To Give Up or Not to Give Up: The Effect of Contract Frame and Target Difficulty on Effort Provision and Performance

ABSTRACT

Bonus contracts are often used in practice but can create incentives for gaming. Penalty contracts are growing in popularity as they can provide the benefit of motivating greater effort than bonus contracts. However, we do not have a clear understanding of how individuals are motivated by penalty contracts at different target levels in relation to bonus contracts. We experimentally evaluate the effects of contract frame and target difficulty on effort provision and performance. Building from Prospect Theory, we predict and find that subordinates working under a penalty contract show greater giving up behavior than those working under a bonus contract when given a high target, but not with a low target. Notably, however, subordinates who do not give up show higher performance under a penalty compared to a bonus contract when given a high target, but lower performance when working towards a low target.

1. Introduction

Bonus contracts are prevalent in practice but have come under scrutiny in recent years for creating incentives to game performance measures to maximize pay (deHaan, Hodge, and Shevlin 2013). Penalty contracts offer an attractive alternative, given research findings that subordinates work harder under penalty contracts (Luft 1994; Hannan, Hoffman, and Moser 2005; Church, Libby, and Zhang 2008; Hossain and List 2012). Indeed, the popularity of penalty contracts is growing. For example, Merrill Lynch penalizes its financial advisors 2% of their pay if they do not meet targets for growth and new client acquisition (Horowitz and Braswell 2017, 2018), while other firms use a combination approach, in which top performers receive a bonus and bottom performers are subject to a penalty (Kristensen 2017; Cai, Gallani, and Shin 2018; Van der Stede, Wu, and Wu 2020). These developments follow practitioner articles encouraging firms to consider using penalties to improve performance (The Economist 2010, 2021; Lapowsky 2013).

The appeal of penalty contracts comes from a breadth of research that documents greater effort and performance under penalty contracts compared to bonus contracts because penalty contracts activate loss aversion (Luft 1994; Hannan et al. 2005; Church et al. 2008; Fryer, Levitt, List and Sadoff 2012; Hossain and List 2012; Brink and Rankin 2013; De Quidt et al. 2017). Loss aversion motivates subordinates to work harder to avoid incurring a loss under a penalty contract than to earn a gain of equal magnitude under a bonus contract (Kahneman and Tversky 1979). However, this research does not account for subordinates' potential to give up on the task and their responses to varying target difficulty under different contract frames. The performance target and its corresponding difficulty can change subordinates' effort choices and may have different effects for subordinates working under a penalty compared to a bonus contract.

1

Goal setting theory asserts that difficult but achievable targets elicit the highest motivation and effort (see Locke and Latham 1990, 2002 for a review of goal-setting theory). However, research supporting goal-setting theory generally examines the effect of target difficulty on performance using either no financial incentive or a bonus for achieving the target. There is a paucity of analyses concerning how different target levels affect motivation and effort under a penalty contract. Further, research demonstrates that supervisors tend to set lower targets for subordinates who are operating under a penalty contract (Martin, Thomas, and Yatsenko 2021), which, according to goal-setting theory, should result in lower motivation and, thus, lower effort. While penalty contracts may motivate greater effort in general compared to bonus contracts, we do not have a clear understanding of how individuals are motivated by contract frame under different target levels. Thus, we seek to provide a more nuanced understanding of motivation and effort under penalty compared to bonus contracts by examining the influence of contract frame on subordinates' giving up behavior and performance under differing targets.

Once subordinates identify that a target cannot be achieved, they are less motivated to exert effort toward achieving the target (Locke and Latham 1990, 2002). Further, individuals tend to give up and stop exerting effort after trying different strategies and determining that low performance may be due to lower ability, which shows that giving up behavior can manifest over time (Hannan, Krishnan, and Newman 2008; Berger, Klassen, Libby, and Webb 2013). Initially missing a target places the subordinate in a loss frame of mind (Heath, Larrick, and Wu 1999), which can lead to greater subsequent effort to avoid missing the target again (Kahneman and Tversky 1979). If this increased effort continues to result in missing the target, subordinates are likely to subsequently give up (Becker and Huselid 1992; Lynch 2005; Harbring and Irlenbusch 2008).

While a difficult target can increase motivation and effort, it also increases the likelihood that subordinates do not meet the target. Subordinates working under a bonus contract will start in a gain frame of mind, and loss aversion will be newly activated if they miss the target, which will drive higher effort in the following period. However, subordinates working under a penalty contract start in a loss frame, so they are already motivated to do their best to avoid missing the target. Missing the target despite already giving additional effort so as not to miss the target will increase the likelihood of the subordinates giving up. Conversely, easily achievable targets increase the likelihood that subordinates will meet the target. Hence, the likelihood that an easy target will prompt greater loss aversion and giving up behavior is low regardless of whether the subordinate works under a bonus or penalty contract. Therefore, we argue that subordinates working under a penalty contract will exhibit more giving-up behavior than those working under a bonus contract with a high target but not with a low target.

Prior studies demonstrate penalty contracts can lead to higher effort than bonus contracts, and we seek to extend this research by evaluating the effect of contract frame on subordinates' performance at different target levels, accounting for potential giving up behavior. One factor that can lead to higher effort under a penalty compared to a bonus contract is that high effort is needed to reach the target. Those working under a penalty contract are more highly motivated to work harder to not incur the penalty compared to earn the bonus as individuals are more motivated to avoid a loss than earn a gain. When the target is easy, however, the threat of a loss is much lower as subordinates can likely achieve the target with a low level of effort, which makes the financial incentive less effective at motivating additional effort under a penalty contract (Church et al. 2008). Further, penalty contracts can lead to disutility and negative sentiment, which, in turn, can reduce subordinates' motivation to exert effort beyond the target

given (Luft 1994; Hannan et al. 2005; Christ, Sedatole, and Towry 2012; Christ 2013). As such, subordinates working under a penalty contract may actively seek to limit their effort to the perceived minimum necessary to avoid the penalty. Conversely, a bonus contract can garner positive sentiment, utility, and a sense of reward, which will not lead to the same desire to limit effort to the perceived minimum necessary and, thus, can potentially motivate greater performance under a bonus compared to a penalty contract with an easy target.

When considerable effort is needed to achieve the target, the financial incentive can effectively motivate effort, which can lead to higher effort under a penalty contract compared to a bonus contract, consistent with prior research (Luft 1994; Hannan et al. 2005; Church et al. 2008; Fryer et al. 2012; Hossain and List 2012; Brink and Rankin 2013; De Quidt et al. 2017). Being loss averse, subordinates working under a penalty contract will be motivated to exert effort to achieve the target and avoid incurring the penalty. This will lead subordinates under a penalty contract to exert greater effort to achieve a high target compared to those working under a bonus contract, provided they do not give up. Thus, we argue that even though a high target can lead to giving up behavior under a penalty contract, a high target can also lead to greater performance under a penalty contract compared to a bonus contract for those motivated to achieve the target. Overall, we predict that, given the subordinate is motivated to achieve the target, a high target will lead to greater performance under a penalty vs. a bonus contract, while an easy target will lead to lower performance under a penalty vs. a bonus contract.

