Penalty contracts: Is it all about the cash?

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Abstract

We experimentally investigate the relevance of a cash upfront payment for the effort-enhancing effect of penalty contracts. We find that penalty contracts where participants receive the upfront payment physically before working on a real effort task induce more effort than penalty contracts where participants are only informed about the upfront payment. When comparing penalty contracts with economically-equivalent bonus contracts, we find that penalty contracts lead to higher effort provision than bonus contracts, but only if participants physically receive the upfront cash payment in advance. Out of several potential reasons, we can rule out reciprocity. We suggest that the higher salience of the cash upfront payment might be a core driver of the detected framing effect. Our findings emphasize the importance of experimental design choices when studying framed incentive contracts.

Keywords: penalty contract, contract framing, loss framing, cash upfront payment, laboratory experiment

JEL codes: C91, J24, J33, M52

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Statements and declarations

Conflict of interest
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Ethics approval
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Data availability
The datasets generated by the experimental research and analyzed during the current study will be made publicly available.
1. Introduction

Incentive contracts are commonly used to motivate employees (Prendergast 1999), and research shows that framing may affect their effectiveness. In particular, experimental evidence reveals that negatively framed incentive contracts that penalize poor performance, can induce more effort than economically-equivalent, positively framed incentive contracts rewarding good performance (e.g., Hannan et al. 2005). One explanation for the effort-enhancing effect of negatively framed incentives is loss aversion around a reference point, formalized in prospect theory (Kahneman and Tversky 1979).

However, while some experiments find large framing effects in the laboratory with Hedges’ g statistics around 0.50 (e.g., Armantier and Boly 2015; Hannan et al. 2005; Imas et al. 2017; von Bieberstein et al. 2020) other studies report only marginally significant effects (e.g., Brooks et al. 2012), and still others do no find any statistically significant effect of contract framing on effort at all (e.g., Essl and Jaussi 2017; Grolleau et al. 2016).1 This is also summarized in a recent meta-analysis on framed incentive contracts that points out a high variability of effect sizes found in laboratory experiments and much smaller effect sizes for field than for lab studies (Ferraro and Tracy 2022). The meta analysis also documents larger effect sizes in studies where workers get their pay handed out in advance compared to studies that only verbally describe the payment but factually pay it out at the end of the task (0.24 SD vs. 0.08 SD), but the difference is not statistically significant. However, the studies included in this comparison also differ in many other design choices, making it hard to assess the impact of the timing of the payment in isolation.

Thus, the aim of this study is to systematically examine two questions: First, do penalty contracts with cash upfront payment elicit significantly more effort than penalty contracts without cash upfront payment? Second, does the penalty contract have a performance-enhancing effect compared to the bonus contract if the cash payment is physically paid out up front, but not if the payment is only announced and paid later? To answer these questions we conducted a between-subject laboratory experiment with two stages. In both stages, participants work on a real effort task. In stage 1, they receive a fixed wage independent of performance and in stage 2, they work under a framed incentive contract. Depending on the treatment, the incentive contract is either a penalty contract with cash upfront payment, a penalty contract without cash upfront payment, or a bonus contract. All contracts are economically equivalent and participants receive a substantially higher payoff when meeting an announced performance target (15 CHF vs. 5 CHF).2 Comparing both types of penalty schemes, we find that penalty contracts with cash upfront payment elicit significantly more effort than penalty contracts without cash upfront payment. However, if we control for performance in stage 1, the effect is only significant at the 10-percent level. With respect to the framing of the contract, we find that penalty contracts with physical cash upfront payment elicit significantly more effort than economically-equivalent bonus contracts. In

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1 An overview of laboratory experiments analyzing the effectiveness of penalty contracts is available in Table A.1 in Appendix A.
2 At the time of the experiment 1 CHF equaled about 1US$. 

contrast, we do not find a statistically significant effort difference between the penalty contract without cash upfront payment and the bonus contract.

