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Do bonus deferral and bonus recovery affect employee effort?

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ABSTRACT

We examine how bonus deferral and bonus recovery affect performance in an effort-sensitive task, where improving overall performance requires effort towards output quantity and output quality. Deferred bonuses and bonus recovery are important elements in contemporary incentive schemes designed to motivate employees to act in the best interest of the firm. We propose that bonus deferral improves performance by encouraging employees to adopt an abstract mindset that focuses on behavior for the good of the firm ("to do the right thing") and thus to exert more effort. In contrast, bonus recovery serves an effort-directing role by indicating undesirable behavior that should be avoided. Bonus recovery activates a mindset that focuses on the monetary implications of their behavior and thus supersedes the abstract mindset of bonus deferral and its positive effects. Our experimental results show that bonus deferral leads to higher performance quantity; in contrast, bonus recovery increases performance quality, the performance domain related to bonus recovery, but at the expense of performance quantity. Furthermore, we find that bonus recovery counteracts the positive effects of bonus deferral and leads to a reduction in overall performance. Two supplemental experiments provide direct process evidence supporting the proposed theoretical mechanism. Our study contributes to the debate on effective compensation by showing that combining bonus deferral and bonus recovery may have undesirable consequences on effort provision and allocation.

1. Introduction

Performance bonus schemes have often been criticized for creating incentives for employees to improve their rewarded performance at the expense of the firm's interest (e.g., Bennett et al., 2017; Lambert, 2001). Traditional bonus plans can destroy value by providing incentives to withhold or misallocate effort toward self-serving activities (Murphy & Jensen, 2024). One proposed remedy is the use of bonus deferral and bonus recovery (e.g., Gillan & Nguyen, 2016; Murphy & Jensen, 2024; Stewart, 1991). Bonus deferral is the delayed payment of bonuses over a pre-specified period, while bonus recovery implements a reduction of previously granted bonuses in case of substandard performance. Prior research on the effects of bonus deferral and bonus recovery is limited and has focused on risk taking and investment decisions. The findings suggest that while bonus deferral by itself can improve incentive alignment (Cheng et al., 2019), recovery of deferred bonuses may have unintended effects on risk taking (Hartmann & Slapničar, 2015). It is, however, unclear whether these bonus features influence employee effort. In this study, we examine how bonus deferral, bonus recovery, and particularly their combination, affect effort and performance. Examining this open question is important, because effort provision in the firm is crucial for its success and employees may withhold or allocate effort in a way that misaligns with firm interests.

In practice, remuneration packages frequently comprise elements that lead to deferred payments, like vesting periods for stock options, delayed bonus payments or pension plans. More recently, recovery policies have been introduced as another element. Regulatory bodies, especially in Europe and Australia, require companies to implement deferred bonus schemes and/or bonus recovery. These requirements were introduced in the aftermath of the financial crisis, to which

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inappropriate remuneration was seen as a contributory factor, as a mechanism to discourage managers from maximizing their current pay at the expense of shareholders' interest.[1] To comply with these regulations, firms need to defer a substantial portion of remuneration and make their payout dependent on longer term performance. In essence, the latter condition requires firms to recover bonuses that would have been granted based on short-term performance when the performance of subsequent periods is negative or below targets.

Bonus recoveries are intended to allow recouping previously awarded bonuses to create downside liability and reduce managers' participation in unsustainable short-term profits (e.g., Stewart, 1991). The key objective is to avoid awarding managers immediately based on short-term performance, even though it could be a "bonfire" (Bischof et al., 2010), that is, to make bonuses dependent on longer-term performance and even out performance fluctuations. These requirements differ from so-called "clawbacks" in the U.S. (DeHaan et al., 2013), which are a type of penalty that allows firms to reclaim bonuses that were already paid out (Dodd-Frank Wall Street Reform and Consumer Protection Act, Section 954, 2010), and are typically triggered by managerial misconduct (e.g., Erkens et al., 2018; Lublin, 2010). Bonus recoveries as analyzed here refer to bonus recuperation due to negative performance outcomes.[2]

Although bonus deferral and bonus recovery need not be combined, they are often implemented together as part of a "bonus bank" scheme (e.g., Byrnes, 2009; Edmans et al., 2012; O'Hanlon & Peasnell, 1998, 2002; Stewart, 1991), to address legal barriers associated with recovering bonuses that have already been paid out (Murphy & Jensen, 2024). Bonus banks are accounting-based performance plans in which a portion of variable remuneration is not paid out immediately but collected in internal accounts, deferred, and paid out subject to pre-specified conditions. In practice, many financial and nonfinancial firms have implemented such schemes (e.g., UBS, BNP Paribas, Société Générale, Credit Suisse, Metro). Importantly, such schemes are not designed to prevent managerial misconduct such as accounting misrepresentation but rather to facilitate managers' participation in losses as well as gains. While companies also defer compensation for reasons beyond incentive alignment, such as risk sharing, cash flow management, and employee retention (e.g., Bischof et al., 2010; Schultze et al., 2026), the behavioral effects of combinations of bonus deferral and recovery are yet unclear.

In this study, we predict that while bonus deferral has a positive effect on effort provision and hence performance, its combination with bonus recovery will counteract these effects. Specifically, we examine the potential consequences of bonus deferral and recovery in a setting that requires a focus on two performance domains (quantity, quality) to improve current overall performance, and where participants are advised that both are important for the long-term benefit of the firm. Drawing on construal level theory (CLT), we argue that bonus deferral encourages a focus on the more distant future and prompts individuals to place a stronger emphasis on doing what is right (Lindenberg, 2001; Trope & Liberman, 2003, 2010). As a result, the deferral of bonus payments increases employees' willingness to exert effort on behalf of their firm and improves overall performance. Since bonus deferral only changes the timing of bonus payments but does not impose specific performance targets across different performance domains, we expect higher effort levels under bonus deferral and thus higher performance in both performance domains.

In contrast, bonus recovery is tied to meeting specific performance targets. Such targets can be financial or non-financial measures. For example, bonus recovery may be based on a failure to meet divisional or firm-wide profit goals, losses of market share, poor customer satisfaction, or more generally, performing poor quality work, as in our experimental setting. Bonus recovery is similar to penalty contracts that lead to a loss of a (share of) non-performance contingent salary in the same period, but focuses on reclaiming previously earned bonuses due to substandard performance.

Prior research finds that penalty contracts are aversive (Luft, 1994) and increase effort (Hannan et al., 2005). The possibility of a loss causes individuals to work harder (Church et al., 2008) and allocate a disproportionate share of their effort to avoiding a loss (Christ et al., 2012). Consistent with this prior research, we posit that the looming threat of losing previously earned pay will cause individuals to prioritize the performance domain related to bonus recovery at the expense of other performance domains. It is *ex ante* unclear how this shift in effort allocation will affect *overall* performance: While bonus recovery may improve overall performance by highlighting relevant performance domains and consequently simplifying self-regulatory processes (Andrejkow et al., 2022), it may also result in effort distortion if individuals re-allocate effort between task domains in a way that reduces overall performance (Christ et al., 2016; Kachelmeier et al., 2016). Which of the two effects prevails in a particular setting is largely an empirical question.

Given the frequent use of bonus deferral to facilitate bonus recovery in practice, the combined effect of the two is of particular interest. The positive impact of bonus deferral rests on the argument that it increases the psychological distance between performance bonuses and the present self, causing individuals to construe a setting more abstractly and be more willing to pursue role-congruent behaviors. However, the looming threat of bonus recovery counteracts this effect by causing employees to focus more strongly on the monetary implications of their actions. As aversion to monetary losses triggers lower-construal concerns (White et al., 2011), we predict that combining bonus recovery with deferral will lower psychological distance and thus reduce the positive effect of bonus deferral on the willingness to exert effort.

We conduct a 2x2 between-participants experiment to test our hypotheses, manipulating the timing of bonus payments (now vs. deferred) and bonus recovery (no recovery vs. recovery). An incentive-compatible piece-rate-compensation scheme creates incentives to exert effort to complete outputs that require attention to both quantity and quality. Overall performance (the number of correctly completed outputs) can be enhanced by either producing more outputs (output quantity), and/or by working more accurately (output quality). Holding constant the economic incentives to simultaneously improve both output quantity and quality, we find that bonus deferral increases output quantity but does not change output quality. In contrast, bonus recovery tied to output quality improves output quality, but at the expense of output quantity. Further, overall performance decreases when bonus deferral and bonus recovery are combined. A causal chain analysis with two supplemental experiments provides process evidence in support of our theorization.

Our findings contribute to prior literature in three main ways. First, our results add to the limited prior research on the effects of bonus deferral and bonus recovery by studying their combination. Hartmann and Slapničar (2015), the only study we are aware of that examines this combination, find in a binary choice task that bonus deferral and recovery have detrimental consequences on risk-taking behavior. Conversely, Cheng et al. (2019) find that bonus deferral by itself improves incentive alignment, and prior literature finds that penalty contracts induce higher effort (Christ et al., 2012; Church et al., 2008).

[1] In Europe and Australia, financial institutions are required to defer a substantial portion of variable remuneration for three to five years and the assessment of performance must be based on longer-term performance of at least three to five years (Directive, 2010/76/EU, known as CRD III; Treasury Laws Amendment (Banking Executive Accountability and Related Measures) Act 2018, Division 4 Part IIAA, known as BEAR). Recovery policies are also mandatory for financial institutions in Australia (Australian Prudential Regulation, 2018: 9). Several national bodies have extended these regulations to non-financial institutions.

[2] For example, in 2024 Qantas Airways reduced the bonus of its departing CEO Alan Joyce by more than A$9 million, not for deliberate wrongdoings but for his part in eroding the company's reputation and his poor workforce management.

While these results might lead us to expect that combining both mechanisms would have positive effects on effort provision, we find that bonus recovery counteracts the effects of bonus deferral, suggesting that the two mechanisms are not always complementary. We further provide direct process evidence that employees' compensation structure affects their construal level and that a more abstract construal level leads to increased voluntary effort provision, supporting the proposed CLT-based mechanism.

Second, prior research on the link between bonus and effort provision has considered different incentive attributes such as how performance is measured, bonus threshold, and the nature of the reward (e.g., Bonner & Sprinkle, 2002; Farrell et al., 2008; Presslee et al., 2013), but has not directly examined how the timing of the bonus payment may also affect employees' effort provision. By showing that the timing of bonus payment matters even when bonus calculation is held constant, our study contributes to understanding how bonuses motivate effort and goal alignment. Importantly, while economic time discounting suggests that delayed bonus payment will lower their effectiveness, we find that bonus deferral has a positive effect on effort, though not equally across performance domains. Furthermore, companies sometimes adopt bonus deferral as a means to retain employees; our findings suggest that companies need to be aware of its broader effects on employee effort when designing such compensation plans.

Third, our study speaks to the widely claimed need for improving alignment between employees' and firms' interests via bonus recovery. Prior research documents positive investor reactions to voluntary adoptions of bonus penalties triggered by accounting misstatements (Iskandar-Datta & Jia, 2013) and suggests that these schemes provide benefits such as higher perceived and actual reporting quality (e.g., Chan et al., 2012; DeHaan et al., 2013; Erkens et al., 2018). These positive effects observed using firm-level data may be due to a deterrent effect on dysfunctional behavior or a selection effect of firms choosing to implement voluntary bonus penalties (Chen et al., 2015). We complement this research by examining whether bonus recovery also mitigates agency problems at an individual's level, and find that it reduces undesirable performance outcomes that trigger it. Our findings imply that bonus recovery triggered by accounting misstatements is likely an appropriate tool for deterring misreporting, consistent with standard setters' intention. However, as bonus recovery directs attention and effort, our results also suggest that it may lead to effort distortion. In our study, participants' strong focus on avoiding bonus recovery has led to lower overall performance.