We test our hypotheses using a 2 (Bonus/Penalty) × 2 (Low/High) between-participant experimental design. Participants in the study work on an effort-based symbol search task under either a bonus or a penalty contract set to be economically equivalent. They work for eight periods with an option to give up in each period and are given either a low or a high target to

4

achieve in the period. Receiving the bonus, or not being subject to the penalty, is dependent on the participant meeting the given target of correctly submitted symbol grids.

The experimental results are consistent with our predictions. We find target difficulty moderates the effect of contract frame on giving up behavior, such that subordinates are more likely to give up under a penalty contract compared to a bonus contract with a high target but not with a low target. For those who do not give up and, instead, choose to continue exerting effort towards achieving the target, performance is higher under a penalty contract compared to a bonus contract with a high target but is *lower* under a penalty contract compared to a bonus contract with a low target. In a supplemental analysis, we find that the lower trust driven by penalty contracts documented in prior research is only an issue for those who choose to give up. For those who choose to continue to exert effort towards achieving the goal, there is no difference between penalty and bonus conditions in how much subordinates trust their superiors.

We make several contributions to the accounting literature. First, we show that penalty contracts lead to a differential likelihood of giving up behavior compared to bonus targets, and that relationship is moderated by target difficulty. Specifically, a penalty contract coupled with a high target leads to a quicker decision to decrease effort once the target is missed. Thus, we extend prior research on penalty contracts by identifying faster self-sorting of subordinates by self-perceived ability relative to target difficulty.

Second, we identify the moderating effect of target difficulty on how contract frame affects performance after allowing for giving up behavior. Penalty contracts lead to higher performance with a high target for those who choose to continue exerting effort, in line with previous research findings. However, with a low target, penalty contracts lead to lower

performance than bonus contracts. Thus, it is important to consider the difficulty of targets in determining the effectiveness of penalty contracts in motivating more effort.

Lastly, prior research documents that superiors tend to set lower targets when their subordinates are working under a penalty contract (Martin et al. 2021) and we document that subordinates working under a penalty contract have lower performance than those working under a bonus contract when the target is low. Thus, firms may not see the additional performance benefits of penalties documented in prior studies.

2. *Literature Review*

Prior studies provide evidence that penalty contracts motivate greater effort than bonus contracts as penalty contracts tend to place subordinates in a loss frame of mind, which elicits loss aversion (Luft 1994; Hannan et al. 2005; Church et al. 2008; Fryer et al. 2012; Hossain and List 2012; Brink and Rankin 2013; De Quidt et al. 2017). As individuals experience greater disutility from a loss than utility from a gain of equal magnitude, they are more motivated to work harder to avoid incurring a loss under a penalty contract than to earn a gain under a bonus contract (Kahneman and Tversky 1979). A performance target can also change effort choices, as the motivation a target provides consists of (1) directing effort towards aspects that will help the individual reach the target and (2) determining effort intensity. Research demonstrates that individuals' effort choices can follow goal-setting theory when working under a bonus contract, in that motivation and effort are highest under a difficult but achievable target. However, there is a paucity of analyses concerning individuals' motivation effects at different target levels under a penalty contract.

2.1. CONTRACT FRAME AND GIVING UP BEHAVIOR

Prior studies evaluating performance in tournaments demonstrate that low performers can display giving up behavior, which occurs over time after trying varying strategies and determining that the low performance can be due to lower ability (Hannan et al. 2008; Berger et al. 2013). Goal-setting theory argues that individuals are motivated by difficult but achievable targets, but overly difficult targets can be demotivating (see Locke and Latham 1990, 2002). Similar to the prior research in a tournament setting, once subordinates identify that the target cannot be achieved, they are less motivated to exert effort toward achieving the target. We posit that under a penalty contract, individuals working toward a high target will more quickly identify the difficulty of the target, compared to a bonus contract, and will be more likely to display giving up behavior.

Penalty contracts can elicit loss aversion and motivate increased effort so as not to incur a penalty. However, prior research finds that not achieving goals or targets can also lead to loss aversion, because targets can serve as reference points, such that falling short of a target is viewed as a loss, while meeting or exceeding the target is viewed as a gain, even when the underlying performance is the same (Heath et al. 1999). Consequently, the level of target is not as important as the reference in determining reactions to performance, as achieving higher performance but missing a target is more disappointing than achieving lower performance but hitting a target. As missing a target is viewed as a loss, loss aversion is triggered when an individual misses a target. Following Prospect Theory (Kahneman and Tversky 1979), individuals placed in a loss frame will exert greater subsequent effort to avoid incurring a loss again. Thus, missing a target in one period can motivate a subordinate to work harder the next period to avoid missing the target again. However, there are limits to the effectiveness of loss

7

aversion in driving greater effort, as repeatedly missing a target and remaining in a loss frame will cause the individual to give up (Becker and Huselid 1992; Lynch 2005; Harbring and Irlenbusch 2008).

When a target is relatively easy there is a high likelihood that subordinates will achieve the target and, thus, a low likelihood that the target will elicit greater loss aversion and giving up behavior, regardless of whether the subordinate works under a bonus or penalty contract. Conversely, a difficult target can increase motivation and effort but also increases the likelihood that subordinates do not meet the target. Because of this, we argue that a difficult target can lead to differing behavior by subordinates working under a bonus versus a penalty contract.

Subordinates working under a bonus contract will start in a gain frame of mind. If they miss the target, loss aversion will be activated, driving higher effort in the subsequent period. However, subordinates working under a penalty contract start in a loss frame, so they are already motivated to give additional effort due to loss aversion to avoid missing the target. Missing the target despite already giving additional effort so as not to miss the target will increase the likelihood of subordinates giving up. These subordinates are already in a loss frame, so missing the target does not provide as much of a motivating effect to continue exerting effort. Thus, we argue that subordinates working under a penalty contract will exhibit more giving-up behavior, than those working under a bonus contract when the target is difficult but not when the target is easy, leading to the following hypothesis:

H1: Target difficulty will moderate the effect of contract frame on giving up behavior, such that subordinates will be more likely to give up under a penalty contract compared to a bonus contract when they have a high vs. a low target.

2.2.   CONTRACT FRAME AND PERFORMANCE

Individuals tend to prefer bonus contracts over penalty contracts for three documented reasons. First, bonus-framed contracts provide higher non-monetary utility compared to identical penalty-framed contracts (Luft 1994), because bonuses offer a positive connotation of achievement, approval, and reward, providing positive non-monetary utility when earned, but avoiding a penalty does not induce the same positive effect. Conversely, being subject to a penalty feels condemning and punishing, leading to disutility, while failing to earn a bonus has less of a negative connotation. Thus, individuals can derive non-monetary positive utility from bonus contracts and negative non-monetary utility from penalty contracts. Second, a potential bonus is perceived as more valuable than compensation of economic equivalence that includes a potential penalty due to loss aversion (Luft 1994; Hannan et al. 2005). Third, contract frame can affect perceptions of fairness and trust between superiors and subordinates, such that implementing a bonus contract leads to greater trust, whereas implementing a penalty contract can prompt distrust (Christ et al. 2012). Thus, prior research documents a strong subordinate preference for bonus contracts due to non-monetary utility, loss aversion, and trust effects. We argue that this preference can drive differences in subordinates' performance under bonus versus penalty contracts with differing target levels.