There are several potential reasons why the cash upfront payment could be important for producing the effort-enhancing effect of penalty contracts (see the discussion in Section 4). People might regard an upfront payment of cash as a kind act by the experimenter and reciprocate this kindness with higher effort (Fehr and Gächter 2000). Based on our experimental design, we can analyze if positive reciprocity explains the expected differences in response to loss contracts with and without cash upfront payment. However, we do not find a similar effect in stage 1, where the payment was independent of performance and where the timing of the cash payments mirrored stage 2. Thus, we conclude that reciprocity does not seem to be the driver of our effect. Our preferred interpretation is that our results are due to an increase in the salience of the upfront payment, which in turn reinforces the feeling of ownership and induces a greater fear of losing the money. This is in line with a study of Reb and Connolly (2007), who find that people who physically possess a good have a higher monetary valuation for keeping it compared to people who only factually own the good without physical possession.

Up to this point, there are only a few attempts to bring more clarity in the experimental design choices researchers face when studying framed incentive contracts in the lab. One exception searching for systematic differences is de Quidt et al. (2017), who suggest that whether participants can check if they meet a performance target while performing the task, or not, influences the effectiveness of contract framing. However, they did not find causal evidence supporting this conjecture and the authors acknowledge that there are many other differences between the studies they considered in their review of the literature. In addition to the timing of payment, Ferraro and Tracy (2022) also consider the type of payment (piece-rate vs. threshold contract design) in their meta-analysis, resulting in comparable effect sizes. In this paper, we experimentally vary the timing of the payment as a driver of differences in the framing effect. While most lab experiments with cash upfront payment find an effort-enhancing effect of penalty contracts as compared to bonus contracts (only Grolleau et al. (2016) does not), the results of laboratory studies without cash upfront payment are more mixed (see Table A.1 in Appendix A).

2. Experimental design and procedure

In a lab experiment, we examine the importance of physical possession of the upfront payment as a potential driver of framing effects. We conducted two penalty treatments, where participants received 15 CHF upfront and had to pay a penalty of 10 CHF in case of missing the target. In the Penalty Cash treatment, participants were physically paid out their upfront payment in cash prior to the task, whereas

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3 The ethical standard of the study was approved by the Faculty of Business Administration, Economics and Social Sciences of the University of Bern. The experimental details were pre-registered on the American Economic Association's registry for randomized controlled trials with the unique identifying number: AEARCTR-0005303.
in the Penalty No Cash treatment, they were only informed about the upfront payment, but did not physically receive the money until the end of the experiment. As a control treatment, we implemented an economically-equivalent Bonus treatment, where participants were paid out 5 CHF as an upfront payment and when meeting the predefined target, they earned an additional bonus of 10 CHF.

At the beginning of the lab experiment, we assessed individual loss aversion (Gächter et al. 2022), followed by two stages, where participants worked on a Word Encryption task with Double Randomization (WEDR task) (Benndorf et al. 2019). Participants had to encode words as numbers and could only proceed with the next word if they encoded all letters correctly. Effort was measured as number of solved words. We chose this task for several reasons: it requires no special knowledge or cognitive abilities, learning possibilities are trivial, there is no scope for guessing, and it is gender-neutral (Benndorf et al. 2019). In stage 1, participants worked on the encryption task for 3 minutes and received a fixed wage of 5 CHF, irrespective of the number of solved words. Participants familiarized themselves with the task and we obtained a measure of baseline performance capturing motivation and ability.

In stage 2, participants had 4 minutes to encode a maximum of 20 words. Payment was performance-based and tied to an announced target. If participants solved at least 12 words, they received 15 CHF, otherwise their payment was 5 CHF. Solving 12 words corresponds to the 80th performance percentile under piece-rate incentives in a similar experiment (von Bieberstein et al. 2020), such that we chose it as challenging, but feasible target. In our experiment, participants solved on average 10.09 words (S.D.=1.7), and 19% reached the target of 12 words. While working in stage 2, participants could see a display of the number of correctly coded words so far. To keep payment procedures consistent over both stages of the experiment, the fixed wage of 5 CHF in stage 1 was always executed in the same way as the upfront payment in stage 2. This means that participants in the Penalty Cash treatment and the Bonus treatment physically received their fixed wage before working on the real effort task. In the Penalty No Cash treatment, the fixed wage was not distributed in advance, but only at the end of the experiment. Moreover, to ensure confidentiality and comparability across all treatments, the returned penalty payments and the bonus payments in the treatments with physical possession were administered via envelopes. This way neither the experimenter distributing and collecting the payments, nor any other participant could infer if the target was met.5

