests in our study. But overvaluation cannot fully explain the pattern of results, as the same results also holds among those that *undervalue* the chocolate box.

[29] We calculate the difference in the extent to which participants like or value the chocolate box vs. MM's and split the sample into two groups based on whether the difference score is above or below the median.

of the tangible rewards, or the conjecture that tangible rewards are more motivating.

--- Insert Table 6 about here ---

Does Rejection and Incentive Scheme Affect the Idea Selection and Development Process?

Creativity is influenced by both the development and the selection of the creative ideas. We empirically examine participants' idea selection and their development of creative ideas over time. Participants are allowed to draft up to 10 creative ideas. Raters evaluated all the ideas, allowing us to test whether our treatment effects also influence the selection of the creative ideas.[30] We compare the creativity level of participants' submitted idea with that of the highest-rated un-submitted idea. Table 7 provides the descriptives and test statistics for this difference measure. Interestingly, the pattern of results mirrors the one in the main analysis: simple effects suggest that for participants provided with cash rewards, those received acceptance selected better ideas than those received rejections ($F = 3.26$, two-tailed $p = 0.071$); whereas under tangible rewards condition, the selection process is not significantly different between accepted and rejected participants ($F = 0.05$, two-tailed $p = 0.788$). Planned contrast test reveals the same pattern of results as in the main analysis ($F = 3.26$, two-tailed $p = 0.075$). Additionally, we explore participants' development process of the creative ideas. Figure 5 plots the creativity ratings against participants' 1st, 2nd, …, and 10th idea for each treatment conditions. The creativity trend suggests that participants in the rejection/cash rewards condition experience a deterioration in creativity over time, whereas participants in all three other conditions maintain a relatively stable level of performance. Taken together, the results suggest that rejection and reward type have a profound influence on both participants' selection and development of creative ideas over time, which combined leads to the lowest creative performance in the rejection/cash rewards condition.

--- Insert Table 7 and Figure 5 about here ---

[30] We only include participants that drafted more than one creative idea in the second task in the examination of the selection process, as it allows a meaningful comparison of the selection process across the treatment conditions.

V. Conclusions

Firms' innovation process usually involves the solicitation of creative ideas from employees. While eliciting a large pool of ideas will often benefit the firm in the search of innovation, the problem of frustrating the numerous employees whose creative ideas are not selected has largely been neglected in prior literature. In our study, we conduct an experiment to explore the critical phase in which employees react to the acceptance/rejection decisions, in an attempt to understand the behavioral consequences of rejections and how we can motivate the rejected employees.

Our experimental results suggest that rejections lead to lower perceived competence of participants and worse performance in the subsequent creativity task. Moreover, this performance discrepancy between rejected and accepted participants only manifests when they are incentivized with cash rewards in the subsequent creativity task, but not when they are provided with tangible rewards. We attribute the observed pattern of results to the different information processing that individuals are engaged in when provided with cash versus tangible rewards. To the extent that individuals do not engage in a "calculation" of outcome, tangible rewards are less likely to disrupt intrinsic motivation compared to cash rewards. Further mediation analysis reveals that participants' interest and enjoyment in the creativity task, as a measure of their intrinsic motivation, mediates the treatment effects on participants' creative performance. Additionally, we find that the observed pattern of results cannot be attributed to participants' affective responses or their overvaluation of the tangible rewards. Additional analyses also indicate that participants in the rejection/cash rewards condition make a worse selection of creative ideas and deliver a deteriorated performance over time compared to participants in the other conditions. Hence, rejection and reward type influence both participants' development and their selection of the creative ideas.

Our findings have important implications for both practice and future research. This study brings to the forefront the neglected role of rejections in firm's innovation process and informs the

potential consequences of different reward types for rejected and accepted employees. Our results draw the caution that rewards can sometimes backfire: offering cash does not always produce desired outcome for rejected employees. Our study contributes to the extant accounting literature on creativity, as we document how different reward types can be employed to motivate employees after they receive the initial selection decisions. Further, we add to the literature on tangible rewards by demonstrating that reward type can have a profound influence on the information processing that is invoked and hence on the motivation of employees to engage in the tasks.

There are many questions remaining regarding the behavioral consequences of rejections. It remains an open question whether the asymmetric effect of reward type also holds in non-creativity settings. Further, we examine a setting that pertains to an average employee's reaction to rejections. It can be that individuals who have an appetite for risk or who are more resilient to negative shocks will self-select into job functions where creativity is the primary task. Examining how rejections might have differential effects for different types of individuals can be potentially interesting for future research. Nevertheless, given firms' increasing tendency to require employees across rank and functional areas to engage in creative pursuits, the average employee's reaction to rejections can be particularly relevant to firms' creativity settings. Additionally, we focus on merchandise tangible rewards in our study. Since gift cards are often used and considered less costly than merchandise rewards (Incentive Federation Inc., 2013), future research can explore the performance effect of other forms of tangible rewards, such as incentive travel and gift cards, for rejected versus accepted employees. Last, the culture of how firms communicate the rejections and the language they use may also be a worthwhile route to explore, as previous research suggest that feedback provision may offer different opportunities for learning (e.g. Loftus and Tanlu, 2017; Choi et al., 2016). Answering these questions can shed light on the critical process that individuals improve from past failure, and how accounting in general and incentives in particular can play a pivotal role.

As to how to motivate people who are rejected, we suggest providing them with incentives, but tangible rewards would be better than cash.

References

Amabile, T. M. (1996). Creativity in context: Update to "The social psychology of creativity.": *Westview Press*.

Amabile, T. M., Hennessey, B. A., & Grossman, B. S. (1986). Social influences on creativity: The effects of contracted-for reward. *Journal of Personality and Social Psychology*, 50(1), 14-23.

Amabile, T. M. (1983a). The social psychology of creativity. New York: Springer-Verlag.

Amabile, T. M. (1983b). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, 45(2), 357-376.

Berger, L., T. Libby and A. Webb. (2017). The effects of tournament horizon and the percentage of winners on social comparisons and performance in multi-period competitions. Forthcoming, *Accounting, Organisations and Society*.

Brüggen, A., Feichter, C., & Williamson, M. G. (2017). The Effect of Input and Output Targets for Routine Tasks on Creative Task Performance. *The Accounting Review In-Press*.

Buckless, F. A., & Ravenscroft, S. P. (1990). Contrast coding: A refinement of ANOVA in behavioral analysis. *Accounting Review*, 933-945.

Calcagno, V., Demoinet, E., Gollner, K., Guidi, L., Ruths, D., & de Mazancourt, C. (2012). Flows of research manuscripts among scientific journals reveal hidden submission patterns. *Science*, 338 (6110), 1065-1069.

Chen, C. X., Williamson, M. G., & Zhou, F. H. (2012). Reward system design and group creativity: An experimental investigation. *The Accounting Review, 87*(6), 1885-1911.

Choi, W., & Presslee, A. (2016). The performance effects of tangible versus cash rewards: The mediating role of categorization. *Working Paper.*

Choi, J., Hecht, G., Tafkov, I. D., & Towry, K. L. (2016). Vicarious learning under implicit contracts. *The Accounting Review*, 91(4), 1087-1108.

Dahlander, L., & Piezunka, H. (2014). Benevolent rejections: Fostering engagement and effectiveness in the external search for innovation. *Working Paper*.

De Dreu, C. K., Baas, M., & Nijstad, B. A. (2008). Hedonic tone and activation level in the mood–creativity link: Toward a dual pathway to creativity model. *Journal of Personality and Social Psychology*, 94(5), 739-756.