Prior studies demonstrate that subordinates working under a penalty contract provide higher effort than those working under a bonus contract to avoid incurring the penalty. However, this assumes that high effort is needed to avoid the penalty. With an easy target, it is more likely that subordinates can achieve the target with a low level of effort. Church et al. (2008) find that when financial incentives are not effective in motivating additional effort, penalty contracts are not likely to lead to greater effort over bonus contracts. With an easy target, subordinates

9

working under a penalty contract have a high likelihood of achieving the target. As such, high effort driven by loss aversion is not needed to avoid the penalty and the financial incentive is less effective in motivating effort. Further, prior research shows that penalty contracts can lead to disutility and negative sentiment, which, in turn, can reduce subordinates' motivation to exert effort beyond the target given (Luft 1994; Hannan et al. 2005; Christ et al. 2012; Christ 2013). As such, subordinates may actively seek to limit their effort to the perceived minimum necessary to avoid the penalty. Conversely, a bonus contract can elicit a gain frame, positive sentiment, utility, and a sense of reward. Thus, subordinates working under a bonus with an easy target will feel more positive about achieving the reward and not feel the same desire to limit their effort to the perceived minimum necessary to achieve the target.

When the target is relatively difficult, however, considerable effort is needed to achieve the target. In this case, the financial incentive can be effective in motivating higher effort to achieve the target, which we posit can lead to higher effort under a penalty contract compared to a bonus contract, consistent with prior research (Luft 1994; Hannan et al. 2005; Church et al. 2008; Fryer et al. 2012; Hossain and List 2012; Brink and Rankin 2013; De Quidt 2017). Subordinates working under a penalty contract, being loss averse, will be motivated to exert effort to achieve the target and avoid incurring the penalty. Therefore, these subordinates will exert greater effort to achieve a high target compared to those under a bonus contract, provided they do not give up. Thus, we argue that even though a high target can lead to giving up behavior under a penalty contract, a high target can also lead to greater performance under a penalty contract compared to a bonus contract for those motivated to achieve the target. Overall, we predict an interaction between contract frame and target difficulty on performance, such that high

targets will lead to higher performance, but easy targets will lead to lower performance under a penalty contract versus a bonus contract, provided subordinates do not give up.

> **H2:** Provided subordinates do not give up, target difficulty will moderate the effect of contract frame on performance, such that subordinates will achieve higher performance under a penalty contract compared to a bonus contract with a high target but lower performance with a low target.

3. Research Design

3.1. PARTICIPANTS

We recruit student participants from a pool maintained at the behavioral research lab in a large state university in the midwestern region of the US and collect completed responses from 149 participants.[1] We remove observations from 2 participants who refreshed the page when working on the grids in at least one round, which resulted in these participants spending more than the allowed 5 minutes in that round.[2] Thus, our sample consists of 147 participants: 113 female, 33 male, and 1 who preferred not to say. On average, participants are 21.7 years old with 37 months of work experience, including 11 months of supervisory work experience.

3.2. SETTING AND PROCEDURE

Participants perform a symbol search task in which they count the number of times a search symbol appears in a 9×18 grid. We randomly generate the grids ahead of time and all participants view the same grids presented in the same order. The symbols in the grids are capital letters in Symbol font (See Appendix B for an example). We present the grids to participants as images to prevent any automated counting of symbols.

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[1] IRB approval was granted by the institution at which the experiment took place.
[2] Due to Qualtrics limitations we were not able to effectively prevent participants from refreshing the page and thus resetting the timer. However, we included non-alterable time stamps at the beginning and end of each round which we used to check for this issue after data collection. We also warned participants not to refresh the page during the study. We removed all data from the 2 participants who refreshed the page, as their perception of the task may have changed after they realized they could get more time in each round. Removing only the rounds in which these participants refreshed the page (while keeping the unaffected rounds) does not change our inferences.

Participants click on a Qualtrics survey link to go through the experimental instrument. Upon consenting to participate in the study, participants read general information explaining the symbol search task and go through a practice period in which they count symbols in four grids. Participants must enter the correct answer for each grid before proceeding, and the correct answer is displayed if an incorrect (or no answer) is given. Immediately after the practice period, participants respond to questions as to the attractiveness of the task, which is followed by a description of their compensation and their performance target. Participants are then given a comprehension quiz and must answer each question correctly to proceed.

The main task starts after the comprehension quiz and consists of eight production periods with a 15-second break between periods. Participants work on the symbol search task for five minutes each period, with a count-down timer displayed on the screen. They have the option to 'give up' at any time after a period begins by clicking "End Period Now", displayed in the bottom right corner of the screen. After each production period or when the participant clicks "End Period Now", a summary screen shows participants the number of grids they solved correctly and the time the round was started and ended. Following the eight production periods, participants answer a post-experimental questionnaire, including demographic information, and learn their pay.

Participants' pay consists of a guaranteed payment of $5 for completing the study, incentive pay (described further below) based on one randomly chosen period, and $0.01 for every unused second in the same randomly chosen period. On average, participants completed the study in 47 minutes and earned $10.67.

3.3.   MANIPULATIONS AND VARIABLES

We manipulate the type of incentive contract as either a bonus or a penalty contract. In the bonus contract condition, participants are informed that they will receive a fixed payment of $5 and can earn a bonus of $12. In the penalty contract condition, participants are informed that they will receive a fixed payment of $17 but can be subject to a $12 penalty. The contracts are set to be economically equivalent. See Appendix C for details.

We manipulate target difficulty at two levels, low and high, and set the target difficulty using a separate sample of participants recruited from the same participant pool. In the pilot study, participants perform the same task as in the main study for four rounds of five minutes each. Participants are paid $0.75 for each correctly counted grid in a randomly chosen round. Approximately 75 percent of participants completed 6 grids and 25 percent completed 10 grids. Based on this sample, we set the low target at 6 grids and the high target at 10 grids.[3]

Our first dependent variable is giving-up behavior. As the primary measure of this variable, we create a dichotomous variable, "*GiveUp10,*" coded as 1 if a participant decides to end a round in less than 10 seconds, as ending the round in such a short time is suggestive of not trying to achieve the target, and zero otherwise.[4] Our second dependent variable is performance in periods in which the participant did not give up. We measure performance as the number of correctly solved grids in a period.

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[3] We chose to hold the bonus/penalty amount constant across the different target levels. Thus, the *expected* compensation is not held constant across target difficulty levels. However, our hypotheses are primarily concerned with differences between contract frame within target level and holding total compensation constant is more essential to the test of our theory than holding expected compensation constant.
[4] As a robustness check, we use other variations of the giving up measure with different cutoffs, such as "*GiveUp5,*" and "*GiveUp15*" indicating finishing a round within the first 5 and 15 seconds, respectively.