The experiment was conducted in the Aare-Lab of the University of Bern between December 2019 and February 2020. Subjects were recruited via Sona-Systems, and the experiment was computerized using z-Tree (Fischbacher 2007). In total, 195 students from various disciplines participated. Based on prior research, we expected a medium sized effect of contract framing on productivity (Cohen's d=0.50). Thus, with at least 67 participants per treatment, we have 80% power to detect such an effect at a 5% level of significance. The participants were randomly assigned to one of the three treatments, which in

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4 Experimental instructions including a screenshot of the task are available in Appendix B.
5 The experimental procedure was not double blind since another experimenter disbursed the outstanding payments at the end of the experiment.
turn were randomized over morning, midday and afternoon sessions. Participants received written instructions for the real effort encryption task and had to answer control questions to ensure that they understood the performance-based incentives in stage 2. Each session lasted about 45 minutes and average earnings were 17 CHF including a show-up fee of 4 CHF. The experiment concluded with a short questionnaire on demographics.  

3. Results  
3.1. Effort-enhancing effects of penalty contracts  
To analyze the effect of physical possession of the base pay on effort provision, we compare the number of correctly solved words across treatments. Table 1 reports descriptive statistics for the number of words solved in stage 2 and the baseline performance measured by the number of words solved in stage 1. Comparing the two penalty contracts that only differ in terms of the timing of the physical payment reveals a significant difference with the cash upfront payment outperforming the penalty contract without physical upfront payment (p=0.024, Mann-Whitney rank sum test). Results further reveal that participants who worked under a penalty contract with physical upfront payment solved significantly more words than those who worked under a bonus contract (p=0.003). In contrast, participants in the Penalty No Cash treatment did not exert more effort than participants in the Bonus treatment (p=0.566).

<table>
<thead>
<tr>
<th></th>
<th>Penalty Cash (n=64)</th>
<th>Penalty No Cash (n=67)</th>
<th>Bonus (n=64)</th>
<th>PC-PNC p-value</th>
<th>PC-B p-value</th>
<th>PNC-B p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>Mean 10.48</td>
<td>Mean 9.99</td>
<td>Mean 9.80</td>
<td>0.024</td>
<td>0.003</td>
<td>0.566</td>
</tr>
<tr>
<td>(Stage 2)</td>
<td>S.D. 1.57</td>
<td>S.D. 1.98</td>
<td>S.D. 1.54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>Mean 6.69</td>
<td>Mean 6.60</td>
<td>Mean 6.44</td>
<td>0.841</td>
<td>0.457</td>
<td>0.602</td>
</tr>
<tr>
<td>Performance</td>
<td>S.D. 1.39</td>
<td>S.D. 1.45</td>
<td>S.D. 1.39</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Stage 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: The table presents means and standard deviations across for the Penalty Cash (PC), the Penalty No Cash (PNC), and the Bonus (B) treatments. The last three columns report p-values obtained from two-sided Mann-Whitney rank-sum tests.

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6 Our experiment was always followed by one of two other experiments such that the total session duration was either 60 minutes or 90 minutes. As expected, neither the number of words solved in stage 1, nor in stage 2 differ statistically significantly between the shorter and longer sessions (stage 1: p=0.332, stage 2: p=0.853; Mann-Whitney rank sum tests, two-sided.)

7 All statistical tests are two-sided.
Table 2: Effect of cash upfront payment on effort under penalty contracts

<table>
<thead>
<tr>
<th></th>
<th>Number of words (1)</th>
<th>Number of words (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penalty Cash</td>
<td>0.423* (0.233)</td>
<td>0.406* (0.242)</td>
</tr>
<tr>
<td>Baseline Performance</td>
<td>0.848*** (0.0902)</td>
<td>0.855*** (0.0912)</td>
</tr>
<tr>
<td>Loss Aversion</td>
<td>-0.169 (0.102)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>-0.0954 (0.241)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>4.393*** (0.637)</td>
<td>4.832*** (0.664)</td>
</tr>
</tbody>
</table>