Overall, our results suggest that bonus recovery may be a relevant design choice for firms with an asymmetric loss function, where one type of undesirable behavior is extremely costly for the firm. However, combining bonus deferral with bonus recovery, as frequently suggested in practice, may not be effective for incentive alignment and may result in unintended consequences. In contrast, the bonus deferral has a positive effect when implemented by itself.

2. Prior literature and hypotheses development

2.1. The behavioral effect of bonus deferral

Bonus deferral and bonus recovery are both designed to mitigate dysfunctional behavior arising from the divergence of interests between employees and the firm (Chan et al., 2012; Chen et al., 2015). Together they form the central elements of a "bonus bank" (e.g., Bischof et al., 2010; Byrnes, 2009), in which bonuses based on positive (negative) performance are credited to (debited against) an internal account over time, and distributed at a future date, which is said to align employees' decisions with the firm's longer-term interests (e.g., Stewart, 1991). Analytical models find that such schemes can provide efficient incentives under certain conditions (e.g., Edmans et al., 2012; Schultze et al., 2026; Zhu, 2018); behavioral research has focused on their effects on risk taking and investment decisions (Cheng et al., 2019; Hartmann & Slapničar, 2015).

To study the behavioral effects of bonus deferral, recovery, and their combination, we first consider the effect of bonus deferral on effort provision. The only study we are aware of that has studied the behavioral effects of bonus deferral is Cheng et al. (2019), who examine managers' investment decisions. We study effort provision rather than investment decisions because the latter involves the problem of performance measurement over time. Because investment decisions always pertain to future periods, the analysis of investment incentives necessarily depends on whether the investment affects future performance positively or negatively and how these are captured in compensation contracts. When bonuses are based on periodic performance measures, they provide efficient investment incentives only if these measures are based on adjusted accounting rules that match investment outlays and proceeds in a strongly goal congruent way, ensuring a positive bonus in any period if and only if the investment has a positive net present value (Rogerson, 1997). This is generally not the case for performance measures used in practice. When studying bonus deferral and recovery in an investment setting, their consequences would automatically depend on the matching procedures underlying the performance measures used. Moreover, future performance also depends on the effort spent in future periods to realize the expected benefits from the investment (e.g., Schultze et al., 2026). The behavioral effects are thus subject to many countervailing factors that are difficult to isolate in an incentive-compatible task. Studying effort provision instead reduces these problems to capturing only the performance that directly results from the effort spent on the task. At the same time, the basic incentives are likely quite similar when deciding how much effort to spend for the good of the firm versus for personal benefit. In our experiment, we hence focus on actions that have directly observable positive or negative outcomes.

Drawing on Construal Level Theory (CLT), Cheng et al. (2019) argue and find that bonus deferral increases the psychological distance of bonus payout from the present self, which causes managers to focus on their superordinate goals and increases their goal-congruent investments. Similarly, we expect bonus deferral to increase effort provision for the good of the firm. However, our setting differs from Cheng et al. (2019) in important ways. Their task involves a choice between investing in a valuable project versus not investing to increase short-run performance pay – a highly intentional choice between firm and self-interest, in which individuals with deferred bonuses face a trade-off between future monetary cost and future benefits to the firm. In contrast, our setting involves the immediate disutility of effort: higher effort benefits the firm in the long-term and increases current performance measures, but requires individuals to exert effort now. Moreover, unlike Cheng et al. (2019), our task is incentive compatible and involves a continuous decision about how much effort to allocate between quantity and quality, both serving the good of the firm.

Role-congruent effort that benefits the firm in the long-term can enhance current performance measures but requires immediate personal sacrifices due to the disutility of effort. Consequently, when deciding about effort provision, individuals experience a conflict between what they should do and what they want to do. Performance-based compensation is intended to create economic incentives to comply with what should be done. Under standard economic theory, bonus deferral would be detrimental because the time value of effort incentives is lower under

bonus deferral, but the personal cost of effort is immediate regardless of the bonus timing. Standard economic theory thus predicts lower effort provision when bonuses are deferred.

CLT (Trope & Liberman, 2003, 2010), however, offers a different perspective. CLT proposes that individuals' representations of an action or event depend on its psychological distance from the present self, including whether the action/event pertains to the near or distant future. Greater psychological distance (i.e., higher level construal representation) causes more abstract thinking and directs attention to superordinate features of an action, whereas individuals are more likely to consider how the action is performed when psychological distance is low. For example, a higher construal, abstract representation of "helping others" may be contrasted with a lower construal, more concrete representation of "giving a dollar to a homeless person in a New York subway late at night" (Trope & Liberman, 2003, p. 405).

Role-congruent behavior for the long-term good of the firm typically conflicts with individuals' self-interest. In our setting, this trade-off arises between the long-term benefits for the firm and the immediate disutility of effort provision. As discussed earlier, standard economic theory predicts lower effort provision under bonus deferral. However, CLT suggests that deferring bonus payments will cause employees to construe the effort decision at a higher level and encourage increased effort. This is because psychological distance reduces individuals' feasibility concerns – that is, the personal sacrifices required to achieve an outcome (Bornemann & Homburg, 2011; Roehm & Roehm, 2011). For example, Liberman and Trope (1998) find that greater temporal psychological distance reduces students' considerations of time constraints and the potential trade-offs required between academic and leisure activities. By encouraging a focus on the more distant future, bonus deferral will reduce concern for the disutility of effort to act in the firm's best interest, making the desire to improve economic well-being less influential. Notably, this prediction is unique to an effort provision setting: in an investment setting, CLT and economic discounting both predict a positive effect of bonus deferral, precluding a clean test of the two theories.

Additionally, CLT suggests that when bonuses are deferred, employees will adopt an abstract mindset and become more aware of the importance of their task for the firm's long-term benefit. Prior literature documents that as psychological distance increases, individuals identify more strongly with their values and principles relative to practical concerns (Kivetz & Tyler, 2007) and are more likely to consider what they should do rather than what they want to do (Rogers & Bazerman, 2008). Further, behaviors consistent with what one should do become more attractive when they are construed at a more abstract level (Fujita et al., 2006; Rogers & Bazerman, 2008). We posit that by encouraging a focus on the more distant future, bonus deferral prompts individuals to emphasize doing what is right and working for the firm's long-term benefit. We test our expectation in an effort-sensitive task and predict a positive effect of bonus deferral on individuals' effort level. We also expect a positive effect on overall performance and its two components, quantity and quality, since bonus deferral does not highlight either component:

Hypothesis 1. Employees under a deferred bonus scheme will have: (a) higher quantity performance, (b) higher quality performance, and (c) higher overall performance than those under an immediate bonus payment scheme.

2.2. Effort allocation and bonus recovery

Bonus recovery enables firms to recoup previous periods' compensation in a period of low performance, such that employees participate in both profits and losses associated with their actions (Bischof et al., 2010). Similar to penalty contracts, bonus recovery puts previous remuneration at stake by punishing undesirable outcomes (e.g., Church et al., 2008; Frederickson & Waller, 2005), while good performance is rewarded by providing "extra credit" (Lazear, 1991). Since bonus recovery schemes reward net performance over time, firms can use it to address employees' myopic preferences. Myopic individuals have incentives to improve current performance at the cost of long-term performance. Since negative effects of these undesirable behaviors can typically be detected in future periods, bonus recovery serves as a deterrent by enabling firms to review performance before making bonus payments, and to make debits against previously deferred compensation without requiring legal actions (e.g., Bischof et al., 2010; Byrnes, 2009; O'Hanlon & Peasnell, 1998, 2002; Stewart, 1991). Especially in settings when it is *ex ante* difficult to define "good" behavior, bonus recovery can ensure that employees participate in positive and negative performance outcomes.

The design of compensation schemes can indicate appropriate behaviors and thereby direct attention to relevant elements of a task or job (e.g., Farrell et al., 2008). We posit that bonus recovery plays a similar role. By imposing an explicit cost for undesirable outcomes, it emphasizes what the firm considers appropriate behavior. For example, an equipment service manager may receive a bonus based on overall profit from maintaining and upgrading customers' equipment, with a recovery provision tied to the costs of revisits due to prior poor-quality services. Here, the recovery makes it salient that servicing customers' equipment correctly the first time, rather than processing a larger number of poor-quality customer requests, is the approach preferred by the firm.

Prior research on the behavioral effects of penalty contracts finds that they induce higher effort (Hannan et al., 2005; Hossain & List, 2012; Christ et al., 2012; Armantier & Boly, 2015), and ascribes this effect to loss aversion, that is, a loss of a certain amount relative to the decision maker's reference point causes greater emotional affect than an equivalent gain (Kahneman & Tversky, 1979). Individuals anticipate aversive future losses (Frederickson & Waller, 2005; Imas et al., 2016) and adapt their behavior to avoid them (Christ et al., 2012; Church et al., 2008; Hong et al., 2015). We expect that individuals consider awarded bonuses as their possessions even if their payout is subject to predetermined conditions (Ariely & Simonson, 2003; Reb & Connolly, 2007). Anticipating the loss experience of bonus recovery, individuals then adapt their behavior to avoid undesirable performance outcomes, placing stronger emphasis on the performance domain that triggers bonus recovery. We thus expect that, holding expected economic returns constant, bonus recovery has a positive effect on employee effort directed at avoiding outcomes that trigger it. In our setting, bonus recovery is tied to output quality. This leads to Hypothesis 2a:

Hypothesis 2a. Employees whose compensation scheme has a bonus recovery tied to output quality will have **higher** quality performance than those who do not have a bonus recovery.

We expect that bonus recovery has an effort-directing effect as stated in Hypothesis 2a, but do not propose an effect on overall effort levels. Employees typically have limited resources, and effort exerted toward one performance domain cannot simultaneously be allocated to another.

Christ et al. (2012) find that penalty contracts can lower performance in domains that do not trigger penalties. In line with this, we expect bonus recovery to reduce effort in domains that do not trigger it. In our setting, this means that increased effort to improve quality performance may come at the cost of reduced effort toward quantity performance (Christ et al., 2016; Farrell et al., 2008; Hannan et al., 2005). When effort is directly linked to performance, we thus hypothesize:

Hypothesis 2b. Employees whose compensation scheme has a bonus recovery tied to output quality will have **lower** quantity performance than those who do not have a bonus recovery.

Since the above arguments lead to improved quality but reduced quantity performance, the effect of bonus recovery on overall performance is less clear and may depend on how an individual optimizes effort allocation across the domains. On the one hand, bonus recovery may improve overall performance by making salient that the firm prioritizes quality over quantity. Absent indications of desirable task approaches, individuals must resolve intra-task conflict through self-regulatory processes that shift limited cognitive resources away from the task itself (Christ et al., 2016; Masicampo & Baumeister, 2011). Bonus recovery indicates that quality is more desirable and frees up cognitive resources by simplifying self-regulatory processes (Andrejkow et al., 2022). Signaling the relative importance of quality also reduces the need to spend time experimenting with different task strategies to determine the best way to perform a task.