4. Results

4.1. MANIPULATION CHECKS

We confirm successful manipulations of contract frame and target difficulty with post-experimental questions. For the contract frame manipulation, we ask participants the following post-experimental question: "Whenever I missed the target, I lost money," measured on a 7-point Likert scale with endpoints of "1 = Strongly Disagree" and "7 = Strongly Agree." The mean response indicates a significant difference in how participants perceived the contract (Bonus = 4.09 vs. Penalty = 5.14, $p < 0.001$, two-tailed). Participants in the penalty contract frame viewed missing the target as a loss to a greater extent than participants in the bonus contract frame, indicating a successful manipulation of contract frame.

We ask participants three post-experimental questions concerning their perception of the difficulty of the target to verify successful manipulation of target difficulty: "I could meet the target even if I did not try very hard," "I could not meet the target even if I did my best," and "The target was difficult to achieve" each measured on a 7-point Likert scale with endpoints of "1 = Strongly Disagree" and "7 = Strongly Agree." The mean responses to each of these questions are significantly different by target difficulty level (Low target = 3.27; 3.36; 4.82 vs. High target = 2.26, 4.43, 5.99, ps < 0.001, two-tailed), indicating a successful manipulation of target difficulty. Notably, participants rated both target levels above the midpoint level of difficulty (4.82 > 4.00 and 5.99 > 4.00, ps < 0.001, two-tailed), suggesting both target levels were perceived as non-trivial.

4.2. HYPOTHESES TESTS

4.2.1. Giving-Up Behavior

Table 1, Panel A shows descriptive statistics of participants' giving-up behavior by condition, and the means are illustrated in Figure 1, Panel A by contract frame and target difficulty. We predict that subordinates are more likely to display giving-up behavior under a penalty compared to a bonus contract when trying to achieve a high vs. low target (H1). We test H1 using a mixed-effects logit regression model with *GiveUp10* as the primary dependent variable and *ContractFrame* and *Target* as the independent variables (see Appendix A for variable definitions). The mixed-effects logit model includes a participant-level intercept and uses robust standard errors clustered by participant to control for repeated observations for each participant. We find that *ContractFrame* and *Target* significantly interact to affect *GiveUp10* (b = 6.40, p = 0.03, one-tailed), supporting H1. As a robustness check, we also present results for this model using *GiveUp5* and *GiveUp15* as the dependent variable and show that the interaction remains significant. Further, simple effects show no difference in giving-up behavior between contract frame under a low target (p = 0.35, two-tailed), but significantly more giving-up behavior for subordinates working under a penalty vs. a bonus contract with a high target (p = 0.05, two-tailed), consistent with H1.

We also evaluate the timing of when participants give up with a high target, to analyze whether those facing a penalty contract give up sooner than those under a bonus contract when faced with a high target, following our theoretical development for H1. For this analysis, we create an ordinal variable, *FirstGiveUp*, which captures the first round in which a participant gives up, specifically the first round in which they worked less than 10 seconds. We regress this measure using an ordinal logistic regression on *ContractFrame*. We find participants in the

15

penalty frame/high target condition gave up, on average, 1.79 rounds earlier than participants in the bonus frame/high target condition (p = 0.01, two-tailed, untabulated).[5] We find no difference in the timing of giving up between penalty and bonus frame in the low target condition (p = 0.86, two-tailed, untabulated). These findings provide further support for H1 and process evidence for our theory that a penalty compared to a bonus contract coupled with a high target leads to a quicker decision to decrease effort once the target is missed.

[Insert Figure 1 and Table 1 here]

4.2.2. Performance

H2 predicts that, provided subordinates do not give up, target difficulty will moderate the effect of contract frame on performance, such that a penalty contract will lead to higher (lower) performance than a bonus contract when the target is high (low). In evaluating subordinates' overall performance, regardless of whether they gave up or not, we do not find significant differences between penalty and bonus contracts with either a high (5.26 vs. 5.68) or low target (5.34 vs. 6.25). However, controlling for giving-up behavior, we find a significant effect of *ContractFrame* and a significant interaction of *ContractFrame* and *Target*, consistent with H2. To directly evaluate H2, we focus on subordinates' performance in periods in which they do not display giving-up behavior.

Table 1, Panel B shows descriptive statistics of *Performance*, defined as the average number of correctly solved grids in rounds participants did not display giving-up behavior, and Figure 2 illustrates the means in performance between contract frame by level of target difficulty. We predict a disordinal interaction of *ContractFrame* and *Target* on subordinates'

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[5] Findings are consistent using alternative definitions of giving up, such as *GiveUp5* and *GiveUp15*.

performance, such that a penalty contract will lead to lower performance than a bonus contract with a low target but higher performance with a high target, dependent on not giving up (H2).

We test H2 using a mixed-effects linear regression model with *Performance* as the primary dependent variable and *ContractFrame* and *Target* as the independent variables. The mixed-effects linear model includes a participant-level intercept and uses robust standard errors clustered by participant to control for repeated observations for each participant. Table 2 presents the results. We run this model using rounds in which participants attempted to solve the grids (i.e., did not end the round within the first 10 seconds). We find a significant interaction of *ContractFrame* and *Target* on *Performance* ($p = 0.04$, one-tailed), supporting H2. The simple effects provide further support for the predicted disordinal interaction in H2. *Performance* is lower under a penalty versus a bonus contract with a low target ($5.68 < 6.98$, $p = 0.01$, two-tailed) but higher with a high target ($7.34 > 6.80$, $p = 0.02$, two-tailed). These findings support our theory that a high target can be more motivating under a penalty versus a bonus contract when individuals are motivated to achieve the target, but a low target can lead to greater performance under a bonus contract compared to a penalty contract.

4.3   SUPPLEMENTARY ANALYSIS

4.3.1   *Suboptimal Strategies*

In this supplementary analysis we attempt to identify and remove participant-periods in which participants pursued suboptimal strategies, represented by guessing, as prior research suggests suboptimal strategies may lead to lower performance (e.g., Hannan et al. 2008). Table 4 presents the results of four mixed-effects linear regression models with *Performance* as the primary dependent variable and *ContractFrame* and *Target* as the independent variables, without participant-rounds in which a suboptimal strategy was pursued. We capture the suboptimal

17

strategy of guessing as providing a response to an extremely high number of grids which could represent overt guessing (providing a response to 20 to 25 grids could display guessing as providing 10 correct responses is considered a high target achievable by about 25% of participants in the pilot). We then run our main analysis removing rounds that display giving up and/or the suboptimal strategy of guessing and we do this in four ways. First, we remove rounds in which a participant either spent less than 10 seconds or answered 20 or more grids (*Guess1*). Second, we remove rounds in which a participant either spent less than 10 seconds or answered all the 25 available grids (*Guess2*). Third, we remove rounds in which a participant either did not answer any grids or answered 20 or more grids (*Guess3*). Fourth, we remove rounds in which a participant either did not answer any grids or answered all the 25 available grids (*Guess4*). We continue to find support for H2 (p-values < 0.03, one-tailed) when we remove rounds in which participants displayed giving-up behavior and/or the suboptimal strategy of guessing.