Note: The table presents the results of an OLS regression with robust standard errors in parentheses. The dependent variable is the performance measured as the number of solved words in stage 2. The dummy variable Penalty Cash is 1 if subject participated in the Penalty Cash treatment and 0 for participants in the Penalty No Cash treatment. Loss aversion is represented by the number of rejected lotteries in the loss aversion test. Female indicates whether the participant is female (=1) or not (=0). The sample sizes differ, because we excluded 7 participants due to inconsistent lottery choices. *, **, and *** document significance at the 10%, 5%, and 1% levels, respectively.

In addition to the descriptive results, we conducted an OLS regression analysis. First, we investigate the question of whether the money at stake is paid out in cash upfront is a driver for the effort-enhancing effect under penalty framed incentive contracts. In Specification 1 of Table 2 we regress the number of solved words in the encryption task of stage 2 on the treatment dummy variable Penalty Cash, which is 1 if individual participated in the Penalty Cash treatment and 0 for participants in the Penalty No Cash treatment. We also include baseline performance, which is the number of solved words under the fixed wage in stage 1. As expected, participants' baseline performance in stage 1 positively predicts the number of solved words under performance-based incentives. Results show that penalty contracts with physical upfront payment induce more effort than penalty contracts without physical upfront payment. However, compared to the descriptive statistics, the inclusion of baseline performance weakens the significance level of the Penalty Cash coefficient (p<0.10). In Specification 2, we further include loss aversion, which is represented by the number of rejected lotteries in the loss aversion test, and whether the participant is female, or not. Including these controls does not alter the results.
Table 3: Contract framing effect on effort in the encryption task

<table>
<thead>
<tr>
<th></th>
<th>Number of words</th>
<th>Number of words</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Penalty Cash</td>
<td>0.495**</td>
<td>0.476**</td>
</tr>
<tr>
<td></td>
<td>(0.219)</td>
<td>(0.226)</td>
</tr>
<tr>
<td>Penalty No Cash</td>
<td>0.0653</td>
<td>0.0469</td>
</tr>
<tr>
<td></td>
<td>(0.250)</td>
<td>(0.258)</td>
</tr>
<tr>
<td>Baseline Performance</td>
<td>0.770***</td>
<td>0.781***</td>
</tr>
<tr>
<td></td>
<td>(0.0711)</td>
<td>(0.0737)</td>
</tr>
<tr>
<td>Loss Aversion</td>
<td></td>
<td>-0.106</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0820)</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>-0.255</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.200)</td>
</tr>
<tr>
<td>Constant</td>
<td>4.838***</td>
<td>5.197***</td>
</tr>
<tr>
<td></td>
<td>(0.483)</td>
<td>(0.519)</td>
</tr>
</tbody>
</table>

N 195 184
R-squared 0.417 0.423

Note: The table presents the results of an OLS regression with robust standard errors in parentheses. The dependent variable is the performance measured as the number of solved words in stage 2. The dummy variable Penalty Cash is 1 if subject participated in the Penalty Cash treatment and 0 for in the Bonus Cash treatment. The dummy variable Penalty No Cash is 1 if subject participated in the Penalty No Cash treatment and 0 for participants in the Bonus Cash treatment. Loss aversion is represented by the number of rejected lotteries in the loss aversion test. Female indicates whether the participant is female (=1) or not (=0). The sample sizes differ, because we excluded 11 participants due to inconsistent lottery choices. *, **, and *** document significance at the 10%, 5%, and 1% levels, respectively.

Next, we analyze the effort enhancing effect of penalty contracts with and without a cash upfront payment compared to the bonus contract. Specifications 1 and 2 of Table 3 report the corresponding estimates. Note that both treatment dummies Penalty Cash and Penalty No Cash are 0 for the Bonus treatment and take on the value 1 if the participant worked under a penalty contract with a cash upfront payment or without a cash upfront payment, respectively. In line with the descriptive statistics and previous literature, the results show that when a cash upfront payment is in place, penalty contracts induce significantly more effort than economically-equivalent bonus contracts. Without the cash upfront payment, there is no effort-enhancing effect of the penalty contract compared to the bonus contract. We therefore conclude that in our experiment cash upfront payment is crucial for enhancing effort under loss contracts.