Unless marginal returns to effort differ between task domains, however, bonus recovery may distort effort allocation at a cost to overall performance (e.g., Hannan et al., 2019). Individual abilities may also differ, giving each individual different marginal returns to effort across domains. If an individual has specialized and strong skills in one domain but mediocre skills in others, overall performance may benefit from focusing on the former (e.g., Kachelmeier, 2019). Consequently, when marginal returns to effort differ across domains, optimal effort allocation depends on employee- and firm-specific characteristics and providing incentives for it hinges on *ex ante* knowledge of ability-dependent marginal returns. Kachelmeier (2019) argues that when abilities are unknown, not restricting individuals' freedom to weigh performance domains according to their own returns to effort may benefit the firm. Indeed, Kachelmeier et al. (2016) find that individuals' overall performance is lower when informal controls emphasize one task domain and inadvertently constrain employees to a suboptimal task strategy.

Because it is not clear if one of the two effects will prevail or whether they will offset each other in our setting, we make no prediction on the impact of bonus recovery on overall performance but analyze its effect as an open research question.

2.3. Combining bonus deferral and bonus recovery

Next, we consider the combined effect of bonus deferral and recovery. H1 argues that deferred bonus payments encourage individuals to adopt a more abstract mindset and construe a decision at a higher level, such that feasibility and concrete concerns such as monetary incentives become less important. However, bonus recovery causes employees to focus more strongly on the monetary implications of their actions because undesirable outcomes result in a loss of earned bonuses. By stimulating loss aversion, bonus recovery may lead employees to pay more attention to the incentive consequences of their behavior, counteracting the effect of bonus deferral. Further, White et al. (2011) find that a loss frame activates a lower construal mindset, because concerns about preventing undesirable outcomes mobilize individuals to take concrete actions. Prior literature also documents that abstract, normative considerations are generally weaker than monetary concerns, such that factors triggering a focus on economic well-being can easily repress cognition of what one should do (Barbopoulos & Johansson, 2016; Lindenberg & Foss, 2011; Thomas, 2016). We thus predict that bonus recovery will counteract the effects of bonus deferral, because it stimulates loss aversion and triggers a focus on financial aspects of the task. In our setting, this means bonus recovery will reduce the positive effects of bonus deferral hypothesized in H1. This leads to our final hypothesis:

Hypothesis 3. When bonus deferral is combined with bonus recovery, the positive effects of bonus deferral on (a) quantity performance, (b) quality performance, and (c) overall performance will be reduced.

3. Research method

3.1. Research design

We test our hypotheses using a 2x2 between-participants experiment programmed in z-Tree (Fischbacher, 2007). The two independent variables are bonus timing (bonus now vs. bonus deferred) and bonus recovery (no bonus recovery vs. bonus recovery). The primary dependent variable is participants' performance on an effort-sensitive task. The experiment was conducted at two large European universities and has received ethics approval.

3.1.1. Participants

148 undergraduate business students voluntarily participated in the computerized experiment. To encourage participation, each participant was guaranteed 5 Euro for participating. Additional performance-based compensation ensures incentive compatibility. Participants earned 23.73 Euro on average for participating in the experiment.

3.2. Experimental task

Upon arrival at the experimental lab, participants are randomly assigned to one of the computer desks. Participants assume the role of a consultant at a consulting firm. They are informed that an important Executive Board presentation at a high-profile client has been moved earlier such that it will take place in 45 min. The presentation is based on an analysis of the client's product portfolio, and participants are asked to prepare as many high-quality slides as possible to visualize the results. Overall performance comprises both output quality and output quantity. Participants learn that the slides are important for acquiring a new high-profile client, and receive performance-based compensation (in EC, experimental currency)[3] that varies based on their treatment groups. They then answer comprehension check questions to ensure that they have understood the scenario and their compensation schemes.[4] Contextualizing the purpose of completing the sliders is an important design choice to give participants a sense of purpose. Our CLT-based expectations imply that deferral induces a higher construal level in which participants consider the higher purpose of their actions more strongly. The task is hence designed to provide an abstract purpose of working for the good of the firm. Working at a consulting firm is common among students, making it easier for them to identify with the situation and adopt the firm's goal as their own.

Bonus recovery occurs when performance targets are not met. We focus on bonus recovery triggered by low effort-based performance outcomes although in practice underperformance can also result from

[3] The experimental currency is experimental Dollar ($; exchange rate: $1 = 1/30 EUR).

[4] These comprehension questions are aimed at ensuring that participants understand their bonus schemes, which is critical to our manipulations. As all incentive schemes are tied to both output quantity and output quality, it is unlikely that participants can guess our hypotheses (i.e., whether they are meant to provide more or less effort in each condition); thus, these questions are unlikely to lead to demand effect (Eckerd et al., 2021). Further, individuals' attitudinal shift as a result of varying construal levels generally happens without awareness (Trope & Liberman, 2010), further reducing the likelihood of demand effect.

external factors. The experimental task is an adaptation of the effort-sensitive slider task developed by Gill and Prowse (2012), which Choi et al. (2025) find well suited for testing the effect of incentive compensation on performance. Participants use the computer mouse to move sliders on scales to pre-specified values, which requires care and precision. The position of each slider can only be changed once; as soon as participants release hold of a slider by removing their finger from the mouse, they cannot move it again. This slider task incorporates the possibility of failure, is effort-sensitive, and requires no specialized skill or knowledge. The values indicated by the position of the slider will then be displayed in diagrams on presentation slides.

Prior to the actual task, participants complete 10 sliders as practice (with no time limit). This practice round controls for learning effects in specialized, repetitive tasks (Bohn & Lapré, 2011; Staats & Gino, 2012).[5] Participants then have 45 min to complete as many high-quality presentation slides as possible to help their firm win a new business opportunity, with each slide containing 10 sliders. After each set of sliders, a screen shows the completed bar diagram, remaining time, number of correctly and incorrectly positioned sliders in the current presentation slide and the resulting effect on the participant's bonus. Throughout the experiment, participants are provided with information about their current quantity and quality performance, as well as accumulated bonus, so that they can allocate effort accordingly. The ongoing performance measurement mimics the information available during a period in which managers aim to meet performance goals before it ends (e.g., a quarter or a year). After 45 min, participants respond to two manipulation check questions that assess whether they recalled their compensation scheme, followed by a post-experimental questionnaire (PEQ) which includes questions on their motivation when performing the task and demographic characteristics.

3.3. Independent variables

While the compensation structure varies across treatments, all participants are informed that compensation earned during the experiment will be transferred to their bank accounts. The first independent variable is bonus timing. In the "bonus deferred" treatment, participants receive their compensation six months after the experiment. The bonus earns no interest during the deferral period; given the low interest rate at the time of the experiment, interest for a 6-month deferral would have been negligible. In the "bonus now" treatment, the bonus is transferred to their bank account immediately after the experiment. Due to regular banking processes, participants receive their bonus within two working days, which reduces perceived differences in transaction costs between treatments (Denant-Boèmont, Diecidue, & l'Haridon, 2017).

The second independent variable is bonus recovery triggered by unsatisfactory output quality. We select quality as the trigger because it can be measured objectively on a binary basis and creates a realistic trade-off between working slowly and diligently or more quickly and less precisely. In the "no bonus recovery" treatment, participants receive $2 for each correctly positioned slider. Based on an average expected success rate of 83.23%, the expected payoff per diagram is $16.65 (10 * $2 * 83.23%). In the "bonus recovery" treatment, incorrectly positioned sliders result in a deduction from the overall bonus earned such that participants can lose already earned bonuses. All participants are advised that the minimum bonus for the first part of the experiment is $0.

Our bonus recovery manipulation thus differs from previous research where performance-contingent bonus recoveries apply to non-contingent bonuses (e.g., Brink & Rankin, 2013). While rewarding net performance over a longer period is a core characteristic of bonus recovery schemes that result in economically different incentives than contracts without recovery (Chen et al., 2015; DeHaan et al., 2013; Gillan & Nguyen, 2016), we are interested in the behavioral effects of bonus recovery abstract from economic consequences. We therefore designed the compensation scheme to keep expected payments equivalent between the no bonus recovery treatment and the bonus recovery treatment.[6] Participants in the bonus recovery treatment receive $2.40 for each correctly positioned slider, while each incorrectly positioned slider reduces their variable compensation by $2.00. The payment per slider effectively incorporates a risk premium in the recovery treatment.[7]

In the experiment, participants receive information on the number of (in)correctly positioned sliders and the effect on their variable compensation immediately after each set of 10 sliders. All compensation payments are made after the experiment. Consequently, the bonus deferred/bonus recovery treatment leads to an immediate recovery with deferred bonus payout. Although in practice, such combinations are commonly implemented as deferred recoveries, the economic incentives are equivalent since bonus payments reflect effort-based performance in both settings. The behavioral effect of bonus recovery is based on the expectation of recovery occurrence (individuals alter their behavior to avoid aversive losses of previously awarded bonuses) which should not differ between the two operationalizations. Additionally, payout of all bonuses after the experiment ensures that participants in both the bonus now and bonus deferred treatment experience the same utility gains associated with earning and receiving the reward, so that temporal unbundling is unlikely to cause the effect of bonus deferral (Stefaniak et al., 2025).

3.4. Dependent variables

Our dependent variable is participants' performance on the slider task, which captures effort. The number of correctly positioned sliders (*PERFORMANCE*) reflects their overall effort-based performance. We measure effort toward performance quantity (*QUANTITY*) by the number of sliders attempted, and effort toward performance quality (*QUALITY*) by the success rate (i.e., the proportion of correctly positioned sliders). Since each slider can be positioned correctly by moving it slowly, the task creates a trade-off between working quickly to increase quantity and working carefully to maintain quality. The instructions equally highlight both, by asking participants to complete "*as many high-quality presentation slides as possible*". As the task itself is uninteresting,

[5] Our results remain qualitatively the same when we exclude the first 30 or 40 sliders from our analysis.

[6] We used pretest results to calibrate the incentive schemes such that economic incentives for a set quantity of sliders are the same in both bonus recovery treatments. A similar approach is used in Oblak et al. (2018) where payments per period differ but the overall payoff is equal across treatments. It is not possible to hold the economic incentives per slider constant across the two bonus recovery manipulations since participants in the no bonus recovery treatment earn a bonus of $0 when they fail to set a slider correctly. As a result, holding the economic incentives per slider constant across the two bonus recovery manipulations would imply a bonus recovery of $0 in case of an incorrectly positioned slider and would thus not allow us to implement losses of previously earned bonuses.

[7] Based on an average expected success rate of 83.23%, the expected payoff per diagram is approximately $16.65 (10 * $2.4 * 83.23% - 10 * $2 * (100% - 83.23%)). We obtained this success rate in a pretest, where seven students completed a total number of 1300 sliders, with 1082 of these positioned correctly. We further tested the robustness of this result with a modification of the slider task that facilitated correct slider positioning. Sixteen participants correctly positioned 4425 out of a total of 5069 sliders (average success rate = 87.30%). For the main experiment, we implemented the first version of the slider task. None of the participants in the pretest study participated in the main experiment. In the experiment, the average payment per correctly positioned slider in the recovery treatment is $1.82 (standard deviation: $1.35) compared to $2 (standard deviation: $0) in the no recovery treatment. A *t*-test indicates that this difference is not significant ($p = 0.287$), suggesting that the expected economic incentives were successfully held constant.