4.3.2   Giving Up and Performance Conditional On Previous Round.

As a more direct test of our theory, we examine how contract frame and target difficulty affect the likelihood of giving up in a round conditional on either missing or meeting the target in the previous round. We expect our hypothesized effect to be stronger in rounds that immediately follow missing the target. Table 5, Panel A presents the frequency of giving up in a round, conditional on having missed or met the target in the previous round. We find a total of 182 instances of giving up, 178 of which are preceded by having missed the target, and only four are preceded by having met the target in the previous round. Table 5, Panel B repeats our main tests in the subsample of observations that are immediately preceded by having missed the target in the previous round. We find results consistent with our main analyses as evidenced by a

significant interaction term (p < 0.01, one-tailed) in every definition of giving up.[6] We also examine performance in the round immediately prior to giving up and find significantly lower performance in those who subsequently give up (1.24 vs. 6.78, p < 0.01, two-tailed).

4.3.3 Trust

We construct a trust measure to evaluate the effects of contract frame and giving-up behavior on trust, as prior research finds penalty contracts may lead to lower trust (Christ et al. 2012). We ask five trust related questions in the post experimental questionnaire, each on a 7-point Likert scale, as shown in Appendix D. The responses to each of the five questions load on a single factor, with factor loadings at or above 0.80. We construct the aggregate trust measure by adding the responses to each of the five questions, resulting in the Trust measure on a 7 – 35 scale. We find no differences in the trust measure between target levels. However, as Table 6 presents, we find markedly lower levels of trust in participants who gave up under a penalty contract, compared to all other participants, suggesting those who operate under a penalty contract and no longer trust their manager choose to give up, or those who gave up while working under a penalty contrast lost trust in their manager.

5. Conclusion

With the growing appeal of penalty contracts, including the use of potential penalties in executive compensation (Van der Stede 2011; deHaan et al. 2013; Hartmann and Slapnicar 2014), we seek to provide a more nuanced understanding of the motivational and performance effects of penalties vs. bonuses. Prior research finds that subordinates provide more effort under penalty compared to bonus contracts due to loss aversion (Kahneman and Tversky 1979; Luft 1994; Hannan et al. 2005; Church et al. 2008; Fryer et al. 2012; Hossain and List 2012; Brink

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[6] We are unable to estimate this model in the subsample of observations that are immediately preceded by having met the target in the previous round due to only four instances of giving up.

and Rankin 2013; De Quidt et al. 2017). We extend this research by examining subordinates'

giving up behavior and performance under different levels of target difficulty. As research

demonstrates that supervisors tend to set lower targets for subordinates who are operating under

a penalty contract (Martin et al. 2021), it is important to understand whether the positive

motivational effect of penalties compared to bonuses will still manifest with a lower target.

While a difficult target can increase motivation and effort, it also increases the likelihood

that subordinates do not meet the target. Loss aversion will be newly activated for subordinates

working under a bonus contract if they miss the target, as they start in a gain frame, which will

drive higher effort in the following period. However, subordinates working under a penalty

contract start in a loss frame, so they are already motivated to do their best to avoid missing the

target. Missing the target despite already giving additional effort so as not to miss the target will

increase the likelihood of subordinates giving up. Conversely, easily achievable targets increase

the likelihood that subordinates will meet the target. Hence, the likelihood that an easy target will

prompt greater loss aversion and giving-up behavior is low regardless of whether the subordinate

works under a bonus or penalty contract. Accordingly, we predict and find that subordinates

working under a penalty contract exhibit more giving-up behavior than those working under a

bonus contract with a high target but not with a low target.

When the target is easy, subordinates can likely achieve the target with a low level of

effort, which makes the financial incentive less effective at motivating additional effort under a

penalty contract (Church et al. 2008). Further, subordinates working under a penalty contract

may actively seek to limit their effort to the perceived minimum necessary to avoid the penalty,

as penalty contracts can lead to disutility and negative sentiment (Luft 1994; Hannan et al. 2005;

Christ et al. 2012; Christ 2013). Conversely, a bonus contract can garner positive sentiment,

utility, and a sense of reward, which will not lead to the same desire to limit effort to the perceived minimum necessary. When considerable effort is needed to achieve the target, the financial incentive can effectively motivate effort, which can lead to higher effort under a penalty contract compared to a bonus contract. Thus, we predict and find, given subordinates do not give up, high targets lead to greater performance under a penalty compared to a bonus contract, but low targets lead to lower performance under a penalty vs. a bonus contract.

We make several contributions to the accounting literature. First, we show that penalty contracts lead to a differential likelihood of giving-up behavior compared to bonus targets, and that relationship is moderated by target difficulty. Specifically, a penalty contract coupled with a high target leads subordinates to decrease effort quicker once the target is missed. Thus, we extend prior research on penalty contracts by identifying faster self-sorting of subordinates by self-perceived ability relative to target difficulty.

Second, we identify the moderating effect of target difficulty on how contract frame affects performance. Penalty contracts lead to higher performance with a high target for those who choose to continue exerting effort, in line with previous research findings. However, with a low target, penalty contracts lead to lower performance than bonus contracts. Thus, it is important to consider the difficulty of targets in determining the effectiveness of penalty contracts in motivating more effort.

Lastly, research demonstrates that superiors tend to set lower targets when subordinates work under a penalty compared to a bonus contract (Martin et al. 2021). We document that subordinates working under a penalty contract have lower performance than those working under a bonus contract when the target is low. Thus, firms may not see the additional performance

21

benefits of penalties that are documented in prior research as subordinates respond with lower performance to a low target.

Future research can examine giving-up behavior and performance given self-selection into a penalty or bonus contract. In addition, we had to choose whether to hold expected pay or the bonus and penalty amounts constant across conditions. Participants' perception of the importance of the bonus/penalty was more important to our tests of motivation and performance. Thus, we chose to hold the bonus and penalty amounts constant across conditions. Future research could examine differences while holding expected pay constant across conditions.

APPENDIX A: VARIABLE DEFINITIONS

Variable	Definition
ContractFrame	Binary variable coded as 1 if a participant is in the penalty frame condition, 0 otherwise.
Target	Binary variable coded as 1 if a participant in the High target condition, 0 otherwise.
GiveUp5	Binary variable coded as 1 if a participant chose to end a round within 5 seconds of starting, 0 otherwise.
GiveUp10	Binary variable coded as 1 if a participant chose to end a round within 10 seconds of starting, 0 otherwise.
GiveUp15	Binary variable coded as 1 if a participant chose to end a round within 15 seconds of starting, 0 otherwise.
Performance	The average number of correctly solved grids in a round by participants who did <u>not</u> end the round within 10 seconds of starting or Performance | GiveUp10 = 0 (i.e., performance conditional on trying).
Guess1	Binary variable coded as 1 if a participant either spent less than 10 seconds in a round or answered 20 or more grids in a round, 0 otherwise. Answering many grids in a round indicates guessing.
Guess2	Binary variable coded as 1 if a participant either spent less than 10 seconds in a round or answered 25 grids in a round, 0 otherwise. Answering many grids in a round indicates guessing.
Guess3	Binary variable coded as 1 if a participant did not answer any grids or answered 20 or more than grids in a round, 0 otherwise. Answering many grids in a round indicates guessing.
Guess4	Binary variable coded as 1 if a participant did not answer any grids or answered all the 25 grids available in a round, 0 otherwise. Answering many grids in a round indicates guessing.