Deci, E., & Ryan, R. (1985). Intrinsic motivation and self-determination in human behavior (Perspectives in Social Psychology). New York: Plenum.

Deci, E. (1975). Intrinsic motivation. New York: Plenum.

Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: integration in personality. In Nebraska Symposium on Motivation. Nebraska Symposium on Motivation, 38, 237-288.

Deichmann, D., & Ende, J. V. D. (2014). Rising from failure and learning from success: The role of past experience in radical initiative taking. *Organization Science*, 25(3), 670-690.

Erat, S., & Gneezy, U. (2016). Incentives for creativity. *Experimental Economics*, 19(2), 269-280.

Fehr, E., & Falk, A. (2002). Psychological foundations of incentives. *European Economic Review*, 46(4), 687-724.

Fischbacher, Urs (1998): Z-Tree: Zurich Toolbox for Readymade Economic Experiments. Instruktionen für Experimentatoren, *mimeo*, University of Zurich.

Gibbs, M., Neckermann, S., & Siemroth, C. (2017). A field experiment in motivating employee ideas. *Review of Economics and Statistics*, 99(4), 577-590.

Gneezy, U., List, J. A., & Wu, G. (2006). The uncertainty effect: When a risky prospect is valued less than its worst possible outcome. *The Quarterly Journal of Economics*, 1283-1309.

Grabner, I. (2014). Incentive system design in creativity-dependent firms. *The Accounting Review, 89*(5), 1729-1750.

Grant, A. M., & Berry, J. W. (2011). The necessity of others is the mother of invention: Intrinsic and prosocial motivations, perspective taking, and creativity. *Academy of Management Journal*, 54(1), 73-96.

Hammond, M. M., Farr, J. L., & Sherman, P. O. C. (2011). The role of errors in the creative and innovative process. *Routledge Academic New York*.

Hennessey, B. A. (2003). The social psychology of creativity. *Scandinavian Journal of Educational Research*, 47(3), 253-271.

Haynes, D. (2013). Samsung using contest to crowdsource ideas for flex displays. http://www.sixteen-nine.net/2013/08/14/samsung-crowdsourcing-ideas-flex-displays-contest/

Hsee, C. K., & Rottenstreich, Y. (2004). Music, pandas, and muggers: on the affective psychology of value. *Journal of Experimental Psychology: General*,133(1), 23-30.

Incentive Federation Inc. (2013). Incentive Market Study: October 2013. *Westfield, NJ: Author*

Jeffrey, S. A. (2009). Justifiability and the motivational power of tangible noncash incentives. *Human Performance*, 22(2), 143-155.

Jeffrey, S. A., Dickinson, A. M., & Einarsson, Y. F. (2013). The use of incentives in organizations. *International Journal of Productivity and Performance Management*, 62(6), 606-615.

Kachelmeier, S. J., Reichert, B. E., & Williamson, M. G. (2008). Measuring and motivating quantity, creativity, or both. *Journal of Accounting Research, 46*(2), 341-373.

Kachelmeier, S. J., Wang, L. W., & Williamson, M. G. (2018). Incentivizing the creative process: From initial quantity to eventual creativity. *The Accounting Review In-Press*.

Kachelmeier, S. J., & Williamson, M. G. (2010). Attracting creativity: The initial and aggregate effects of contract selection on creativity-weighted productivity. *The Accounting Review, 85*(5), 1669-1691.

Kachelmeier, S. J., Williamson, M. G., & Zhang, X. (2016). Cash vs. noncash rewards: Motivational effect of reward type across individual and group-based tournaments. *Working paper*.

Kadous, K., Kennedy, S. J., & Peecher, M. E. (2003). The effect of quality assessment and directional goal commitment on auditors' acceptance of client-preferred accounting methods. *The Accounting Review*, 78(3), 759-778.

Kahneman, D., A. Tversky. 1979. Prospect theory: An analysis of decision under risk. *Econometrica,* 47(2), 263–291.

Kelly, K., Presslee, A., & Webb, R. A. (2017). The Effects of Tangible Rewards Versus Cash Rewards in Consecutive Sales Tournaments: A Field Experiment. *The Accounting Review In-Press*.

Kirton, M. (1978). Have adaptors and innovators equal levels of creativity? *Psychological Reports*, 42(3), 695-698.

Knauer, T., Sommer, F., & Wöhrmann, A. (2017). Tournament winner proportion and its effect on effort: An investigation of the underlying psychological mechanisms. *European Accounting Review*, 26(4), 681-702.

Lambert, T. A., & Agoglia, C. P. (2011). Closing the loop: Review process factors affecting audit staff follow-through. *Journal of Accounting Research*, 49(5), 1275-1306.

Loftus, S., & Tanlu, L. (2017). Because of" Because": Examining the Use of Causal Language in Relative Performance Feedback. *The Accounting Review In-Press*.

McGraw, A. P., Shafir, E., & Todorov, A. (2010). Valuing money and things: Why a $20 item can be worth more and less than $20. *Management Science*, 56(5), 816-830.

Mueller J.S., S. Melwani, and J A. Goncalo (2012). The Bias Against Creativity: Why People Desire but Reject Creative Ideas. Psychological Science 23(1): 13 –17

Peterson, R. A. (1994). A Meta-Analysis of Cronbach's Coefficient Alpha. *Journal of Consumer Research*, 381-391.

Presslee, A., Vance, T. W., & Webb, R. A. (2013). The effects of reward type on employee goal setting, goal commitment, and performance. *The Accounting Review*, 88(5), 1805-1831.

Rigdon, E. E., Schumacker, R. E., & Wothke, W. (1998). A comparative review of interaction and nonlinear modeling. *Interaction and Nonlinear Effects in Structural Equation Modeling*, 1-16.

Rottenstreich, Y., & Hsee, C. K. (2001). Money, kisses, and electric shocks: On the affective psychology of risk. *Psychological Science*, 12(3), 185-190.

Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology*, 43(3), 450-461.

Shaffer, V. A., & Arkes, H. R. (2009). Preference reversals in evaluations of cash versus non-cash incentives. *Journal of Economic Psychology*, 30(6), 859-872.

Slovic, P., Griffin, D., & Tversky, A. (1990). Compatibility effects in judgment and choice. *Insights in Decision Making: A tribute to Hillel J. Einhorn*, 5-27.

Sprinkle, G. B. (2003). Perspectives on experimental research in managerial accounting. *Accounting, Organizations and Society*, 28(2), 287-318.

Staw, B. M. (1995). Why no one really wants creativity. *Creative Action in Organizations*, 161-166.

Sullivan, E. A. (2010). A group effort: More companies are turning to the wisdom of the crowd to find ways to innovate. *Marketing News*, 44(2), 22-28.

Tversky, A., Sattath, S., & Slovic, P. (1988). Contingent weighting in judgment and choice. *Psychological Review*, 95(3), 371-384.

Vallerand, R. J., & Reid, G. (1984). On the causal effects of perceived competence on intrinsic motivation: A test of cognitive evaluation theory. *Journal of Sport Psychology*, 6, 94-102.

Watson, D., L. A. Clark, and A. Tellegen. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology* 54: 1063-070.

Zhou, J. (1998). Feedback valence, feedback style, task autonomy, and achievement orientation: Interactive effects on creative performance. *Journal of Applied Psychology*, 83(2), 261-276.