Table 1
Descriptive statistics of dependent variables.

Panel A: Means (standard deviation) of the number of sliders attempted (*QUANTITY*)

		TIMING		TOTAL
		Bonus Now	Bonus Deferred	
RECOVERY	**No Bonus Recovery**	335.53	385.20	361.48
		(104.72)	(101.00)	(105.03)
		N = 32	N = 35	N = 67
	Bonus	296.89	306.12	301.43
	Recovery	(69.40)	(93.28)	(81.56)
		N = 35	N = 34	N = 69
TOTAL		315.34	346.23	331.01
		(89.50)	(104.45)	(98.24)
		N = 67	N = 69	N = 136

Panel B: Means (standard deviation) of the percentage of correctly solved slider tasks (*QUALITY*)

		TIMING		TOTAL
		Bonus Now	Bonus Deferred	
RECOVERY	**No Bonus Recovery**	0.79	0.76	0.77
		(0.14)	(0.13)	(0.14)
		N = 32	N = 35	N = 67
	Bonus	0.85	0.81	0.83
	Recovery	(0.07)	(0.16)	(0.13)
		N = 35	N = 34	N = 69
TOTAL		0.82	0.79	0.80
		(0.12)	(0.15)	(0.13)
		N = 67	N = 69	N = 136

Panel C: Means (standard deviation) of the number of correctly solved slider tasks (*PERFORMANCE*)

		TIMING		TOTAL
		Bonus Now	Bonus Deferred	
RECOVERY	**No Bonus Recovery**	257.25	283.86	271.15
		(71.25)	(51.49)	(62.69)
		N = 32	N = 35	N = 67
	Bonus	253.83	245.97	249.96
	Recovery	(67.64)	(83.89)	(75.62)
		N = 35	N = 34	N = 69
TOTAL		255.46	265.19	260.40
		(68.88)	(71.45)	(70.11)
		N = 67	N = 69	N = 136

participants face a salient conflict between what they should do and what they want to do. On average, participants attempted 331.01 sliders with a success rate of 80.33% (see Table 1).

3.5. Other measured variables

We use the percentage of correctly solved sliders in the practice round to control for participants' innate ability (*ABILITY*). Since bonus recovery introduces the possibility of losing previously earned bonuses, we measure participants' loss aversion (*LOSS*) in an incentive compatible procedure (Abdellaoui et al., 2013). Our findings remain inferentially unchanged when using alternative loss aversion measures (Gneezy & Potters, 1997; Dohmen et al., 2011; Weber et al., 2002). The PEQ also asks participants to state what they were concerned with during the task, to provide insight into their decision processes.

3.6. Regression estimation

We use regression analyses to control for participants' characteristics when examining our hypotheses. We expect individual characteristics, *ABILITY*, *LOSS* and *GENDER*, to affect performance. Since performing a consulting-related task can differ across participants with different levels of work experience and interest in consulting, we add *JOB* and *CONSULTING* to our model for overall performance, reflecting participants' overall strategy of performing well. When including *JOB* and *CONSULTING* in the separate regressions of *QUANTITY* and *QUALITY*, both are insignificant and results are qualitatively unaffected.

We use effect coding to investigate the main effects of bonus timing, bonus recovery, and their interaction based on the variables *TIMING* (−1 = bonus now; 1 = bonus deferred) and *RECOVERY* (−1 = no bonus recovery; 1 = bonus recovery). Effect coding directly derives the effect of an independent variable averaged across the population and thus requires a balanced sample (Bech & Gyrd-Hansen, 2005; Collins & Kugler, 2018). Table 1 shows that participants are evenly distributed across the four treatment groups. We use ordinary least squares regressions for the dependent variables *QUANTITY* and *PERFORMANCE*, and TOBIT regressions for *QUALITY*, which is naturally limited to values between 0 and 1. We exclude participants (8.1%) who failed the two manipulation checks. Results remain inferentially unchanged when including these participants. For directional hypotheses, *p*-values are reported one-tailed; two-tailed otherwise.

4. Results

4.1. The effect of bonus deferral

The first set of hypotheses tests competing predictions of CLT and economic discounting. We hypothesize that deferred bonus payments lead to higher quantity (H1a), higher quality (H1b), and higher overall

Table 2
Regression Analysis for direct and indirect effects of *TIMING* and *RECOVERY*.

Panel A: Linear regression results for dependent variable *QUANTITY*[a]

	Model 1: OLS for *QUANTITY* N = 136		Model 2: OLS for *QUANTITY* N = 132	
Variable	Coefficient	p-value	Coefficient	p-value
Constant	330.93	0.000	295.78	0.000
TIMING [b]	**14.73**	**0.034**	**17.38**	**0.013**
RECOVERY [b]	**−29.43**	**0.000**	**−27.45**	**0.001**
TIMING* x *RECOVERY [#]	−10.11	0.104	**−12.90**	**0.049**
ABILITY			−12.18	0.712
LOSS			3.10	0.003
GENDER			57.98	0.000
	Adj. R^2	**Max. VIF**	**Adj. R^2**	**Max. VIF**
	10.70%	1.00	20.23%	1.08

Panel B: Tobit regression results for dependent variable *QUALITY*

	Model 1: Tobit regression for *QUALITY* N = 136		Model 2: Tobit regression for *QUALITY* N = 132	
Variable	Coefficient	p-value	Coefficient	p-value
Constant	0.80	0.000	0.70	0.000
TIMING [b]	−0.02	0.129′	−0.02	0.134
RECOVERY [b]	**0.03**	**0.007**	**0.03**	**0.002**
TIMING* x *RECOVERY [b]	0.00	0.374	0.00	0.711
ABILITY			**0.24**	**0.000**
LOSS			−0.00	0.179
GENDER			−0.02	0.328
	Pseudo R^2	**Max. VIF**	**Pseudo R^2**	**Max. VIF**
	−5.39%	1.00	−23.78%	1.07

Variable definitions.
TIMING – factor variable (−1 = Bonus Now; 1 = Bonus Deferred).
RECOVERY – factor variable (−1 = No Recovery; 1 = Bonus Recovery).
ABILITY – performance in the practice round.
LOSS – degree of loss aversion under risk calculated based on mixed outcome prospects (Abdellaoui et al., 2013).
GENDER – dummy variable (0 = female, 1 = male).
[a] Untabulated results including a dummy variable for the location of the experimental session indicate that there is no statistically significant main or interaction effect between the university the experiment was conducted at and the independent variables. The results remain qualitatively the same.
[b] Indicates *p*-values are reported one-tailed (with directional hypotheses); all other p-values are reported two-tailed.

performance (H1c). Table 1 presents descriptive statistics for these variables. Consistent with H1a, the regression analysis shows that the timing of bonus payments has a significantly positive effect on output quantity in both models with (17.38, $p = 0.013$) and without (14.73, $p = 0.034$; Table 2 panel A) control variables, with higher output quantity when the bonus is deferred than when it is received immediately (346.2 vs. 315.3; Table 1 panel A). Inconsistent with H1b, we find no significant effect of bonus timing on output quality (Table 2 panel B). These results indicate that although bonus deferral does not highlight a specific performance target, participants' natural inclination in improving overall performance is to prioritize quantity.

These unidimensional effects of bonus timing are consistent with prior cognitive psychology research suggesting that individuals typically focus on one objective when several objectives are present (Payne et al., 1993). In multitask settings, individuals typically focus on easier, more productive activities (Duggan et al., 2013; Janssen et al., 2011; Payne et al., 2007) and increasing effort toward output quantity may appear a superior strategy in our setting. Also, quality performance is characterized by an upper bound at 100%, which limits quality improvements. Consequently, performance is more sensitive to quantity than quality efforts.

While participants achieve higher overall performance in the bonus deferred treatment than the bonus now treatment (265.2 vs. 255.5; Table 1 panel C), we do not find a significant main effect of the timing of bonus payments on overall performance (Table 3 panel A). This suggests that when deferred bonuses encourage higher effort levels, participants' strategy of prioritizing quantity does not significantly affect overall performance.

4.2. The effect of bonus recovery

H2a proposes that quality performance is higher in the presence of bonus recovery tied to output quality. Consistent with this, average output quality is higher in the bonus recovery treatment than in the no bonus recovery treatment (0.83 vs. 0.77; Table 1 panel B). Regression results provide formal support for H2a and show a significantly positive effect of bonus recovery on output quality in both models with (0.03, $p = 0.002$) and without (0.03, $p = 0.007$; Table 2 panel B) control variables. Evidence from the PEQ provides further support for the effort-directing effect of bonus recovery: Participants with bonus recovery self-reported significantly greater concern of failing in the slider task (no bonus recovery vs. bonus recovery: 4.4 vs. 5.01, $\chi 2 = 8.940$, $p = 0.003$, untabulated) and significantly greater focus on working with precision (no bonus recovery vs. bonus recovery: 5.57 vs. 6.17, $\chi 2 = 5.489$, $p = 0.019$, untabulated) than those without bonus recovery.

In support of H2b, our results also show that output quantity is lower in the presence of bonus recovery (301.43 – 361.48 = - 60.05; Table 1 panel A) and this effect is significant in both models with (−27.45, $p = 0.001$) and without (−29.43, $p = 0.000$; Table 2 panel A) control variables. This finding cannot be explained by participants overestimating their success rate (e.g., Heath & Tversky, 1991; Shelley, 1994), which would predict higher perceived incentives and thus a positive rather than negative effect on output quantity in the bonus recovery treatment.

Next, we examine the effect of bonus recovery on overall performance. Table 1 panel C shows that overall performance is lower in the bonus recovery treatment than in the no bonus recovery treatment (250.0 vs. 271.1) and regression results find a significantly negative effect of bonus recovery on overall performance in the model without control variables (−10.33, $p = 0.085$; Table 3 Panel A), but not with control variables. This finding provides weak support for the argument that bonus recovery leads to lower overall performance by causing effort distortions. Bonus recovery raises performance quality but lowers performance quantity, and quantity efforts translate into overall performance more effectively than quality efforts (ceteris paribus). Our results consequently suggest that bonus recovery affects employees' effort

Table 3
Analyses of overall performance.