### 3.2. Reciprocity as a driver of effort provision

One potential driver of the effort enhancing effect of the cash payment could be positive reciprocity (Falk and Fischbacher 2006; Rabin 1993). Reciprocity means that people respond favorably to intentional actions perceived as positive, whereas they respond unfavorably to those perceived as negative (Fehr and Gächter 2000). Thus, if people regard the cash upfront payment as a kind action, they might return more effort. Therefore, one possibility is that positive reciprocity in response to receiving an upfront cash payment induces higher effort irrespective of any fear of losing the money. To analyze this possibility, we use stage 1 of the experiment and examine the effect of upfront cash...
payments on effort under a fixed wage. Table 1 presents the means and standard deviations of the number of solved words under the fixed wage in stage 1 across the three treatments. Pairwise comparisons reveal that there are no statistically significant differences in baseline performance across the treatments. Therefore, we suggest that the effort-enhancing effect of the physical upfront payment under penalty contracts is not due to a positive reciprocation of the cash upfront payment, as effort provision in stage 1 is not affected by physical possession of the fixed wage.

4. Discussion and conclusion

Experimental evidence on the effectiveness of penalty contracts is ambiguous (see Table A.1 in Appendix A). A closer look at the literature reveals that existing studies differ considerably in their design choices. We contribute to the ongoing methodological debate by examining the relevance of the cash upfront payment as a driver of contract framing effects. First, we compare effort provision when working under two penalty contracts that only differ in terms of the timing of the physical payment. In the Penalty Cash treatment, participants solved significantly more tasks as compared to Penalty No Cash treatment. Second, we find that in comparison to a Bonus treatment, the Penalty Cash treatment leads to significantly higher effort provision, but not the Penalty No Cash. Based on our findings, we conclude that the effort-enhancing effect of penalty contracts is considerably driven by a cash upfront payment handed out prior to working on the task.

There are several potential reasons as to why the cash handout in the Penalty Cash treatment fosters higher effort provision. First, based on effort-provision in stage 1 of the experiment, we can exclude that positive reciprocity in response to receiving a cash payment drives the results. Second, handing out the cash upfront could affect participants’ beliefs that it is highly likely or the norm to reach the target. However, while we cannot rule out this possibility, we believe that it is rather unlikely, given that participants got well acquainted with the task in stage 1 and received feedback about their own performance, allowing them to use this knowledge in their assessment of stage 2. Finally, a more likely driver behind our results could be that holding the cash upfront payment in one’s hands increased its salience and in turn induced a stronger feeling of ownership. Reb and Connolly (2007) experimentally examined the effect of physical possession of a good in contrast to factual ownership on participants’ subjective feeling of ownership. They concluded that the endowment effect (Thaler 1980), which states that people tend to value a good more highly when they own it, results from perceived ownership induced by physical possession. Physical possession could thus induce a stronger shift of the reference point (Kahneman and Tversky 1979) and therefore, given loss aversion, foster effort provision. Following this argumentation, our results might be due to an increase in the salience of the upfront

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8 Prior lab experiments show that reference points can be systematically shifted (e.g., Abeler et al. 2011; Hack and von Bieberstein 2015). Although these shifts are often due to varying expectations, de Quidt (2018) showed that a model combining status quo and expectations-based reference points can produce framing effects.
payment, which in turn reinforces the feeling of ownership and induces a greater fear of losing the money. Further research is warranted to provide a deeper understanding of the underlying mechanisms.

Furthermore, future research could deepen our understanding of the driving factors behind framing effects and could broaden our understanding of the interplay with different factors. For example, Czibor et al. (2022) find that penalty contracts do not lead to an increase in performance, but they observe an increase in theft, suggesting that there are important behavioral spillover effects of framed contracts. This could further be extended to the interplay between supervisor remuneration and employee engagement (e.g., Hendriks et al. 2022 for CEO compensation and employee effort). In addition, the threat of employees having to actually pay back money could have an effect on the social sustainability of the firm (Tipu 2022), that future research could investigate. Related to our design choices, we believe that the implemented real effort task (Benndorf et al. 2019), as well as the choice and parametrization of the incentive contracts conditioning a substantial fraction of the maximum payoff on a challenging, yet achievable, performance target might be conductive to inducing a relatively large framing effect. Learning more about framing effects in different tasks or with different targets could prove to be an important avenue for future research.