Figure 1: Observed Pattern of Results – Task 2

Creative Performance in Task 2, Decision of Task 1, and Incentive Scheme of Task 2

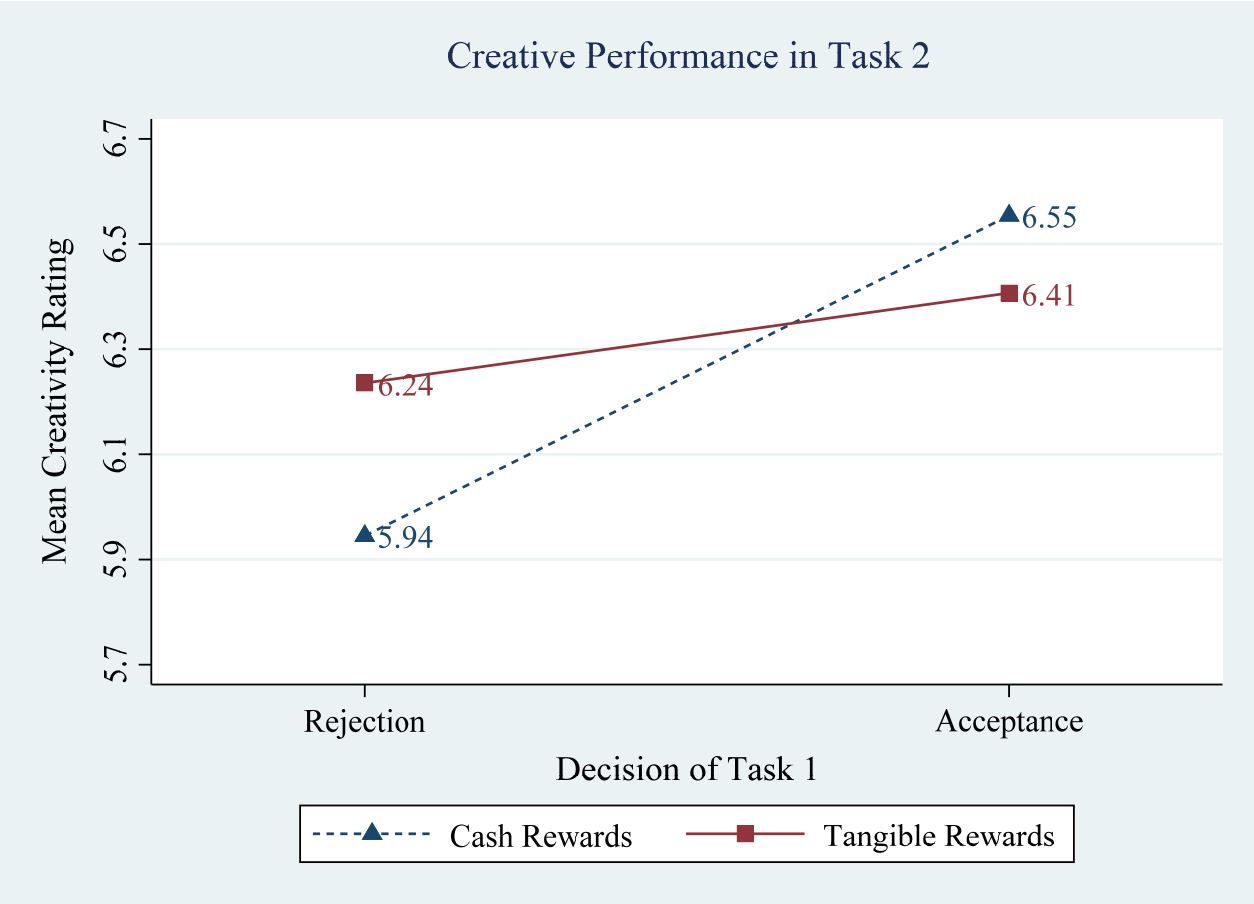


Figure 1. – Observed pattern of results for participants' creative performance in Task 2. This figure plots participants' average creative performance for submitted creative solutions in Task 2. The numbers denote the average creativity ratings for submitted creative solutions in Task 2 in each condition. Participants receive either a rejection or acceptance of the creative solution they submit in Task 1. Participants receive either fixed wage, performance-based cash rewards or performance-based tangible rewards in Task 2. The fixed-wage condition is excluded in the main tests, which serves as a control condition for comparison of the incremental effect of performance-based incentives on creative performance.

Figure 2: Observed Pattern of Results – Task 1

Creative Performance in Task 1, Decision of Task 1, and Incentive Scheme of Task 2