Panel A: Linear regression results for the number of correctly solved slider tasks (*PERFORMANCE*)[b]

	Model 1: OLS for *PERFORMANCE* N = 136		Model 2: OLS for *PERFORMANCE* N = 132	
Variable	Coefficient	p-value	Coefficient	p-value
Constant	260.23	0.000	201.69	0.000
TIMING	4.69	0.216′	6.15	0.132
RECOVERY	**−10.33**	**0.085**	−8.36	0.139
TIMING* x *RECOVERY [a]	**−8.62**	**0.075′**	**−9.44**	**0.046**
ABILITY			**82.67**	**0.001**
LOSS			**1.28**	**0.082**
GENDER			**39.27**	**0.001**
JOB			**24.66**	**0.030**
CONSULTING			−33.59	0.130
	Adj. R^2	**Max. VIF**	**Adj. R^2**	**Max. VIF**
	2.07%	1.00	21.20%	1.08

Panel B: Linear regression results for the number of correctly solved slider tasks (*PERFORMANCE*) in the no recovery subsample

	Model 1: OLS for *PERFORMANCE* N = 67		Model 2: OLS for *PERFORMANCE* N = 63	
Variable	Coefficient	p-value	Coefficient	p-value
Constant	257.25	0.000	184.37	0.000
TIMING [a]	**26.61**	**0.042**	**29.46**	**0.024**
ABILITY			39.98	0.174
LOSS			**1.56**	**0.032**
GENDER			**41.73**	**0.007**
JOB			17.46	0.255
CONSULTING			25.40	0.408
	Adj. R^2	**Max. VIF**	**Adj. R^2**	**Max. VIF**
	3.09%	1.00	20.21%	1.14

Panel C: Linear regression results for the number of correctly solved slider tasks (*PERFORMANCE*) in the recovery subsample

	Model 1: OLS for *PERFORMANCE* N = 69		Model 2: OLS for *PERFORMANCE* N = 69	
Variable	Coefficient	p-value	Coefficient	p-value
Constant	253.83	0.000	206.31	0.000
TIMING [a]	−7.86	0.335	−8.10	0.312
ABILITY			**115.22**	**0.003**
LOSS			0.16	0.953
GENDER			**34.84**	**0.049**
JOB			21.77	0.199
CONSULTING			**−71.19**	**0.031**
	Adj. R^2	**Max. VIF**	**Adj. R^2**	**Max. VIF**
	−1.21%	1.00	21.92%	1.12

Variable definitions.
TIMING – factor variable (−1 = Bonus Now; 1 = Bonus Deferred).
RECOVERY – factor variable (−1 = No Recovery; 1 = Bonus Recovery).
ABILITY – performance in the practice round.
LOSS – degree of loss aversion under risk calculated based on mixed outcome prospects (Abdellaoui et al., 2013).
GENDER – dummy variable (0 = female, 1 = male).
JOB – dummy variable (whether participants currently have a job where 0 = no, 1 = yes.).
CONSULTING – participants' interest in consultancy, where lower values indicate higher interest.

[a] Indicates *p*-values are reported one-tailed (with directional hypotheses); all other p-values are reported two-tailed.

[b] Untabulated results including a dummy variable for the location of the experimental session indicate that there is no statistically significant main or interaction effect between the university the experiment was conducted at and the independent variables. The results remain qualitatively the same.

allocation and can, at least in our setting, reduce overall performance.

4.3. Combining bonus deferral and bonus recovery

H3a and H3b posit that the positive effects of bonus deferral on quantity and quality performance are lower when it is combined with bonus recovery. Consistent with H3a, we find that the difference in output quantity is larger in the absence of bonus recovery (385.20 – 335.53 = 49.67) than when it is present (306.12 – 296.89 = 9.23; Table 1 panel A). Based on a *t*-test, this difference (49.67-9.23 = 40.44) is significant ($p = 0.016$, one-tailed, untabulated). A regression analysis with controls finds a significant negative interaction of bonus deferral and recovery on output quantity (−12.90; $p = 0.049$; Table 2 panel A), but not in the model without controls. Overall, these results support H3a, that is, that bonus recovery counteracts the positive effect of bonus deferral.

With respect to H3b, we find that the difference of output quality between immediate and deferred bonus payments is similar between the no recovery (0.79 – 0.76 = 0.03) and the recovery treatment (0.85 – 0.81 = 0.04; Table 1 panel B). The regression analyses of output quality do not show a significant interaction effect between bonus deferral and recovery (Table 2 panel B). These findings indicate that output quality is generally unchanged under bonus deferral and combinations of bonus deferral and bonus recovery. We illustrate these results in Figs. 1 and 2.

Finally, consistent with H3c, the interaction between bonus deferral and recovery is significant and negative in regressions of overall performance with (−9.44; $p = 0.046$) and without (−8.62; $p = 0.075$; Table 3 panel A) control variables. Splitting the sample and testing the effect of bonus deferral on overall performance separately for the recovery and the no recovery treatment, bonus deferral has a significant positive effect on overall performance when there is no bonus recovery (26.61; $p = 0.042$ without controls; 29.46; $p = 0.024$ with controls, Table 3 panel B), but not in the recovery subsample (Table 3 panel C). H3c is supported.

Overall performance is highest in the deferred bonus/no bonus recovery treatment (283.9, Table 1 panel C), and lowest when bonus deferral is combined with bonus recovery (246.0). Untabulated *t*-tests suggest that overall performance in the deferred bonus/no bonus recovery treatment is significantly higher than in the other three treatments ($p = 0.027$), whereas performance in the other treatments is not statistically different (pairwise t-tests: $p = 0.841$, $p = 0.559$, and $p = 0.669$; untabulated). These findings suggest that bonus deferral in the absence of bonus recovery yields the highest overall performance by increasing participants' willingness to exert effort without directing it to specific performance domains. Combining bonus deferral and recovery reduces overall performance, since it reduces quantity performance (H3a; see Table 2 panel A), while quality performance does not change (H3b; see Table 2 panel B). These results are illustrated in Fig. 3.

Together, our findings suggest that while bonus deferral increases effort, bonus recovery emphasizes the monetary consequences. The fear of losing bonuses prompts individuals to redirect effort toward the performance domain associated with bonus recovery and reduces their concern for what they should do. By increasing participants' concern for their economic payoff, the bonus recovery impedes the positive effect of bonus deferral on overall performance.

4.4. Supplementary analysis: post experimental questions

To further examine our results, we analyze participants' self-reported motivation when working on the task via follow-up questions. Participants rate 12 items on how important various considerations were when working on the task (1 (6) = not important at all (extremely important); see Table 4 Panel A). A principal component analysis with varimax rotation yields three factors that together explain 56.34% of the variance. We average the items to form three composite variables: *RESPONSIBILITY* (concern for advancing the firm's long-term interest; 5 items), *MONETARY* (concern for obtaining a high bonus; 5 items), and *SELF* (concern for self-improvement; 2 items).

Regression results (Table 4 Panel B) show no significant effects for *RESPONSIBILITY*. In contrast, *MONETARY* motivation is significantly higher in the presence of bonus recovery (coefficient of *RECOVERY*: 0.261; $p < 0.01$), consistent with bonus recovery directing participants' attention to the monetary consequences of their performance. We also find a significantly negative effect of *RECOVERY* on *SELF* motivation (−0.241; $p < 0.01$), suggesting that the threat of losing a bonus negatively affects participants' sense of self-advancement.

4.5. Supplemental experiments: process evidence

To establish the causal chain underlying our main findings, we conduct two supplemental experiments (see Appendix) following the approach advocated by Spencer et al. (2005). Supplemental Experiment 1 replicates the main experiment's design and task but measures construal level as the dependent variable, to show that the same

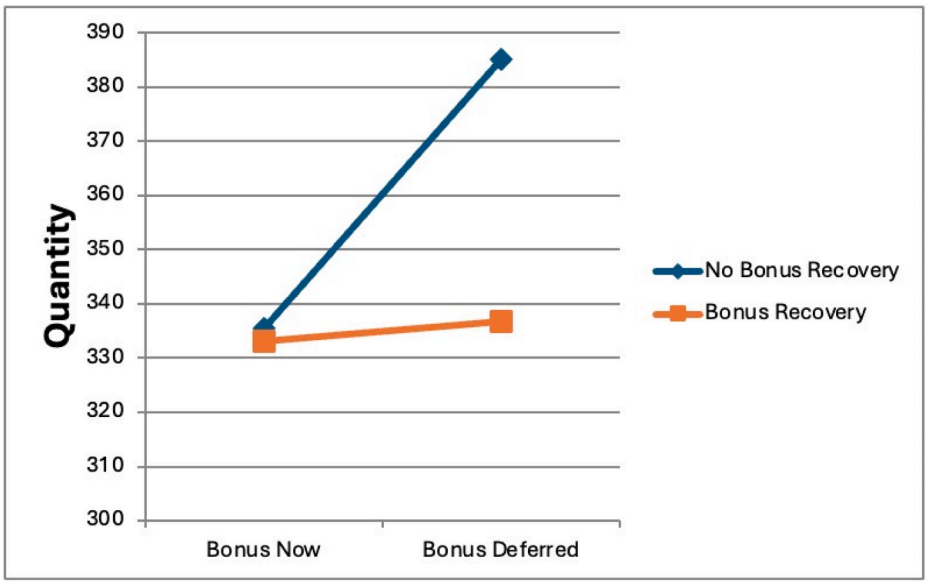


Fig. 1. Number of sliders attempted (*QUANTITY*) depending on treatment.

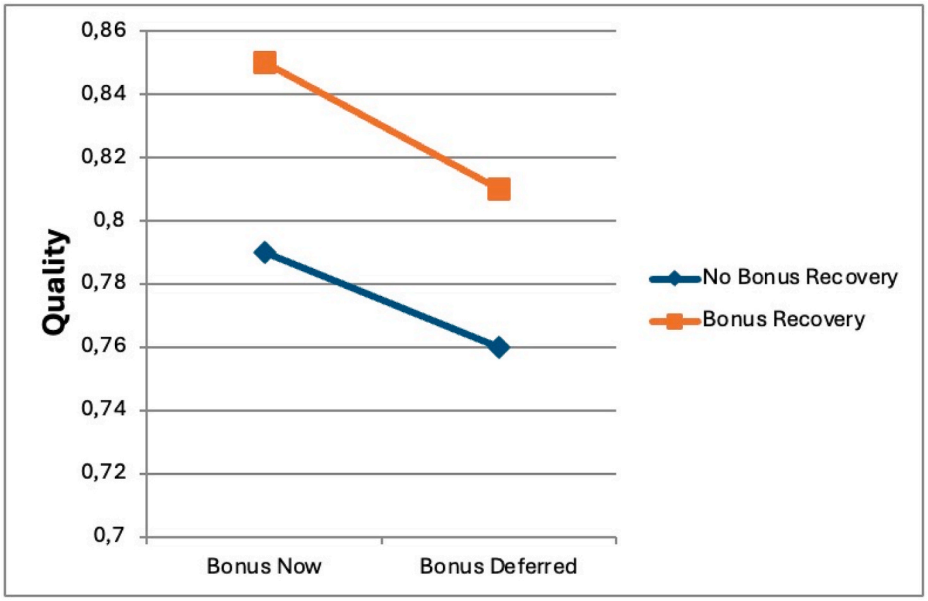


Fig. 2. Percentage of correctly solved slider tasks (*QUALITY*) depending on treatment.