Task description

During the task, you will view boxes of random characters. Each box has a single character (the search character) in the top left corner. Below the search character is an 8-row by 18-column block of characters. Your task is to determine the number of times the search character appears in the corresponding box of characters.

An example of this task is provided below. In this example, character "A" (in the top left corner) is the search character. The grid contains 7 "A"s. The answer for this grid is therefore "7".

Search character: A																	
ϑ	M	B	Δ	Γ	Φ	B	Φ	ϑ	ϑ	X	A	I	B	A	B	ϑ	I
A	H	K	H	M	M	Λ	Φ	K	Φ	ϑ	Λ	H	X	Φ	E	H	Γ
Λ	Λ	ϑ	H	Γ	B	K	ϑ	Γ	Λ	Δ	Δ	A	I	Φ	Δ	X	E
Φ	ϑ	E	Γ	ϑ	X	B	Φ	X	X	Γ	K	ϑ	Φ	E	X	ϑ	H
Φ	B	Γ	Γ	H	Δ	K	X	X	X	M	ϑ	Φ	X	K	Γ	X	Φ
Λ	X	X	X	X	Φ	Γ	H	B	H	E	Γ	B	Γ	K	B	A	M
E	Γ	B	E	ϑ	K	I	Γ	K	H	X	Γ	K	A	Γ	A	ϑ	Γ
Φ	H	Φ	Λ	ϑ	B	Δ	X	Λ	Δ	Λ	Γ	Φ	Φ	ϑ	Δ	K	ϑ

A box will be provided for you to record your answers in the practice and production periods.

If, at any time, you would like to end the period and move on to the next period, click the "End Period Now" button at the bottom right corner of the page.

Symbols used

A	N
B	O
X	Π
Δ	Θ
E	P
Φ	Σ
Γ	T
H	Y
I	ς
ϑ	Ω
K	Ξ
Λ	Ψ
M	Z

The instrument used symbols from one column in any given grid. For example, the grid above uses symbols only from the first column.

APPENDIX C: CONTRACT FRAME MANIPULATION

Bonus

The company both you and your manager work for has determined that you will receive an initial payment of $5 with a potential bonus.

In order to earn the bonus, you must meet the target of correct character searches that your manager sets for you.

Your manager has set a target of **6 (10) correct character searches in a period**.

If you achieve the target, you will receive a bonus of $12, so your pay will be $17.

If you do not achieve the target, you will not receive the $12 bonus, so your pay will be $5.

Penalty

The company both you and your manager work for has determined that you will receive an initial payment of $17 with a potential penalty.

In order to avoid the penalty, you must meet the target of correct character searches that your manager sets for you.

Your manager has set a target of **6 (10) correct character searches in a period**.

If you achieve the target, you will not be subject to the $12 penalty, so your pay will be $17.

If you do not achieve the target, you will be subject to a $12 penalty, so your pay will be $5.

APPENDIX D: TRUST MEASURE

Question	Endpoints
I trust the manager who set my target to treat me fairly.	
I trust the manager who set my target to have my back.	1 = Strongly Disagree
I would choose to work for this manager over a different manager.	7 = Strongly Agree
The manager set an appropriate target for me.	
I am grateful to my manager for setting my target.	

Question	Factor loading
I trust the manager who set my target to treat me fairly.	0.90
I trust the manager who set my target to have my back.	0.87
I would choose to work for this manager over a different manager.	0.84
The manager set an appropriate target for me.	0.80
I am grateful to my manager for setting my target.	0.83

Every question loads only on a single factor.