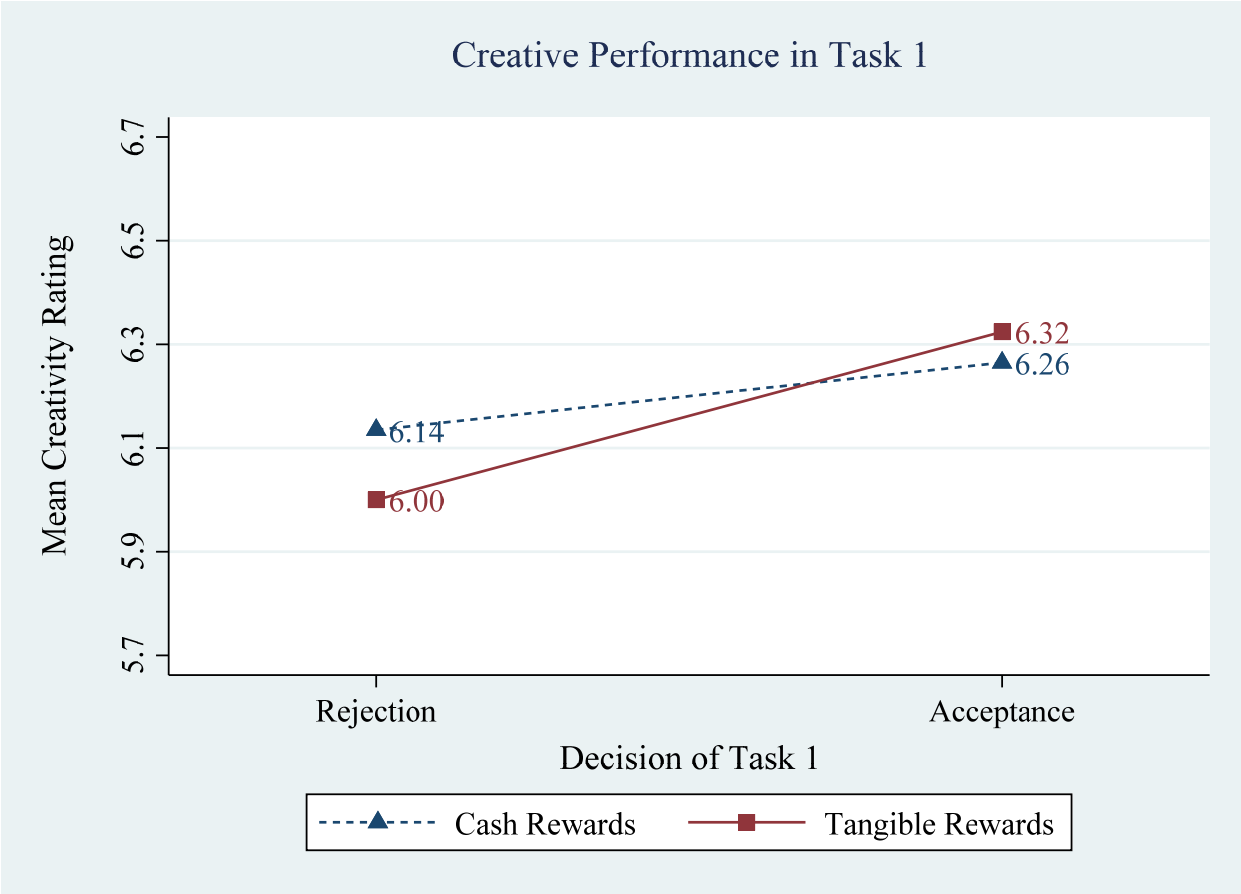


Figure 2. – Observed pattern of results for participants' creative performance in Task 1. This figure plots participants' average creative performance for submitted creative solutions in Task 1. The numbers denote the average creativity ratings for submitted creative solutions in Task 1 in each condition. Participants receive either a rejection or acceptance of the creative solution they submit in Task 1. Participants receive either fixed wage, performance-based cash rewards or performance-based tangible rewards in Task 2. The fixed-wage condition is excluded in the main tests. The pattern of results for Task 1 tests for any *ex-ante* difference in participant's creativity that leads to performance difference in Task 2.

Figure 3: Observed Creative Performance – Task 2

Creative Performance in Task 2, Performance Tercile in Task 1, and Incentive Scheme in Task 2

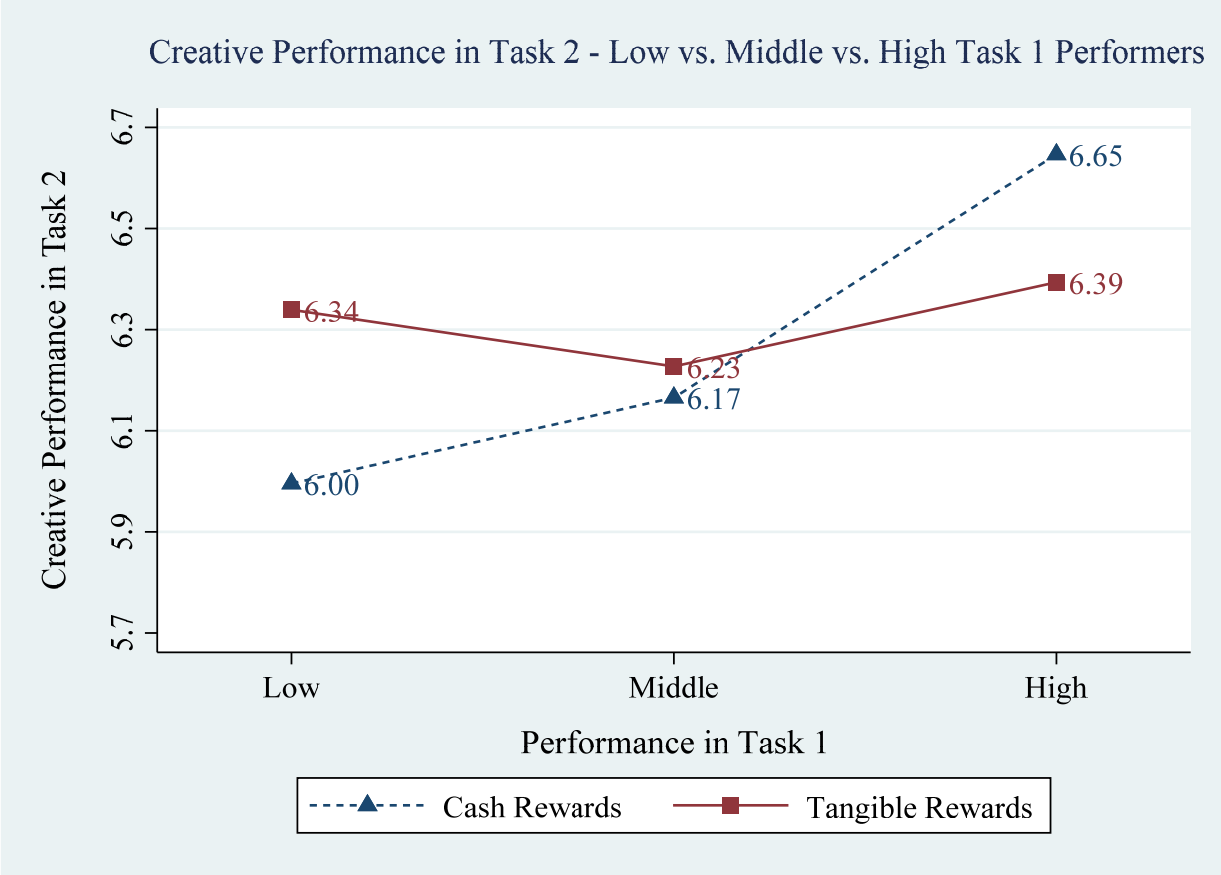


Figure 3. – Observed pattern of results for participants' creative performance in Task 2. This figure plots participants' average creative performance for submitted creative solutions in Task 2 against low vs. middle vs. high performers in Task 1. The numbers denote the average creativity ratings for submitted creative solutions in Task 2 in each condition. We split the sample into terciles based on the creative performance of participants' submitted creative ideas in Task 1. Participants receive either performance-based cash rewards or performance-based tangible rewards in Task 2. The fixed-wage condition is excluded in the main tests, which serves as a control condition for comparison of the incremental effect of performance-based incentives on creative performance.