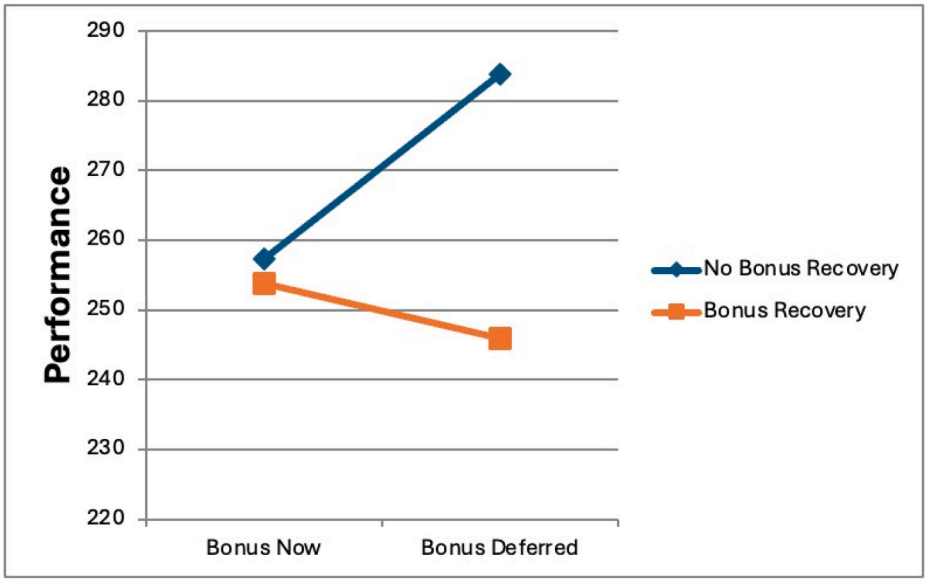


Fig. 3. Number of correctly solved slider tasks (*PERFORMANCE*) depending on treatment.

compensation manipulation that produces the performance effects in our main experiment also shifts construal level (compensation → construal level). In Supplemental Experiment 2, we manipulate construal level through an established priming procedure (Freitas et al., 2004; Sweeney & Freitas, 2014) and test its causal effect on effort provision (construal level → effort). For this experiment, we deliberately employ a different effort-sensitive task, a proofreading task (e.g., Cho, 2015; Halin et al., 2014; Levy & Begin, 1984), to show that any resultant positive findings do not merely reflect task-specific features, but rather, a general cognitive mechanism. Demonstrating the effect in a different context provides stronger evidence for the construal level to effort link (Trope & Liberman, 2010).

4.5.1. *Supplemental experiment 1: The effect of compensation on construal level*

Supplemental Experiment 1 examines the direct effect of bonus deferral and recovery on participants' construal level. We measure construal level using the dynamic Behavior Identification Form (BIF) (Nguyen et al., 2023), a novel and validated measure that overcomes key limitations of the classic BIF (Vallacher & Wegner, 1989).[8] Consistent with our hypotheses, we expect bonus deferral to increase construal level and bonus recovery to counteract this effect. Supplemental Experiment 1 replicates the 2x2 between-participants design in our main experiment, manipulating bonus timing (bonus now vs. bonus deferred) and bonus recovery (no recovery vs. recovery). 89 business students

[8] The classical BIF asks individuals to choose between pre-specified abstract and concrete descriptions of actions (e.g., describing "writing a list" as either "getting organized" or "writing things down"). However, these pre-specified descriptions may not match participants' individual goal hierarchies, potentially obscuring their construal levels. The dynamic BIF addresses this limitation by allowing participants to generate their own abstract ("why") and concrete ("how") descriptions of activities in a context that fit their experimental setting.

Table 4
Analyses of post experimental questions·

Panel A: Means (standard deviation) for the importance of different factors to participants' effort provision

	Bonus Now/No Recovery	Bonus Now/ Recovery	Deferred Bonus/No Recovery	Deferred Bonus/ Recovery	*Average*
Managers' responsibility for advancing firm interests					
i) Commitment to creating excellent presentation slides for the firm.	4.50 (1.30)	4.17 (1.84)	3.77 (1.59)	4.32 (1.43)	*4.18 (1.56)*
ii) My responsibility towards the firm.	3.50 (1.30)	3.71 (1.71)	3.11 (1.86)	3.47 (1.66)	*3.45 (1.65)*
iii) The fact that the firm benefits from a larger number of presentation slides.	3.72 (1.51)	3.17 (1.54)	3.54 (1.79)	3.71 (1.57)	*3.53 (1.61)*
iv) My contribution to the prospects of the firm.	3.78 (1.48)	3.43 (1.48)	3.17 (1.74)	3.56 (1.44)	*3.48 (1.54)*
v) The fact that the firm benefits from high-quality presentation slides.	3.84 (1.44)	3.69 (1.45)	3.34 (1.70)	3.65 (1.50)	*3.62 (1.52)*
Managers' monetary motivation to obtain a high bonus					
vi) The impact of a larger number of correct slides on my compensation.	4.66 (1.49)	5.00 (1.21)	4.66 (1.41)	5.12 (0.81)	*4.86 (1.26)*
vii) The compensation I could earn through my work.	5.06 (0.98)	5.17 (0.95)	5.00 (1.21)	5.35 (0.77)	*5.15 (0.99)*
viii) The likelihood that my compensation is paid out to me.	4.41 (1.29)	4.63 (1.31)	4.83 (1.40)	4.71 (1.49)	*4.65 (1.37)*
ix) The fact that I felt rewarded for good work.	4.66 (1.38)	4.83 (1.32)	4.77 (1.35)	5.21 (0.95)	*4.87 (1.26)*
x) The impact of a larger number of attempted slides on my compensation.	4.59 (1.48)	4.57 (1.38)	4.17 (1.64)	4.97 (1.14)	*4.57 (1.43)*
Managers' concern about self-advancement					
xi) The fact that I felt punished for bad work.	2.84 (1.48)	4.49 (1.38)	2.77 (1.63)	3.85 (1.64)	*3.50 (1.68)*
xii) The extent to which my work will be beneficial for me personally.	3.78 (1.72)	4.00 (1.66)	3.66 (1.81)	3.35 (1.55)	*3.70 (1.69)*

Panel B: Linear regression results for the composite variables *RESPONSIBILITY, MONETARY,* and *SELF*[a]

	RESPONSIBILITY N = 136		*MONETARY* N = 136		*SELF* N = 136	
Variable[2]	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
Constant	0.003	0.972	−0.002	0.978	0.003	0.976
TIMING	−0.078	0.365	0.052	0.530	0.008	0.922
RECOVERY	0.056	0.518	0.261	0.002	−0.241	0.005
TIMING* x *RECOVERY	0.090	0.295	0.079	0.346	−0.030	0.725
	Adj. R[b]	**Max. VIF**	**Adj. R**[b]	**Max. VIF**	**Adj. R**[b]	**Max. VIF**
	−0.46%	1.00	5.66%	1.00	3.82%	1.00

Variable definitions.
RESPONSIBILITY – Factor variable for PEQ questions related to participants' motivation by responsibility toward the firm.
MONETARY – Factor variable for PEQ questions related to participants' motivation by monetary rewards.
SELF – Factor variable for PEQ questions related to participants' considerations about their self advancement.
TIMING – factor variable (−1 = Bonus Now; 1 = Bonus Deferred).
RECOVERY – factor variable (−1 = No Recovery; 1 = Bonus Recovery).
[a] Untabulated results including a dummy variable for the location of the experimental session indicate that there is no statistically significant main or interaction effect between the university the experiment was conducted at and the independent variables. The results remain qualitatively the same.
[b] All *p*-values are reported two-tailed.

participated in the computerized laboratory, earning 19.97 Euro on average.

We measure participants' construal level using the dynamic BIF procedure similar to Nguyen et al. (2023). Participants assume the role of consultants and learn that activities can be described either in terms of "why" (abstract level) or "how" (concrete level). After completing a practice item, participants generate their own "why" and "how" descriptions for eight consulting-related work activities.[9] Next, they receive the same information about their consulting project assignment and compensation scheme as in our main experiment. After completing a manipulation check (as before, participants who failed these checks are excluded; failure rate: 5.6%), they rate each of the eight activities on a 6-point Likert scale, anchored by their own previously generated "how" description (1) and "why" description (6). We compute the average rating across all activities as our measure of construal level (higher scores indicate more abstract thinking). To maintain experimental realism and incentive compatibility, participants briefly perform a real-effort slider task to ensure that their performance-contingent compensation is genuine. Finally, we measure the same control and demographic variables (e.g., loss aversion) as in the main experiment.

Table 5 panel A presents descriptive statistics for construal level. The mean values are lowest in the Bonus Now/No recovery group, and highest in the Bonus Deferred/No Recovery group. Table 5 panel B presents the same regression models as those in the main experiment analyses. Consistent with our theory underpinning H1, the coefficients on *TIMING* are significantly positive across both models with and without control variables ($p < 0.05$), indicating that bonus deferral increases construal level. Also consistent with our theory for H3, the coefficients on the interaction of *TIMING*RECOVERY* are significantly negative in the model with control variables ($p < 0.05$) and marginally significant in the model without control variables ($p < 0.10$), indicating that the combination of bonus deferral and recovery reduces construal level.

The findings of Supplemental Experiment 1 provide direct process evidence in support of our argument that while bonus deferral increases construal level, bonus recovery diminishes it. Notably, the significant reduction in construal level in the deferred bonus/recovery treatment

[9] The following activities were used to tailor the dynamic BIF to our specific context: (1) taking notes during a client meeting, (2) preparing a PowerPoint presentation about work results, (3) proofreading a report, (4) doing overtime at work, (5) analyzing a client's data set of key performance indicators, (6) giving a presentation for a client, (7) writing an email to a supervisor about project progress, and (8) incorporating client feedback in a report.

Table 5
Descriptive statistics of *average construal level* as dependent variable and regression analysis for direct and indirect effects of *TIMING* and *RECOVERY*.

Panel A: Means (standard deviation) of *average construal level*

		TIMING		TOTAL
		Bonus Now	Bonus Deferred	
RECOVERY	**No Bonus Recovery**	3.13	3.75	3.42
		(1.05)	(0.73)	(0.95)
		N = 21	N = 19	N = 40
	Bonus	3.54	3.61	3.57
	Recovery	(0.84)	(1.10)	(0.96)
		N = 23	N = 21	N = 44
TOTAL		3.34	3.68	3.50
		(0.96)	(0.93)	(0.95)
		N = 44	N = 40	N = 84

Panel B: Linear regression results for *average construal level*

	Model 1: OLS for *Average Construal Level* N = 84		Model 2: OLS for *Average Construal Level* N = 67	
Variable	Coefficient	p-value	Coefficient	p-value
Constant	3.51	0.000	4.23	0.000
TIMING[a]	**0.17**	**0.050**	**0.22**	**0.044**
RECOVERY	0.07	0.515	0.01	0.944
TIMING x RECOVERY	**−0.14**	**0.091**	**−0.23**	**0.032**
GENDER			−0.44	0.096
ABILITY			−0.06	0.213
LOSS			−0.13	0.313
JOB			0.24	0.331
CONSULTING			−0.06	0.563
	Adj. R^2	**Max. VIF**	**Adj. R^2**	**Max. VIF**
	0.02	1.00	0.07	1.24

Variable definitions.
TIMING – factor variable (−1 = Bonus Now; 1 = Bonus Deferred).
RECOVERY – factor variable (−1 = No Recovery; 1 = Bonus Recovery).
ABILITY – performance in the practice round.
LOSS – degree of loss aversion under risk calculated based on mixed outcome prospects (Abdellaoui et al., 2013).
GENDER – dummy variable (0 = female, 1 = male).
JOB – dummy variable (whether participants currently have a job where 0 = no, 1 = yes.).
CONSULTING – participants' interest in consultancy, where lower values indicate higher interest.
[a] indicates *p*-values are reported one-tailed (with directional hypotheses); all other p-values are reported two-tailed.

indicates that bonus recovery does not merely redirect effort toward the recovery-relevant performance, but fundamentally alters participants' mental representation of the task, providing the theoretical link between the compensation structure and the performance patterns observed in our main experiment. Importantly, these results establish the link between compensation structure and construal level in the context of effort provision, extending prior evidence on this link from the investment decision-making setting (Cheng et al., 2019).