In sum, our contribution to the methodological discussion about the implementation of framing experiments in the laboratory is straightforward: In order to use scarce resources efficiently, we recommend including cash upfront payments when aiming for eliciting a contract framing effect or analyzing its consequences. Our findings suggest physical possession of the money as a simple and valid tool to successfully induce framing effects in a laboratory setting and point out the importance of design choices when conducting research on framed incentives.
## Appendix A

### TABLE 3: Overview of laboratory and online experiments on contract framing

<table>
<thead>
<tr>
<th>Study</th>
<th>Cash upfront</th>
<th>Penalty effect</th>
<th>Effect size Hedge's g</th>
<th>Country</th>
<th>Subjects</th>
<th>Lab / online</th>
<th>N B, P</th>
<th>Task</th>
<th>Fixed pay</th>
<th>Variable pay B, P</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferraro and Tracy 2022</td>
<td>Yes</td>
<td>Yes</td>
<td>0.12</td>
<td>US</td>
<td>Students</td>
<td>Lab</td>
<td>268, 268</td>
<td>Counting numbers</td>
<td>None</td>
<td>$ 0.25</td>
<td>No</td>
</tr>
<tr>
<td>Goldsmith and Dhar 2013</td>
<td>Yes</td>
<td>Yes</td>
<td>0.68</td>
<td>US</td>
<td>Students</td>
<td>Lab</td>
<td>31, 31</td>
<td>Anagrams</td>
<td>None</td>
<td>$ 0.25</td>
<td>No</td>
</tr>
<tr>
<td>Grolleau et al. 2016</td>
<td>Yes</td>
<td>No</td>
<td>0.03</td>
<td>France</td>
<td>Students</td>
<td>Lab</td>
<td>150, 150</td>
<td>Finding numbers</td>
<td>None</td>
<td>€ 1.50 per task</td>
<td>No</td>
</tr>
<tr>
<td>Hannan et al. 2005</td>
<td>Yes</td>
<td>Yes</td>
<td>0.54</td>
<td>US</td>
<td>Students</td>
<td>Lab</td>
<td>35, 33</td>
<td>Chosen effort</td>
<td>$ 20</td>
<td>$ 10</td>
<td>Yes</td>
</tr>
<tr>
<td>Hochman et al. 2014 (Exp. 2A)</td>
<td>Yes</td>
<td>Yes</td>
<td>0.8</td>
<td>Israel</td>
<td>Students</td>
<td>Lab</td>
<td>25, 25</td>
<td>Answering Questionnaires</td>
<td>None</td>
<td>7 or 9 NIS</td>
<td>No</td>
</tr>
<tr>
<td>Imas et al. 2017</td>
<td>Yes</td>
<td>Yes</td>
<td>0.49</td>
<td>US</td>
<td>Students</td>
<td>Lab</td>
<td>40, 43</td>
<td>Slider task</td>
<td>None</td>
<td>T-shirt (cost $ 9)</td>
<td>Yes</td>
</tr>
<tr>
<td>von Bieberstein et al. 2020</td>
<td>Yes</td>
<td>Yes</td>
<td>0.54</td>
<td>Germany</td>
<td>Students</td>
<td>Lab</td>
<td>33, 34</td>
<td>Encrypting letters</td>
<td>€ 10</td>
<td>€ 0.50 per task</td>
<td>No</td>
</tr>
<tr>
<td>Armantier and Boly 2015</td>
<td>No</td>
<td>Yes</td>
<td>0.46</td>
<td>Canada</td>
<td>Students</td>
<td>Lab</td>
<td>58, 56</td>
<td>Grading exams</td>
<td>C$ 2.08</td>
<td>C$ 6.25/10.42/18.75</td>
<td>Yes</td>
</tr>
<tr>
<td>Brooks et al. 2012</td>
<td>No</td>
<td>No</td>
<td>0.26</td>
<td>Switzerland</td>
<td>Students</td>
<td>Lab</td>
<td>72, 73</td>
<td>Chosen effort</td>
<td>CHF 20</td>
<td>CHF 5</td>
<td>Yes</td>
</tr>
<tr>
<td>Brooks et al. 2017</td>
<td>No</td>
<td>Yes</td>
<td>n/a</td>
<td>Germany</td>