Figure 4: Mediating Role of Interest and Enjoyment in Task 2

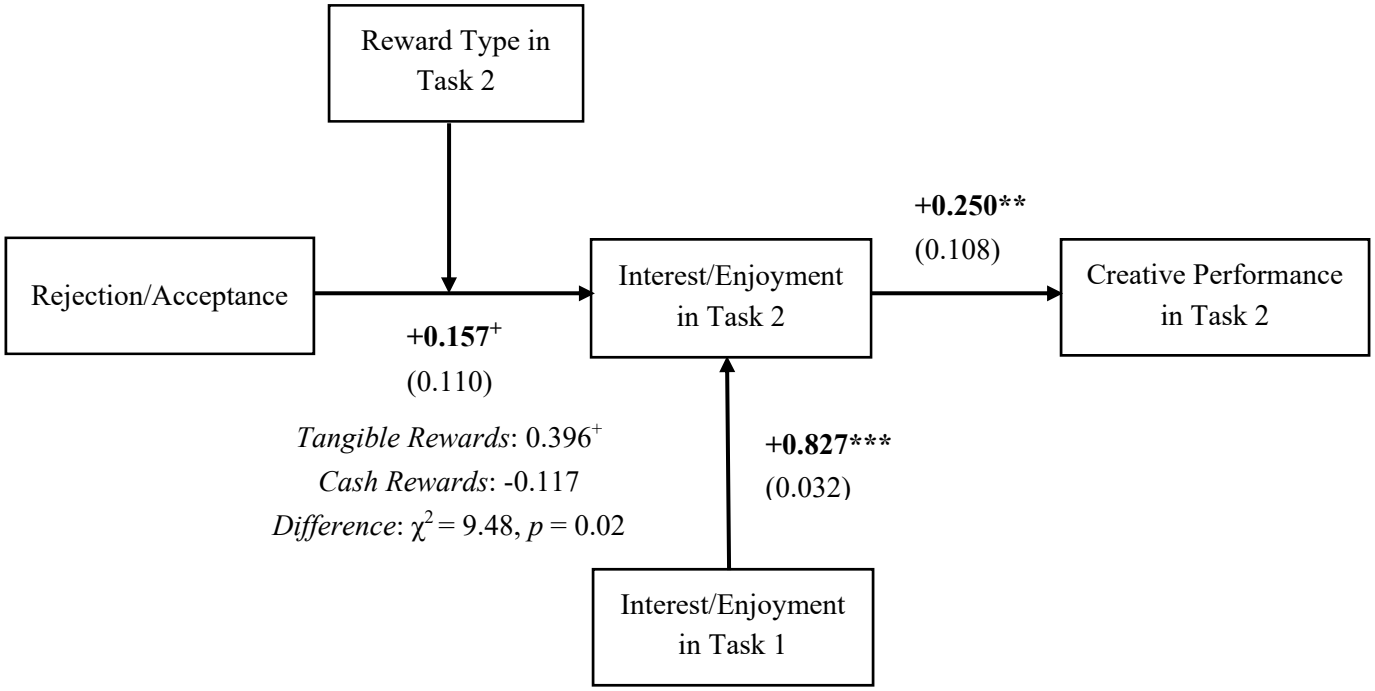
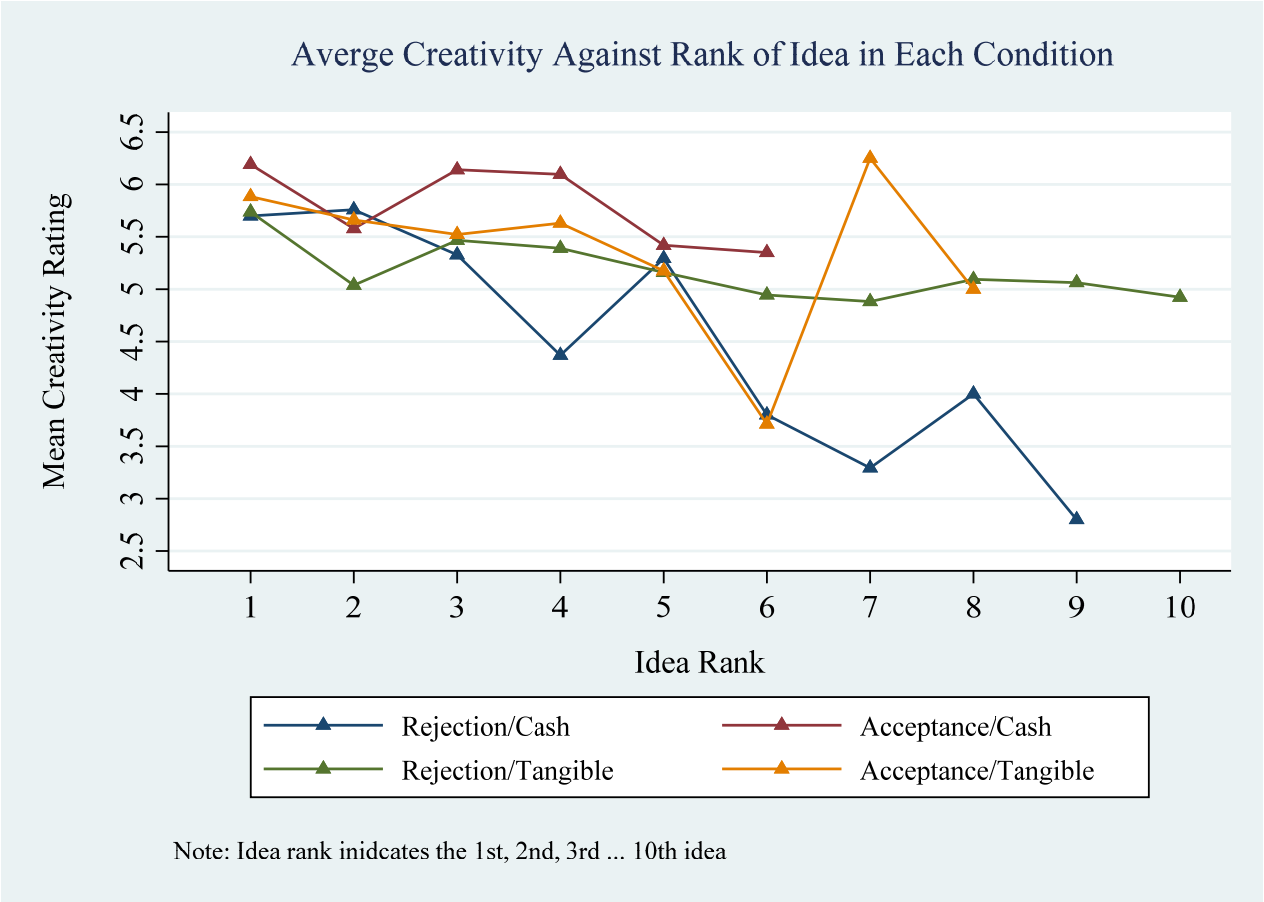


Figure 4. – Mediation analysis with interest and enjoyment in Task 2 as mediator. This figure summarizes the structural equations-based path analysis results for the mediating role of interest and enjoyment in Task 2 for the relation between rejection, reward type and Task 2 creative performance, controlling for interest and enjoyment in Task 1 as a covariate. Standardized path coefficients and standard errors (in parentheses) are provided for each effect. We also use a nested model comparison to test the interaction effect, with the LR Chi-square statistics and *p*-value reported for the test of the link between the interaction and the mediator. Participants are provided with either cash rewards or tangible rewards in Task 2. Participants receive either rejection (coded as 1 in the analysis) or acceptance (coded as 0 in the analysis) in Task 1. Interest and enjoyment in the creativity task is measured as the average score of all the items in the subscale of Interest and Enjoyment in the Intrinsic Motivation Inventory (Ryan, 1982).

Fit Indices: χ^2 (df = 4, n = 74) = 3.33, p = 0.5047 (tests the null that the model is a good fit); GFI = 0.961; RMSEA = 0.031. *, **, *** denote one-tailed statistical significance at 10%, 5%, and 1%, respectively. $^{+}$, $^{++}$, $^{+++}$ denote one-tailed statistical significance level at 10%, 5%, and 1%, respectively.

Figure 5: Creativity Trend in Task 2 in Each Treatment Conditions

Creative Performance in Task 2 and Idea Rank in Task 2



Note: Idea rank inidcates the 1st, 2nd, 3rd ... 10th idea

Figure 5. – Idea development process in Task 2 in each condition. This figure plots the average creative performance for participants' developed ideas against the idea rank in time sequence. Idea rank indicates the 1st, 2nd, 3rd…10th idea developed by each participants. Participants can draft up to 10 creative ideas in the idea development phase. Participants receive either a rejection or acceptance of the creative solution they submit in Task 1. Participants receive either performance-based cash rewards or performance-based tangible rewards in Task 2. Crossing the two factors results in four treatment conditions. The figure presents the creativity trend over time for each treatment conditions.