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Fig. 1: Summary results

Panel A: Giving up Behavior
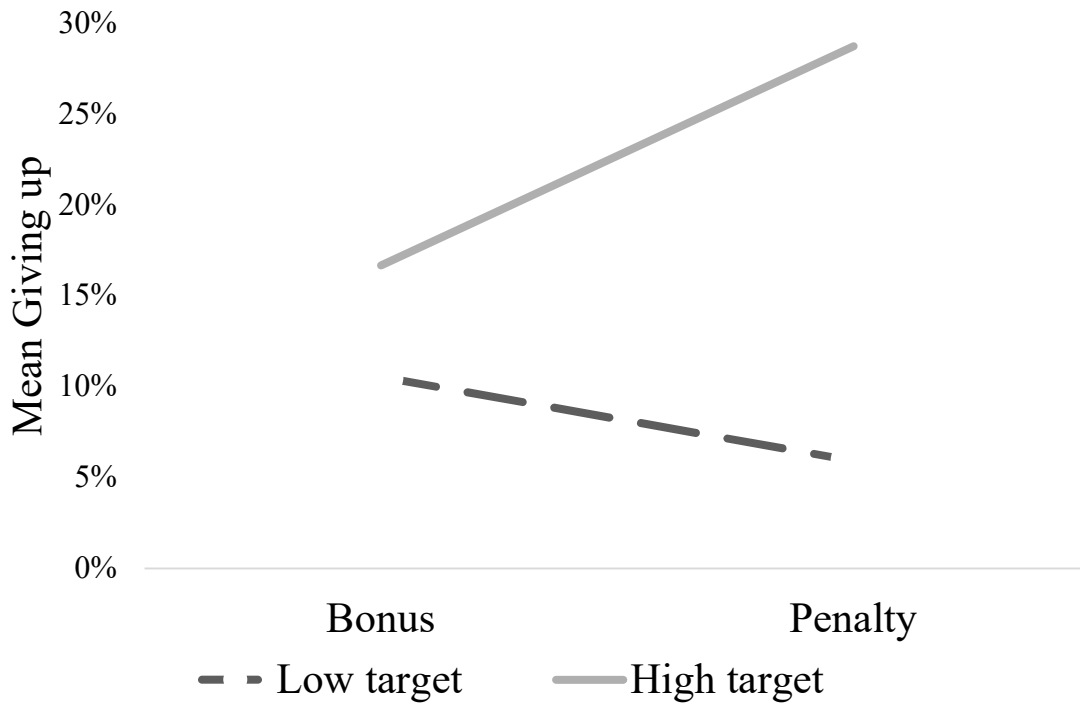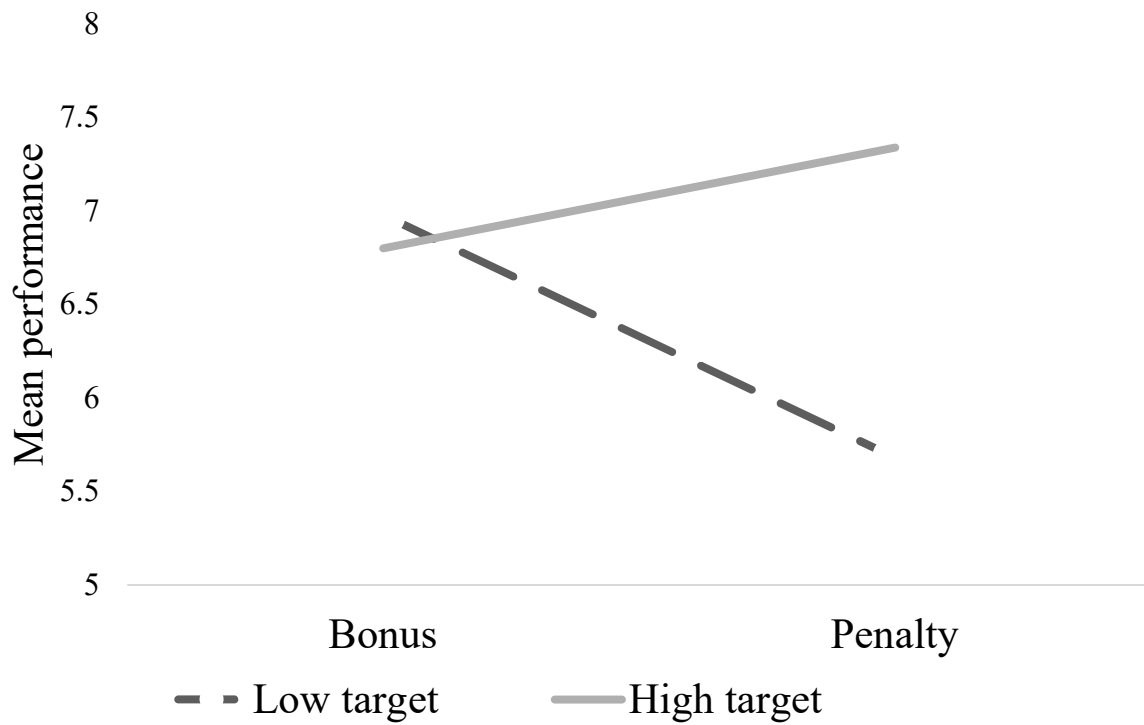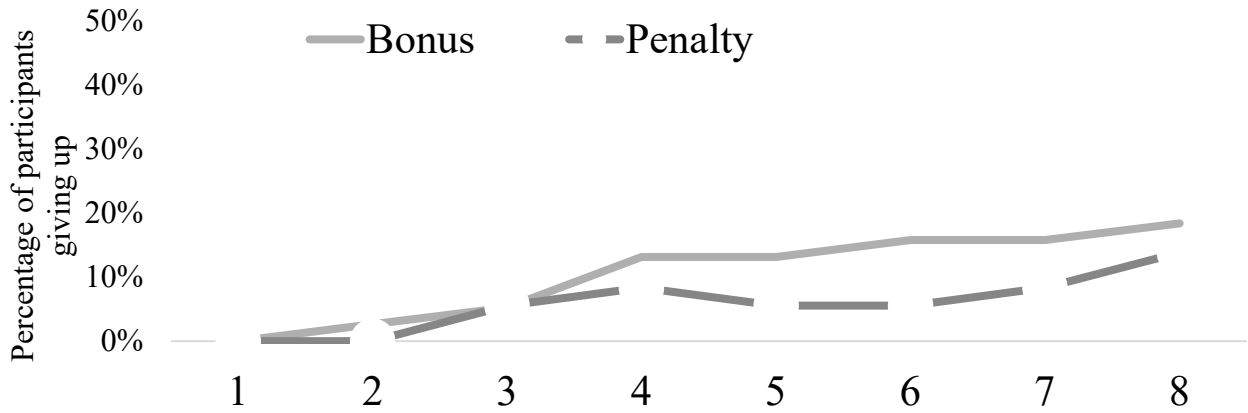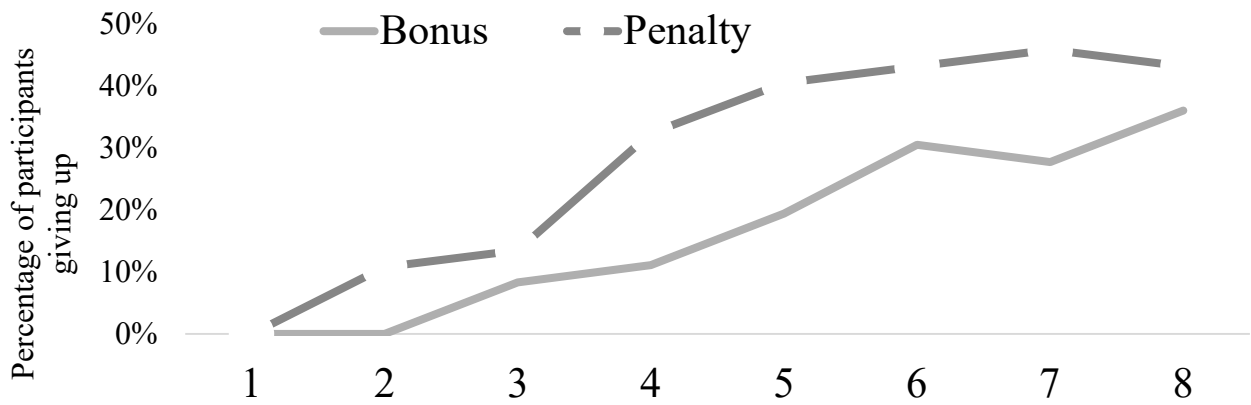

Panel B: Performance

Fig. 2: Giving up by Round

Panel A: Giving up in the Low Target Condition

Panel B: Giving up in the High Target Condition

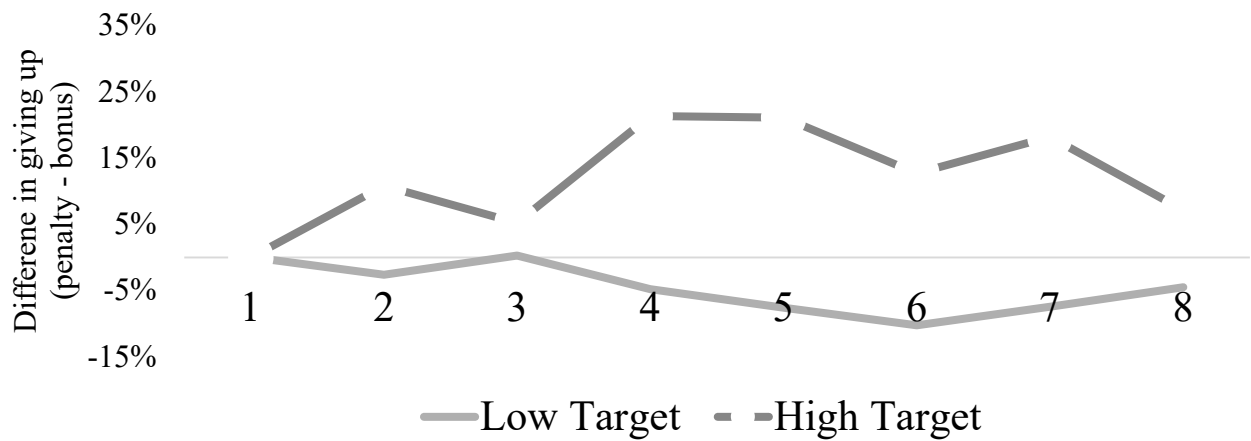**Panel C: Excess Giving up in Penalty over Bonus Framed Contract**

TABLE 1
Descriptive Statistics

Panel A: Cell Means (Standard Deviations) of *GiveUp10*

Target level	Bonus	Penalty	Total
Low	**10.53%** (30.73) N = 304	**5.91%** (23.61) N = 288	**8.28%** (27.58) N = 592
High	**16.67%** (37.33) N = 288	**28.72%** (45.32) N = 296	**22.77%** (41.97) N = 584
Total	**13.51%** (34.22) N = 592	**17.47%** (38.00) N = 584	**15.48%** (36.18) N = 1,176

Panel B: Cell Means (Standard Deviations) of *Performance*

Target level	Bonus	Penalty	Total
Low	**6.98** (2.48) N = 272	**5.68** (2.79) N = 271	**6.33** (2.72) N = 543
High	**6.80** (3.03) N = 240	**7.34** (3.08) N = 211	**7.05** (3.06) N = 451
Total	**6.89** (2.75) N = 512	**6.40** (3.03) N = 482	**6.66** (2.90) N = 994

See Appendix A for variable definitions.