4.5.2. Supplemental experiment 2: The effect of construal level on effort

Supplemental Experiment 2 examines the effect of construal level on effort provision, the second link in our proposed causal chain. Prior research finds that a high-level construal mindset enhances self-control and promotes behaviors aligned with long-term goals (Fujita et al., 2006; Sweeney & Freitas, 2014). The main mechanism involves a shift from feasibility-focused to desirability-focused processing, which increases the salience of superordinate goals relative to immediate costs (Fujita et al., 2006; Liberman & Trope, 1998). Carrera et al. (2020) further find that abstract construal increases individuals' willingness to perform desirable but demanding actions because it reduces immediate feasibility concerns. In our setting, participants face a trade-off between the disutility of immediate effort and the superordinate goal of performing well for the firm. Consistent with H1, we expect a higher construal level to increase effort provision.

To test this expectation, we conduct a 1x2 between-participants experiment with construal level (concrete vs. abstract) as the independent variable. We recruited 60 business students, who were paid a fixed compensation of 10 Euro. Those who failed a compensation-related comprehension check were excluded (failure rate: 10%). To manipulate construal level, participants complete a two-stage priming procedure (Freitas et al., 2004; Sweeney & Freitas, 2014; Carrera et al., 2020, see Appendix, Panel C). In stage 1, participants in the abstract (concrete) treatment iteratively generate reasons why (procedures how) they would want to perform well at a consulting firm, each building on their preceding answer to form a chain of increasingly superordinate purposes (subordinate means). In stage 2, participants describe work-related activities in terms of why (how) they are performed, thus reinforcing the mindset established in stage 1.

Participants assume the role of a consultant required to proofread a client report, framed as a critical task for the firm. To measure effort exertion on behalf of the firm, we adopt the extra-work design of DellaVigna et al. (2022). Participants first complete a 10-min obligatory proofreading phase, then freely decide, one paragraph at a time, whether to continue proofreading or to stop and instead browse the internet. The voluntary proofreading phase lasts 15 min, after which participants indicate how many further paragraphs they would be willing to complete if they had the chance (0-20). We capture voluntary effort in two ways: *Voluntary Time*, the number of minutes participants continue proofreading beyond the obligatory phase, and *Voluntary Output*, the number of paragraphs they voluntarily proofread plus the number of additional paragraphs they state they would have completed had more time been available[10]. The experiment concludes with a measurement of relevant control variables and demographics.

As shown in Table 6 panel A, both *Voluntary Time* and *Voluntary Output* are higher in the abstract treatment than in the concrete treatment. These differences are significant (Mann-Whitney-U-Test $p < 0.05$, one-tailed, untabulated). Table 6 panel B and C report the Tobit regression analyses. Consistent with the construal-level mechanism underlying H1, *CONSTRUAL* is significantly positive for both *Voluntary Time* and *Voluntary Output*, with and without control variables ($p < 0.05$).

Together, the two supplemental experiments establish the causal chain underlying our main findings: the compensation structure shifts construal level and construal level in turn increases voluntary effort provision. This provides process evidence that the performance effects documented in our main experiment operate through the construal-level mechanism we propose.

5. Conclusion and discussion

In this study, we examine how compensation schemes that include bonus deferral and bonus recovery affect incentive problems concerning effort provision. We find that bonus deferral increases effort provision, raising output quantity, while output quality remains unchanged. In contrast, bonus recovery shifts effort to the performance domain linked to recovery, raising performance in that domain at the expense of others. By emphasizing the monetary consequences of behavior, bonus recovery counteracts the positive effect of bonus deferral such that bonus deferral increases overall performance only in the absence of bonus recovery.

The management accounting literature has long acknowledged that bonus schemes can affect employees' willingness to work effectively toward firm interests, and in the aftermath of the global financial crisis,

[10] Two design features ensure that continued proofreading reflects genuine firm-directed effort. First, participants' decision to stop does not affect their pay. Second, those who stop can browse the internet for the remainder time, thus providing a real-leisure option and an opportunity cost on continued work (Goerg et al., 2019).

Table 6
Descriptive statistics of effort measures *Voluntary Time* and *Voluntary Output* as dependent variable and Tobit regression analysis for direct effects of *CONSTRUAL*.

Panel A: Means (standard deviation) of *Voluntary Time* and *Voluntary Output*

		CONSTRUAL		TOTAL
		Abstract	Concrete	
Effort measure	***Voluntary Time***	7.91	5.01	6.46
		(5.14)	(4.73)	(5.10)
		N = 27	N = 27	N = 54
	Voluntary Output	10.56	5.22	7.89
		(11.31)	(7.03)	(9.71)
		N = 27	N = 27	N = 54

Panel B: Tobit regression results for *Voluntary Time*

	Model 1: Tobit for *Voluntary Time* N = 54		Model 2: Tobit for *Voluntary Time* N = 54	
Variable	Coefficient	p-value	Coefficient	p-value
Constant	4.28	0.001	5.18	0.074
CONSTRUAL [a]	**3.58**	**0.019**	**3.22**	**0.032**
GENDER			−1.36	0.451
ABILITY			−0.05	0.640
JOB			1.23	0.511
CONSULTING			−0.70	0.309
	Pseudo R^2	**Max. VIF**	**Pseudo R^2**	**Max. VIF**
	1.50%	1.00	2.00%	1.16

Panel C: Tobit regression results for *Voluntary Output*

	Model 1: Tobit for *Voluntary Output* N = 54		Model 2: Tobit for *Voluntary Output* N = 54	
Variable	Coefficient	p-value	Coefficient	p-value
Constant	3.61	0.093	4.46	0.372
CONSTRUAL [a]	**6.31**	**0.019**	**5.57**	**0.031**
GENDER			−3.85	0.219
ABILITY			−0.11	0.515
JOB			3.78	0.245
CONSULTING			−1.25	0.294
	Pseudo R^2	**Max. VIF**	**Pseudo R^2**	**Max. VIF**
	1.20%	1.00	1.60%	1.16

Variable definitions.
CONSTRUAL – dummy variable, where 0 = concrete mindset manipulation, 1 = abstract mindset manipulation.
GENDER – dummy variable (0 = female, 1 = male).
ABILITY – proxy for participant's reading speed, measured as the time taken to read the experimental instruction text (reverse coded such that higher values indicate faster reading).
JOB – dummy variable (whether participants currently have a job where 0 = no, 1 = yes.).
CONSULTING – participants' interest in consultancy, where lower values indicate higher interest.
[a] Indicates *p*-values are reported one-tailed (with directional hypotheses); all other p-values are reported two-tailed.

bonus schemes combining bonus deferral and recovery have been considered as an effective remedy. Our results indicate that individually, bonus deferral and bonus recovery are effective in aligning behavior with firm goals in settings where employees' behavior influences the probability of bonus recovery. Our study extends prior research on the behavioral effects of bonus deferral in investment decision-making, by showing that bonus deferral also encourages goal-congruent behavior that requires effort. Moreover, our additional experiment provides direct process evidence that supports a CLT-based mechanism, complementing prior evidence in an investment decision-making setting (Cheng et al., 2019). This finding is important because in practice, bonus deferral and recovery are tied not only to misconduct, investment and reporting decisions, but also effort-based performance. Yet, our results indicate that combining bonus deferral with bonus recovery counteracts the positive behavioral effects of deferred bonus payments and may result in lower overall performance. Finally, our results also contribute to the prior research examining the effect of performance-contingent incentives on effort provision, by demonstrating that even when payment *structure* is held constant, the *timing* of bonus payment is important.

We acknowledge limitations in our study that also provide avenues for future research. We find that bonus deferral encourages effort toward output quantity and bonus recovery directs effort to output quality, but the combined effect of both on overall performance likely depends on task characteristics and the definition of performance. Thus, our results regarding total performance should be interpreted with caution. In our task a stronger emphasis on output quality naturally impedes the ability to achieve high output quantity; while this is a common task characteristic, it does not hold for all tasks. Prior literature indicates that the trade-off between output quantity and output quality depends on task difficulty and finds that when individuals focus on accomplishments, simultaneously achieving both is possible (Förster et al., 2003). However, when concerned with potential losses, as is likely the case under bonus recovery, individuals maximize output quality at the expense of output quantity, focusing on avoiding both easy and difficult mistakes. Future research may examine how task difficulty influences the effects of deferral and recovery, fostering a better understanding of their interaction in environments that allow for learning and developing alternative approaches to a task.

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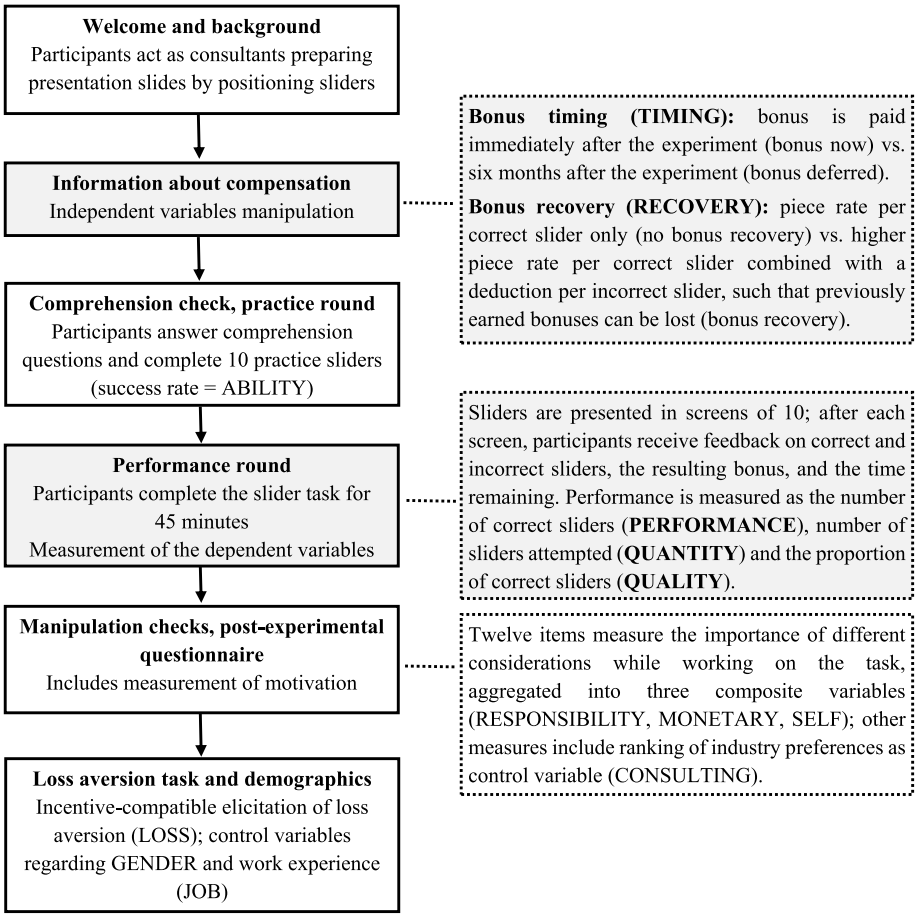
Appendix A. Experimental procedures and manipulations

Panels A to C summarize the procedures of the main experiment and the two supplemental experiments. The left column shows the experimental flow; the right column provides details about the manipulation and measurement of variables. Information related to independent and dependent variables are in shaded boxes.