<td>Students</td>
<td>Online</td>
<td>50/50/54/39</td>
<td>Counting numbers</td>
<td>€ 0/5/15/50</td>
<td>€ 1 beyond the threshold</td>
<td>Yes</td>
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<tr>
<td>Church et al. 2008</td>
<td>No</td>
<td>Yes</td>
<td>n/a</td>
<td>Canada</td>
<td>Students</td>
<td>Lab</td>
<td>36, 32</td>
<td>Encrypting symbols</td>
<td>$ 10</td>
<td>$ 10</td>
<td>Yes</td>
</tr>
<tr>
<td>DellaVigna and Pope 2018</td>
<td>No</td>
<td>No</td>
<td>0.07</td>
<td>US</td>
<td>MTurkers</td>
<td>Online</td>
<td>545, 532</td>
<td>Pressing a-b keys</td>
<td>$ 1</td>
<td>$ 0.4</td>
<td>Yes</td>
</tr>
<tr>
<td>de Quidt et al. 2017</td>
<td>No</td>
<td>No</td>
<td>0.07</td>
<td>US</td>
<td>MTurkers</td>
<td>Online</td>
<td>429, 424</td>
<td>Encrypting letters</td>
<td>$ 0.50</td>
<td>$ 1.50</td>
<td>Yes</td>
</tr>
<tr>
<td>de Quidt 2018</td>
<td>No</td>
<td>Yes</td>
<td>-0.5</td>
<td>US</td>
<td>MTurker</td>
<td>Online</td>
<td>153 – 193, 151 – 191</td>
<td>Transcribing text strings</td>
<td>$ 0.5 – $ 2</td>
<td>$ 1.5 – $ 3</td>
<td>Yes</td>
</tr>
<tr>
<td>Essl and Jaussi 2017</td>
<td>No</td>
<td>No</td>
<td>0.30</td>
<td>Switzerland</td>
<td>Students</td>
<td>Lab</td>
<td>34, 30</td>
<td>Counting numbers</td>
<td>None</td>
<td>CHF 0.4 / 0.6</td>
<td>No</td>
</tr>
<tr>
<td>Goldsmith and Dhar 2013</td>
<td>No</td>
<td>Yes</td>
<td>0.26</td>
<td>US</td>
<td>MTurker</td>
<td>Online</td>
<td>134, 134</td>
<td>Anagrams</td>
<td>$ 0.5</td>
<td>$ 0.02</td>
<td>No</td>
</tr>
<tr>
<td>Liu and Zhang 2015</td>
<td>No</td>
<td>No</td>
<td>-0.24</td>
<td>US</td>
<td>Students</td>
<td>Lab</td>
<td>31, 34</td>
<td>Symbol decoding task</td>
<td>$ 10</td>
<td>$ 5</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Notes: The table presents details of the experimental designs of previous lab and online studies. B=Bonus, P=Penalty, C$=Canadian Dollar, FCFA=CFA Franc, €=Euro, NIS=New Israeli Shekel, CHF=Swiss Franc, US Dollar.
Appendix B: Experimental instructions

General instructions

Welcome.

Please read the instructions carefully. All participants get the same information:

- In this experiment, you will be paid in cash according to your decisions.
- All decisions, answers and payments are anonymous, i.e. no participant will know the amount of money the other participants receive.
- The experiment consists of 4 parts and a questionnaire.
- You are not allowed to communicate with other participants, use a mobile phone, or start any computer application. If you violate these rules, you will be excluded from the experiment and the payments.
- If you have any questions, please raise your hand. An experimenter will then come to you and answer your question.

Thank you very much for participating and have fun!

Please start reading the instructions for part 1 of the experiment on your computer screen now.
Part 2

In part 2, we ask you to encode capital letters into three-digit numbers. You have 3 minutes and receive 5 CHF.