Participants could solve up to 25 grids in each round.

N is the number of participant-rounds. Each participant had the opportunity to work on 8 rounds.

TABLE 2
Mixed-Effects Logit Model (Odds Ratio):
Effect of Contract Frame and Target Difficulty on Giving Up Behavior

IV / DV	*GiveUp5*	*GiveUp10*	*GiveUp15*
Intercept	0.00	0.00	0.00
p-value	0.00	0.00	0.00
ContractFrame	0.31	0.47	0.49
p-value	0.19	0.35	0.36
TargetDifficulty	3.09	4.03	5.29
p-value	0.06	0.02	0.01
Frame × Difficulty	**10.13**	**6.40**	**4.98**
***p*-value**	**0.02**	**0.03**	**0.05**
Participants	147	147	147
Observations	1,176	1,176	1,176

Bolded variables indicated predicted differences and their p-values are one-tailed.

Simple effects (*GiveUp10*)

	χ2	p-value
Across Contract Frame		
Low, Bonus vs. Low, Penalty	0.88	0.35
High, Bonus vs. High, Penalty	3.93	0.05
Across Target Difficulty		
Low, Bonus vs. High, Bonus	5.31	0.02
Low, Penalty vs. Low, Penalty	20.24	0.00

See Appendix A for variable definitions.

TABLE 3
Mixed-Effects Linear Model:
Effect of Contract Frame and Target Difficulty on Performance

IV / DV	*Performance | GiveUp5 = 0*	*Performance | GiveUp10 = 0*	*Performance | GiveUp15 = 0*
Intercept	6.85	6.85	6.85
p-value	0.00	0.00	0.00
ContractFrame	-1.31	-1.27	-1.24
p-value	0.02	0.02	0.02
TargetDifficulty	-0.92	-0.01	0.11
p-value	0.86	0.99	0.83
Frame × Difficulty	**1.25**	**1.29**	**1.28**
***p*-value**	**0.05**	**0.04**	**0.04**
Participants	147	147	147
Observations	1,009	994	985

Bolded variables indicated predicted differences and their p-values are one-tailed.

Simple effects *Performance | GiveUp10 = 0*

	$\chi 2$	p-value
Across Contract Frame		
Low, Bonus vs. Low, Penalty	5.93	0.01
High, Bonus vs. High, Penalty	0.00	0.97
Across Target Difficulty		
Low, Bonus vs. High, Bonus	0.00	0.99
Low, Bonus vs. Low, Penalty	5.84	0.02

See Appendix A for variable definitions.

TABLE 4
Mixed-Effects Linear Model:
Effect of Contract Frame and Target Difficulty on Performance
(removed observations from suboptimal strategies)

IV / DV	Performance | GiveUp10 = 0 & Guess1 = 0	Performance | GiveUp10 = 0 & Guess2 = 0	Performance | Guess3 = 0	Performance | Guess4 = 0
Intercept	6.98	6.99	6.99	6.99
p-value	0.00	0.00	0.00	0.00
ContractFrame	-1.46	-1.46	-1.27	-1.27
p-value	0.01	0.01	0.01	0.01
TargetDifficulty	0.11	0.07	0.19	0.26
p-value	0.83	0.89	0.70	0.59
Frame × Difficulty	**1.35**	**1.42**	**1.41**	**1.28**
***p*-value**	**0.03**	**0.03**	**0.03**	**0.03**
Participants	145	144	142	143
Observations	923	914	896	910

Bolded variables indicated predicted differences and their p-values are one-tailed.

See Appendix A for variable definitions.

TABLE 5
Giving up After Missing or Meeting the Target

Panel A: Frequency of giving up conditional on missing or meeting the target in the previous round.

	Missed the target	Met the target	Total
Did not give up	449	398	847
Gave up	178	4	182
Total	627	402	1,029

Panel B: Mixed-Effects Logit Model (Odds Ratio): Effect of Contract Frame and Target Difficulty on Giving Up Behavior, Conditional on having missed the target in the previous round.

IV / DV	*GiveUp5*	*GiveUp10*	*GiveUp15*
Intercept	0.03	0.04	0.06
p-value	0.00	0.00	0.00
ContractFrame	0.06	0.09	0.09
p-value	0.00	0.01	0.01
TargetDifficulty	0.43	0.53	0.75
p-value	0.28	0.42	0.72
Frame × Difficulty	**66.70**	**44.64**	**38.02**
***p*-value**	**0.00**	**0.00**	**0.00**
Participants	125	125	125
Observations	627	627	627

Bolded variables indicated predicted differences and their p-values are one-tailed.

    Simple effects (*GiveUp10*)

	χ2	p-value
Across Contract Frame		
Low, Bonus vs. Low, Penalty	6.58	0.01
High, Bonus vs. High, Penalty	5.32	0.02
Across Target Difficulty		
Low, Bonus vs. High, Bonus	0.65	0.42
Low, Penalty vs. Low, Penalty	16.78	0.00

See Appendix A for variable definitions.

TABLE 6
Effects of Giving up on Trust

Panel A: Cell Means (Standard Deviations) of *Trust* by *Contract Frame* and *Giving Up*

Giving-up	Bonus	Penalty	Total
Never gave up	22.02 (6.70) n = 53	19.98 (6.94) n = 51	21.02 (6.86) n = 104
Gave up	21.10 (8.01) n = 21	13.41 (6.68) n = 22	17.16 (8.25) n = 43
Total	21.76 (7.06) n = 74	18.00 (7.46) n = 73	19.89 (7.48) n = 147

Panel B: Effect of *Contract Frame* and *Giving Up* on *Trust*

IV / DV	*Trust*
Intercept	22.02
p-value	0.00
ContractFrame	-2.04
p-value	0.14
EverGiveUp	-0.92
p-value	0.61
Frame × GiveUp	-5.65
***p*-value**	0.03
Observations (participants)	147

Panel C: Simple Effects on *Trust*

	F-value	p-value
Across Contract Frame		
Did not GiveUp, Bonus vs. Did not GiveUp, Penalty	2.22	0.14
GiveUp, Bonus vs. GiveUp, Penalty	13.03	< 0.01
Across Giving Up		
GiveUp, Bonus vs. Did not GiveUp, Bonus	0.26	0.61
GiveUp, Penalty vs. Did not GiveUp, Penalty	13.62	< 0.01