T A B L E 1

Descriptive Statistics of Creative Performance in Task 2 and Task 1

Panel A: Descriptive Statistics of Creative Performance in Task 2 (subsequent creative performance)

	Incentive Scheme in Task 2			
Decision of Task 1	Fixed Wage (Control)	Cash Rewards	Tangible Rewards	Mean {S.D.}
Acceptance	6.11	6.55	6.41	6.36
	{0.93}	{0.96}	{0.87}	{0.93}
	$n = 30$	$n = 31$	$n = 27$	$n = 88$
Rejection	6.10	5.94	6.24	6.10
	{1.43}	{1.25}	{1.36}	{1.34}
	$n = 28$	$n = 27$	$n = 33$	$n = 88$
Mean {S.D.}	6.11	6.27	6.31	
	{1.19}	{1.14}	{1.16}	
	$n = 58$	$n = 58$	$n = 60$	

Panel B: Descriptive Statistics of Creative Performance in Task 1 (baseline creative performance)

	Incentive Scheme in Task 2			
Decision of Task 1	Fixed Wage (Control)	Cash Rewards	Tangible Rewards	Mean {S.D.}
Acceptance	6.11	6.26	6.32	6.23
	{0.93}	{0.85}	{0.70}	{0.83}
	$n = 30$	$n = 31$	$n = 27$	$n = 88$
Rejection	6.05	6.14	6.00	6.06
	{1.10}	{0.62}	{1.00}	{0.93}
	$n = 28$	$n = 27$	$n = 33$	$n = 88$
Mean {S.D.}	6.08	6.20	6.15	
	{1.01}	{0.75}	{0.88}	
	$n = 58$	$n = 58$	$n = 60$	

Table 1. – This table contains the mean {standard deviation} of the creative performance of participants' submitted creative solutions (average ratings of all the raters) in Task 2 (Panel A) and Task 1 (Panel B) in each of the treatment conditions. The creative performance is measured by the average ratings of all the raters of the same creative solution. Each creative solution is evaluated by 5 to 8 raters. Participants receive either rejection or acceptance of the creative solution they submit in Task 1. Participants receive either fixed wage, performance-based cash rewards or performance-based tangible rewards in Task 2. Crossing the two factors results in the six conditions reported above.

T A B L E 2

Test of Hypotheses: Creative Performance in Task 2

Panel A: Conventional Analysis of Variance

Source	Sum of Squares	*df*	Mean Square	*F*-Statistic	*p*-Value
Incentive Scheme	0.17	1	0.17	0.13	0.71
Rejection vs. Acceptance	3.70	1	3.70	2.88	0.09
Rejection*Incentive Scheme	1.58	1	1.58	1.23	0.27
Task 1 Creativity Rating	1.46	1	1.46	1.13	0.29
Error	145.18	113	1.28		

Panel B: Planned Contrast

Combined test of H1 and H2: Creative performance will be lowest in the cash rewards/rejection condition, slightly higher in the tangible rewards/rejection condition, higher in the tangible rewards/acceptance condition, and highest in cash rewards/acceptance condition (contrast weights are -3, -1, +1, and +3, respectively).

Source of Variation	*df*	*F*-Statistic	*p*-Value
Contrast	1	4.03	0.047

Panel C: Simple Effects

	df	*F*-Statistic	*p*-Value
Cash rewards: Rejection in Task 1 will decrease creative performance in Task 2	1	4.169	0.048
Tangible rewards: Rejection in Task 1 will not influence creative performance in Task 2	1	0.338	0.671

Table 2. – This table reports the results of hypotheses tests of participants' creative performance in Task 2. Panel A contains ANCOVA results for the effect of decision of Task 1 (rejection vs. acceptance) and incentive scheme for Task 2 (performance-based cash rewards vs. performance-based tangible rewards) on participant's creative performance in Task 2. We estimate ANCOVA with creative performance in Task 1 as covariate. The fixed-wage condition is excluded in the main tests, as our primary interest is in the difference in the incremental influence of cash and tangible rewards on creative performance. Panel B contains the results of a planned contrast test based on the contrast weights that capture the predicted pattern of results. Panel C reports the results of the simple effects tests that break down the simple main effect and help us identify the pattern of results that we hypothesize.

All reported p-values are two-tailed.

T A B L E 3

Tercile Analyses for Creative Performance in Task 2

Panel A: Descriptive Statistics of Creative Performance in Task 2

	First-round performance				
Reward Type	Bottom	Middle	Top	Mean {S.D.}	Top-Bottom
Cash rewards	6.00	6.17	6.65	6.27	0.65
	{1.03}	{1.28}	{1.01}	{1.14}	$t = 1.94$
	n = 18	$n = 21$	$n = 19$	$n = 58$	$p = 0.06$
Tangible rewards	6.34	6.23	6.39	6.31	0.05
	{1.13}	{1.31}	{1.04}	{1.16}	$t = 0.15$
	$n = 19$	$n = 23$	$n = 18$	$n = 60$	$p = 0.88$
Mean {S.D.}	6.17	6.20	6.52		
	{1.08}	{1.28}	{1.02}		
	$n = 37$	$n = 44$	$n = 37$		
Cash – Tangible	-0.34	-0.06	0.25		
t-statistic	$t = 0.97$	$t = -0.16$	$t = 0.75$		
p-value(two-tailed)	$p = 0.33$	$p = 0.88$	$p = 0.46$		
Non-parametric test (Fisher's exact p two-tailed)	0.02	0.78	0.33		

Panel B: ANCOVA Without the Middle Tercile

Source	Sum of Squares	*df*	Mean Square	*F*-Statistic	*p*-Value
Incentive Scheme	0.39	1	0.39	0.35	0.556
Rejection vs. Acceptance	0.05	1	0.05	0.05	0.827
Rejection*Incentive Scheme	2.63	1	2.63	2.37	0.128
Task 1 Creativity Rating	2.06	1	2.06	1.85	0.178
Error	76.53	69	1.11		

Table 3. – This table contains the mean {standard deviation} of the creative performance of participants' submitted creative ideas in Task 2 (Panel A) and ANCOVA results without the participants in the middle tercile of Task 1 performance. We split the sample into terciles based on the creative performance of participants' submitted creative ideas in Task 1. Participants' Task 1 performance is classified as either in the bottom, middle or top tercile. Participants receive either performance-based cash rewards or performance-based tangible rewards in Task 2. Crossing the two factors results in the six conditions reported above.

All reported p-values are two-tailed.

T A B L E 4

Tests of Hypotheses: Multiple Regression Analyses

Dependent Variable: Creative Performance in Task 2	Model (1)	Model (2)	Model (2) Cash Rewards Condition	Model (2) Tangible Rewards Condition
Reward Type	-0.156	-0.167		
	(-0.521)	(-0.552)		
Rejection	-0.591*	-0.720**	-0.740*	-0.480
	(-1.979)	(-1.988)	(-1.733)	(-1.254)
Rejection*Reward Type	0.465	0.433		
	(1.108)	(1.022)		
Task 1 Performance	0.138	0.155	0.296	0.131
	(1.064)	(1.181)	(1.490)	(0.736)
Perf. Discrepancy Accept vs. Reject		0.132	0.175	0.231
		(1.277)	(1.244)	(1.401)
Perceived Competence		-0.020	0.120	-0.148
		(-0.116)	(0.471)	(-0.601)
Change in Interest/Enjoyment		0.178	-0.260	0.330*
		(1.319)	(-1.024)	(1.960)
Change in Effort		-0.107	-0.216	-0.088
		(-0.932)	(-1.234)	(-0.577)
Net Affect		-0.078	-0.060	-0.165
		(-0.653)	(-0.340)	(-1.007)
KAI (Innate Creativity Measure)		0.230	-0.072	0.581*
		(1.040)	(-0.216)	(1.923)
Intercept	5.688***	4.939***	4.809***	4.198***
	(6.784)	(4.446)	(2.935)	(2.680)
Observations	118	118	58	60
Adj. R-squared	0.014	0.010	0.051	0.026
F	1.420	1.123	1.383	1.201

Table 4. – Multiple regression analysis. This table reports the coefficients and t-statistics (in parentheses) from multiple regressions with creative performance in Task 2 as the dependent variable. The last two columns present the full-model multiple regression results in the cash and tangible rewards conditions respectively. *Reward Type* is coded as 1 for tangible rewards and 0 for cash rewards condition. *Rejection* is coded as 1 if participants receive rejection in Task 1 and 0 if they receive acceptance. *Perf. Discrepancy Reject vs. Accept* is the difference in Task 1 performance between accepted and rejected participants in each pair. *Perceived Competence*, *Change in Interest/Enjoyment*, and *Change in Effort* are measured as the average score of the subscales from the Intrinsic Motivation Inventory (Ryan, 1982). *Net Affect* is measured as the difference between positive affect and negative affect using the PANAS scale (Watson et al. 1988). *KAI* measure captures individuals' general creativity potential adapted from Kirton (1978).