- Each task consists of 5 capital letters to be coded.
- Coding means that a three-digit number must be assigned to each of the 5 capital letters.
- An encryption code indicates the numbers to be assigned to the respective letters.
- You can find the encryption code in a table below the letters to be coded.

Here you see one task as an example:

<table>
<thead>
<tr>
<th>Encryption</th>
<th>I</th>
<th>X</th>
<th>T</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>326</td>
<td>983</td>
<td>443</td>
<td></td>
</tr>
</tbody>
</table>

- In this task, the participant has to code the 5 letters: "I", "X", "Y", "T" and "C". The solution can be taken directly from the encryption code:
  - The correct number for "I" is 326 (see participant's entry in the example)
  - The correct number for "X" is 983 (see participant's entry in the example)
  - The correct number for "Y" is 443 (see participant's entry in the example)
  - The correct number for "T" is 230
  - The correct number for "C" is 271
- To make an entry, please click in the blue entry field below the respective letter.
- With the tab key you can switch from one entry field to the next.
- When you have completed a task, i.e. when you have coded all 5 letters into 3-digit numbers, please click the OK button.
- Only after you clicked the OK button, you will learn whether you solved the task correctly.
- If you solved the task correctly, you can start with the next task. Please note that a new encryption code is generated for each task.
- If you solved the task incorrectly, you will be asked to solve the same task again.
If you have any question, please raise your hand. The experimenter will then come to you and help.

If you have no further questions, please klick "Next" on your computer screen.
In part 3, you face the same exercise as in part 2.

- You receive a total of **20 tasks**.
- You have **exactly 4 minutes** to complete these tasks.
- It is exactly the same type of task as you did in part 2.
- Again, one task consists of 5 capital letters to be coded. In each task, a 3-digit number must be assigned to each of the 5 letters. The input mask and the general conditions correspond to those of part 2 (see instructions for part 2).
- In contrast to part 2, your payment in part 3 depends partly on how many tasks you complete.

**Your payment**

- You receive **5 CHF**.
- If you solve **at least 12 tasks**, you will receive an **additional 10 CHF and your payment is 15 CHF**.
- If you solve **less than 12 tasks**, you will **not receive any additional payment**.

**Examples:**

- Assume you solve **between 12 and 20 tasks**, then you **receive additional 10 CHF** on top of your 5 CHF.
- Assume you solve **between 0 and 11 tasks**, then you do **not receive an additional payment** on top of your 5 CHF.

We now ask you to answer 2 comprehension questions on the screen. **Afterwards, you receive 5 CHF from the experimenter and you can start with part 3.**

If you have no further questions, please click "Next" on your computer screen.
Part 3

In part 3, you face the same exercise as in part 2.

- You receive a total of **20 tasks**.
- You have **exactly 4 minutes** to complete these tasks.
- It is exactly the same type of task as you did in part 2.
- Again, one task consists of 5 capital letters to be coded. In each task, a 3-digit number must be assigned to each of the 5 letters. The input mask and the general conditions correspond to those of part 2 (see instructions for part 2).
- In contrast to part 2, your payment in part 3 depends partly on how many tasks you complete.

**Your payment**

- You receive **5 CHF**.
- If you solve **at least 12 tasks**, you **may keep the 15 CHF**.
- If you solve **less than 12 tasks**, you must **pay back 10 CHF** and your payment **is 5 CHF**.

**Examples:**

- Assuming you solve **between 12 and 20 tasks**, you **keep your 15 CHF**.
- Assuming you solve **between 0 and 11 tasks**, you have to **pay back 10 CHF** of your **15 CHF and keep 5 CHF**.

We now ask you to answer 2 comprehension questions on the screen. **Afterwards, you receive 5 CHF from the experimenter and you can start with part 3.**

If you have no further questions, please klick “Next” on your computer screen.
References


Ferraro PJ, Tracy JD (2022) A reassessment of the potential for loss-framed incentive contracts to increase productivity: a meta-analysis and a real-effort experiment. Experimental Economics. https://doi.org/10.1007/s10683-022-09754-x