*, **, *** denote two-tailed statistical significance at 10%, 5%, and 1%, respectively.

T A B L E 5

Descriptive Statistics of Process Variables – Subscales of Intrinsic Motivation in Task 2

	Incentive Scheme in Task 2					
	Cash Rewards Decision of Task 1		Tangible Rewards Decision of Task 1		Difference in Means	Difference in Means
Subscales to Capture Intrinsic Motivation	Rejection	Acceptance	Rejection	Acceptance	Rejection vs. Acceptance	Cash vs. Tangible Rewards
Interest/Enjoyment	4.65	4.65	4.91	4.78	0.08	-0.21
	{1.17}	{1.30}	{1.40}	{1.42}		
Perceived Effort	4.95	5.48	4.81	5.15	-0.45**	0.28
	{1.31}	{0.97}	{1.28}	{1.08}		
Felt Pressure and Tension	3.02	3.46	2.41	2.60	-0.38	0.77***
	{1.17}	{1.37}	{1.24}	{1.29}		
Perceived Value/Usefulness	5.06	5.16	5.33	5.15	0.05	-0.14
	{1.11}	{1.18}	{1.30}	{1.12}		
Experience of Relatedness	4.52	3.61	4.21	3.70	0.69**	0.05
	{1.48}	{1.82}	{1.82}	{2.23}		
Perceived Choice	5.41	5.37	5.39	5.63	-0.09	-0.11
	{0.88}	{1.22}	{1.18}	{0.87}		
Perceived Competence	3.02	3.32	3.13	3.38	-0.27**	-0.06
	{0.78}	{0.71}	{0.81}	{0.61}		
All IM Measures	4.73	4.77	4.94	4.91	0.01	-0.17
	{0.76}	{0.81}	{0.86}	{0.85}		
Observations	n = 27	n = 31	n = 33	n = 27		

Table 5. – Process Measures, adapted from Intrinsic Motivation Inventory (IMI) (Ryan, 1982). This table reports the subscales used to capture participants' intrinsic motivation in Task 2 and the mean {standard deviation} of each subscale scores by each condition. We averaged across all items within each subscale, resulting in seven subscales reported to assess participants' interest/enjoyment, effort, felt pressure and tension, perceived value/usefulness, experience of relatedness, perceived choice, and perceived competence in the second creativity task, along with the average score of all the seven subscales. Participants were asked to rate their agreement with each statement on a 7-point Likert scale with "1" labeled "Not at all true" and "7" labeled "Very true". Two-sample mean tests are also reported to test the null hypothesis that the means between the rejection vs. acceptance and cash vs. tangible rewards conditions are equal. All the statistics are based on the whole sample, excluding the control condition of fixed wage.

*, **, and *** indicate that the null hypothesis can be rejected at significance levels of $p < 0.1$, $p < 0.05$ and $p < 0.01$, respectively. All reported significance are based on two-tailed p-values.

T A B L E 6

Robustness Tests for Subgroups Based on the Extent to Which Participants Like/Value the Chocolate Box

Panel A: Analysis for Subsample of Participants Who *Like* Chocolate Box *Less*

Planned contrast: –3 for rejection/cash rewards condition, –1 for rejection/tangible rewards condition, +1 for acceptance/tangible rewards condition, and +3 for acceptance/cash rewards condition.

Source of Variation	*df*	*F*-Statistic	*p*-Value
Contrast	1	5.01	0.028

Simple Effects

	df	*F*-Statistic	*p*-Value
Effect of rejection within cash rewards condition	1	3.942	0.066
Effect of rejection within tangible rewards condition	1	2.294	0.183

Panel B: Analysis for Subsample of Participants Who *Like* Chocolate Box *More*

Planned contrast: –3 for rejection/cash rewards condition, –1 for rejection/tangible rewards condition, +1 for acceptance/tangible rewards condition, and +3 for acceptance/cash rewards condition.

Source of Variation	*df*	*F*-Statistic	*p*-Value
Contrast	1	2.92	0.091

Simple Effects

	df	*F*-Statistic	*p*-Value
Effect of rejection within cash rewards condition	1	4.873	0.028
Effect of rejection within tangible rewards condition	1	0.518	0.466

Panel C: Analysis for Subsample of Participants Who *Value* Chocolate Box *Less*

Planned contrast: –3 for rejection/cash rewards condition, –1 for rejection/tangible rewards condition, +1 for acceptance/tangible rewards condition, and +3 for acceptance/cash rewards condition.

Source of Variation	*df*	*F*-Statistic	*p*-Value
Contrast	1	4.62	0.034

Simple Effects

	df	*F*-Statistic	*p*-Value
Effect of rejection within cash rewards condition	1	4.616	0.035
Effect of rejection within tangible rewards condition	1	0.399	0.574

Panel D: Analysis for Subsample of Participants Who *Value* Chocolate Box *More*

Planned contrast: –3 for rejection/cash rewards condition, –1 for rejection/tangible rewards condition, +1 for acceptance/tangible rewards condition, and +3 for acceptance/cash rewards condition.

Source of Variation	*df*	*F*-Statistic	*p*-Value
Contrast	1	2.26	0.137

Simple Effects

	df	*F*-Statistic	*p*-Value
Effect of rejection within cash rewards condition	1	3.968	0.064
Effect of rejection within tangible rewards condition	1	0.000	0.769

Table 6. – Robustness tests on subsamples. This table reports the robustness test results of the main analysis on the subsample of participants that differ on the extent to which they *like/value* the tangible rewards of chocolate box. Participants were asked to indicate the extent to which they like the tangible reward of a box of Belgium chocolate on a 5-point Likert scale with "1" labeled "Not like at all" and "5" labeled "Like very much". Participants were also asked to estimate the monetary value of the chocolate box. Panel A contains the planned contrast test results and follow-up simple effects for the participants who self-report they like chocolate box *less* (equal to or below the mid-point of "3" on a 5-point Likert scale). Panel B contains the same analysis for the participants who self-report they like chocolate box *more* (above the mid-point of "3" on a 5-point Likert scale). Panel C contains the results for the participants who assess lower monetary value for the chocolate box (below the mean value of 5 EUR). Panel D contains the results for the participants who assess higher monetary value for the chocolate box (above the mean value of 5 EUR). For brevity, we do not report ANCOVA results in the table.

All reported p-vales are two-tailed.

T A B L E 7

Descriptive Statistics, ANOVA and Planned Contrast for Selection of Creative Idea in Task 2

Panel A: Descriptives for Participants' Selection of Creative Ideas in Task 2

	Incentive Scheme in Task 2			
Decision of Task 1	Fixed Wage (Control)	Cash Rewards	Tangible Rewards	Mean {S.D.}
Acceptance	-0.29	0.39	0.27	0.10
	{1.24}	{1.39}	{1.08}	{1.25}
	$n = 24$	$n = 20$	$n = 22$	$n = 66$
Rejection	-0.28	-0.40	0.17	-0.15
	{1.48}	{1.64}	{1.54}	{1.55}
	$n = 24$	$n = 20$	$n = 26$	$n = 70$
Mean {S.D.}	-0.29	-0.01	0.22	
	{1.35}	{1.55}	{1.34}	
	$n = 48$	$n = 40$	$n = 48$	

Panel B: Conventional Analysis of Variance

Source	*df*	Mean Square	*F*-Statistic	*p*-Value
Incentive Scheme	1	1.19	0.57	0.48
Rejection vs. Acceptance	1	4.77	2.29	0.13
Rejection*Incentive Scheme	1	2.76	1.33	0.25
Task 1 Creativity Differential	1	0.25	0.12	0.73
Error	82	2.08		

Panel C: Planned Contrast

Combined test of H1 and H2: Creative performance will be lowest in the cash rewards/rejection condition, slightly higher in the tangible rewards/rejection condition, higher in the tangible rewards/acceptance condition, and highest in cash rewards/acceptance condition (contrast weights are -3, -1, +1, and +3, respectively).

Source of Variation	*df*	*F*-Statistic	*p*-Value
Contrast	1	3.26	0.075

Panel D: Simple Effects

	df	*F*-Statistic	*p*-Value
Cash rewards: Rejection in Task 1 will decrease creativity differential in Task 2	1	3.257	0.071
Tangible rewards: Rejection in Task 1 will not influence creativity differential in Task 2	1	0.052	0.788

Table 7. – Selection of Creative Ideas in Task 2. Participants' selection of the creative ideas is measured by the difference in the creativity rating between the submitted creative idea and the highest-rated un-submitted creative idea. Panel A contains the mean {standard deviation} of this creativity differential measure in Task 2. Participants receive either rejection or acceptance of the creative idea they submit in Task 1. Participants receive either fixed wage, performance-based cash rewards or performance-based tangible rewards in Task 2. Crossing the two factors results in the six conditions reported above. Panel B reports the ANCOVA results for the effect of rejection/acceptance and reward type on participants' selection of creative ideas, controlling for Task 1 creativity differential. Panel C contains the results of a planned contrast test using the contrast weights the same as in the main analysis. Panel D reports the results of the simple effects tests that break down the simple main effect the same as in the main analysis.

All reported p-values are two-tailed.

Appendix A

Experimental Instructions for Selection Decisions

[Rejection condition:]

The independent rater has carefully considered your submitted creative solution. We regret to inform you that **your creative solution has been rejected**.

After evaluating your creative solution, the independent rater did not find enough originality and innovation in it and it is not deemed valuable to the Municipality of Tilburg. Your creative solution has been rejected because the goal is to select the most creative solutions that can help tackling the social issue.

Your effort in developing the creative solution for this real-life issue is very much appreciated.

[Acceptance condition:]

The independent rater has carefully considered your submitted creative solution. We are glad to inform you that **your creative solution has been accepted**.

After evaluating your creative solution, the independent rater found it original and innovative and it is deemed valuable to the Municipality of Tilburg. Your creative solution has been accepted because the goal is to select the most creative solutions that can help tackling the social issue.

Your effort in developing the creative solution for this real-life issue is very much appreciated.

Appendix B

Experimental Instructions for Incentive Schemes

[Control condition with no creativity incentives:]

You will receive 4 EUR for the second task. Please note that you will receive 4 EUR, irrespective of how you perform in developing the creative solutions. That is, your compensation does not depend on whether your creative solution is selected by the independent rater or not. You will get the compensation immediately after the experiment. The independent rater who has to evaluate the creative solutions does not know how you are rewarded.

[Condition with performance-based cash rewards:]

You will receive 6 EUR for the second task if your creative solution is selected by the independent rater. You will receive 2 EUR for the second task if your creative solution is NOT selected by the independent rater. That is, your compensation depends on your performance in the creativity task. You will get the cash payment immediately after the experiment. The independent rater who has to evaluate the creative solutions does not know how you are rewarded.

[Condition with performance-based tangible rewards:]

You will receive a gift in the form of a box of delicious chocolate for the second task if your creative solution is selected by the independent rater. You will receive a gift in the form of a packet of M&M's chocolate for the second task if your creative solution is NOT selected by the independent rater. That is, your rewards depend on your performance in the creativity task. You will get the gift rewards immediately after the experiment. The independent rater who has to evaluate the creative solutions does not know how you are rewarded.

Appendix C

Examples of Participants' Creative Ideas

Panel A: Creative Ideas for Task 2 with High Ratings

Example 1

Make shoes that charge your electronics (like phones and tablets) if you move a lot. Make it so that a certain time of sporting creates energy which can be stored, then after a set amound of exersise time, you allow the children to charge their favorite devices with it. This way children cannot use their electronic devices to skip on their exersise and playtime as much, it reduces energy costs for the parents and it might even reduce the fun the child gets out of playing with his/her electronics. Afterall, spending time playing outside will definately increase chances of having friends in the neighbourhood, which will on its turn increase the chance of more exersise and movement with these friends.

Creativity rating: 8.5

Example 2

Children these days are spending a lot of time on their iPads, mobile phones, and other electronic devices. Because of the hype of applications and games, I think it is a clever idea to make an application which creates all kinds of games to play. With games, i do not mean games on the device itself, but games in the garden, on the street, but also inside, just in case the weather is bad. I would develop and think of a lot of easy, simple games, easy to play, with stuff every regular household has. Think about playing "Bottle Soccer"; both kids take an empty bottle and you will have to try and shoot the bottle down with a football. The application will keep the score, so after every game the winner will get a point. After like 8-10 random games, the winner will get a reward.

Creativity rating: 8.2

Panel B: Creative Ideas for Task 2 with Low Ratings

Example 1

forbid usage and possession of mobile phones and other telecommunication accessories in schools

Creativity rating: 2.8

Example 2

Some kind of electric chain around their feet. If they do not move 5 minutes within a time limit of say 60 minutes, they will have an electric shock. If the kid is awake between 7 a.m. and 19 p.m., this means 12 hours with at least 30 minutes of movement. I advise to switch it off if they are sleeping.

Creativity rating: 4.1

Panel C: Creative Ideas for Task 1 with High Ratings

Example 1

We have to give them a job that makes them excited and there should be a job that they are professional with in. For instance; we should establish an organization that old people teaches their knowledge to young people and also young people should pay for it. A photographer can be a teacher about his area.

Creativity rating: 8.00

Example 2

Get unemployed people over 50 involved with assisting migrants and refugees in their cultural immersion in the Netherlands. People can help with language and general things like banks, documents, paperwork etc. The people over 50 would then feel useful for the society and would get some money for it.

Creativity rating: 7.7

Panel D: Creative Ideas for Task 1 with Low Ratings

Example 1

A national promotion of the skills of employees aged over 50 to make the companys realize that they need these employees. An ad at the television could be a way to let this happen.

Creativity rating: 3.7

Example 2

Start a gym , or yogas class for eldery people can be a way to keep them busy and to decrease the number of unemployed people over 50's

Creativity rating: 3.8