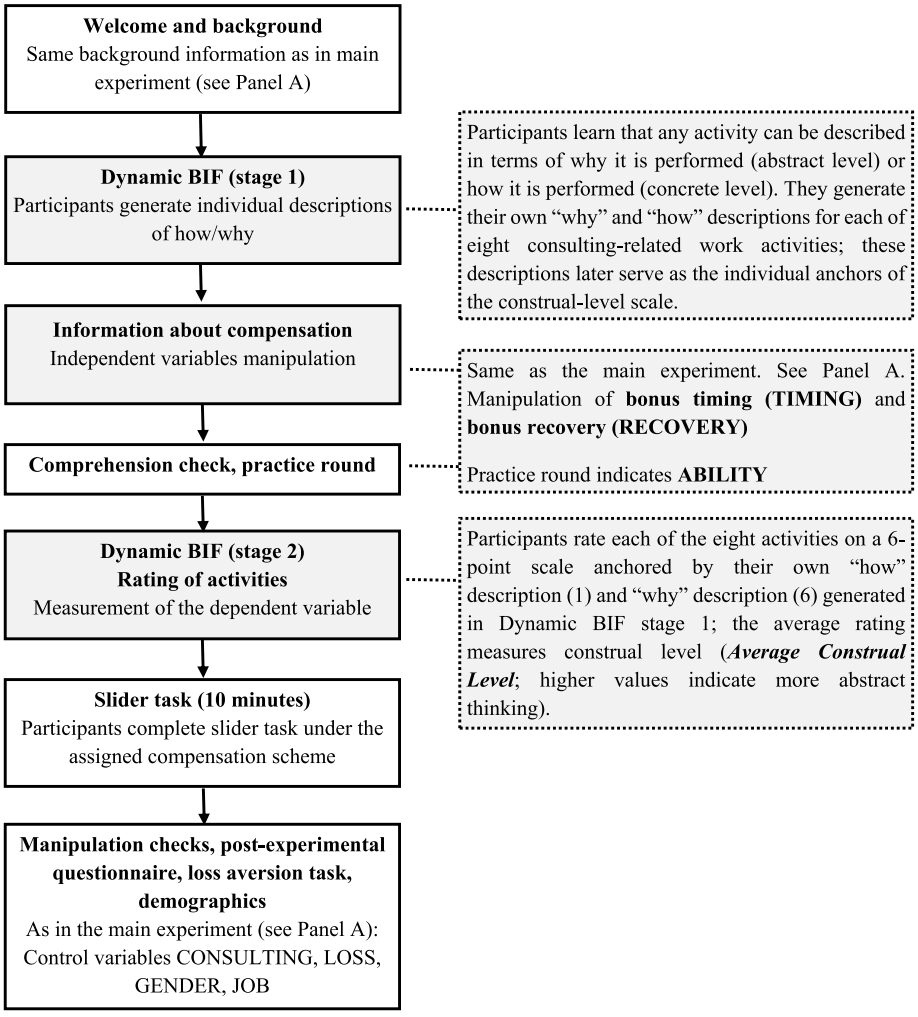
Panel A: Main experiment – effect of bonus deferral and bonus recovery on performance.

Design: 2x2 between-participants; bonus timing × bonus recovery.

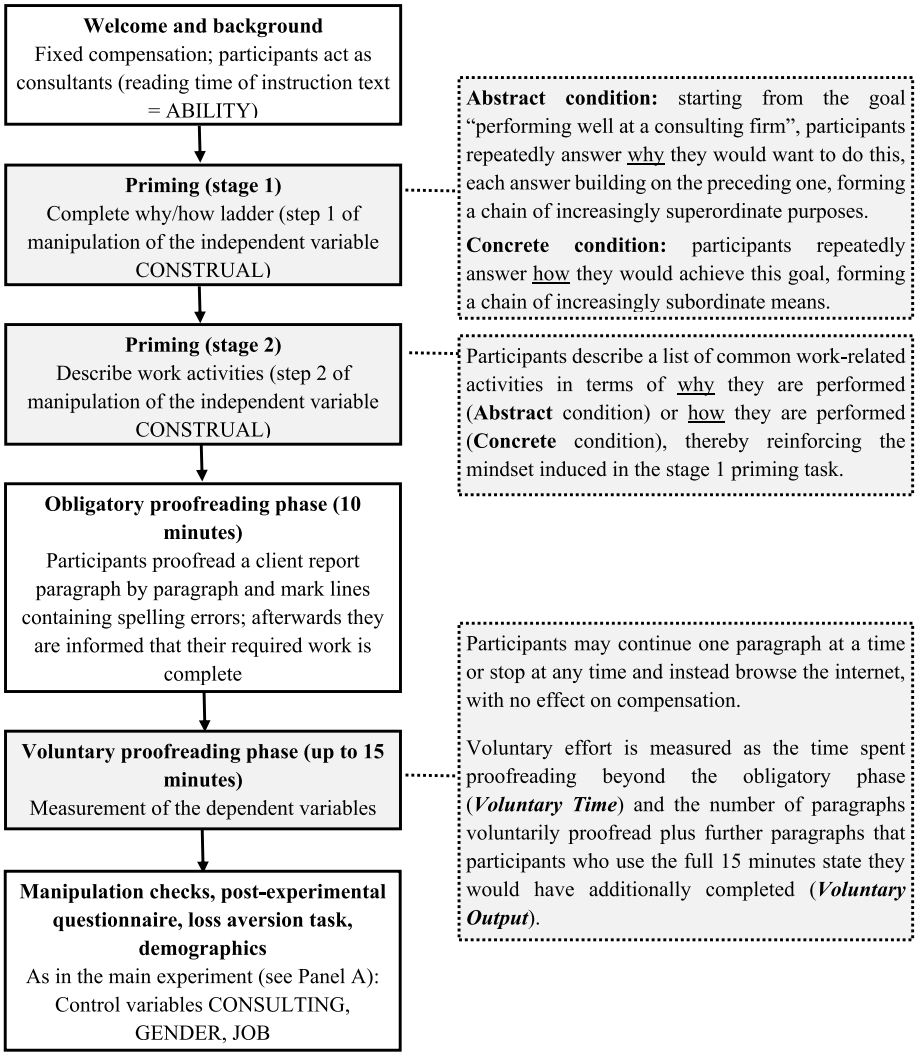
Dependent variable: performance in an effort-sensitive slider task.



Panel B: Supplemental Experiment 1 – effect of bonus deferral and bonus recovery on construal level.
Design: the same as main experiment.
Dependent variable: construal level, measured with the dynamic Behavior Identification Form (dynamic BIF; Nguyen et al., 2023).



Panel C: Supplemental Experiment 2 – effect of construal level on voluntary effort.
Design: 1x2 between-participants; construal level (concrete vs. abstract) manipulated by two-stage priming procedure.
Dependent variable: voluntary effort in a proofreading task.



Data availability

Data will be made available on request.

References

Abdellaoui, M., Bleichrodt, H., l'Haridon, O., & Paraschiv, C. (2013). Is there one unifying concept of utility? An experimental comparison of utility under risk and utility over time. *Management Science, 59*(9), 2153–2169.

Andrejkow, J., Berger, L., & Guo, L. (2022). Conscious and nonconscious goal pursuit in multidimensional tasks. *Accounting, Organizations and Society, 103*, Article 101376.

Ariely, D., & Simonson, I. (2003). Buying, bidding, playing, or competing? Value assessment and decision dynamics in online auctions. *Journal of Consumer Psychology, 13*(1&2), 113–123.

Armantier, O., & Boly, A. (2015). Framing of incentives and effort provision. *International Economic Review, 56*(3), 917–938.

Australian Prudential Regulation. (2018). *Australian prudential regulation authority regulations 2018*. OPC 63440 – B.

Barbopoulos, I., & Johansson, L.-O. (2016). A multi-dimensional approach to consumer motivation: Exploring economic, hedonic, and normative consumption goals. *Journal of Consumer Marketing, 33*(1), 75–84.

Bech, M., & Gyrd-Hansen, D. (2005). Effects coding in discrete choice experiments. *Health Economics, 14*(10), 1079–1083.

Bennett, B., Bettis, C., Gopalan, R., & Milbourn, T. (2017). Compensation goals and firm performance. *Journal of Financial Economics, 124*(2), 307–330.

Bischof, B., Essex, S., & Furtaw, P. (2010). Participating in opportunities and risks. Long live the bonus bank! the re-birth of an old, but strikingly simple idea. *Stern Stewart Research, 40*, 1–12.

Bohn, R. E., & Lapré, M. A. (2011). Accelerated learning by experimentation. In M. Y. Jaber (Ed.), *Learning curves: Theory, models, and applications* (pp. 191–209). Boca Raton: CRC Press.

Bonner, S., & Sprinkle, G. B. (2002). The effects of monetary incentives on effort and task performance: Theories, evidence, and a framework for research. *Accounting, Organizations and Society, 27*(4–5), 303–345.

Bornemann, T., & Homburg, C. (2011). Psychological distance and the dual role of price. *Journal of Consumer Research, 38*(3), 490–504.

Brink, A. G., & Rankin, F. W. (2013). The effects of risk preference and loss aversion on individual behavior under bonus, penalty, and combined contract frame. *Behavioral Research in Accounting, 25*(2), 145–170.

Byrnes, N. (2009). Executive pay: Bonus banks. *Business Week*, (February 4). Available at: https://www.bloomberg.com/news/articles/2009-02-03/executive-pay-bonus-banks.

Carrera, P., Fernández, I., Muñoz, D., & Caballero, A. (2020). Using abstractness to confront challenges: How the abstract construal level increases people's willingness to perform desirable but demanding actions. *Journal of Experimental Psychology: Applied, 26*(2), 339–349.
Chan, L. H., Chen, K. C. W., Chen, T.-Y., & Yu, Y. (2012). The effects of firm-initiated clawback provisions on earnings quality and auditor behavior. *Journal of Accounting and Economics, 54*(2–3), 180–196.
Chen, M. A., Greene, D., & Owers, J. (2015). The costs and benefits of clawback provisions in CEO compensation. *Review of Corporate Finance Studies, 4*(1), 108–154.
Cheng, M., Dinh, T., Schultze, W., & Assel, M. (2019). The effect of bonus deferral on managers' investment decisions. *Behavioral Research in Accounting, 31*(2), 31–49.
Cho, M. (2015). The effects of working possible selves on second language performance. *Reading and Writing, 28*(8), 1099–1118.
Choi, J., Clark, J. D., & Presslee, A. (2025). Measuring effort intensity using real-effort tasks: Eight rules of thumb and comparative analysis of three popular real-effort tasks. *SSRN Working paper*. Available at: https://ssrn.com/abstract=3233162.
Christ, M. H., Emett, S. A., Tayler, W. B., & Wood, D. A. (2016). Compensation or feedback: Motivating performance in multidimensional tasks. *Accounting, Organizations and Society, 50*, 27–40.
Christ, M. H., Sedatole, K. L., & Towry, K. L. (2012). Sticks and carrots: The effect of contract frame on effort in incomplete contracts. *The Accounting Review, 87*(6), 1913–1938.
Church, B. K., Libby, T., & Zhang, P. (2008). Contracting frame and individual behavior: Experimental evidence. *Journal of Management Accounting Research, 20*(1), 153–168.
Collins, L. M., & Kugler, K. C. (2018). *Optimization of behavioral, biobehavioral, and biomedical interventions*. Cham: Springer International Publishing.
DeHaan, E., Hodge, F., & Shevlin, T. (2013). Does voluntary adoption of a clawback provision improve financial reporting quality? *Contemporary Accounting Research, 30*(3), 1027–1062.
DellaVigna, S., List, J. A., Malmendier, U., & Rao, G. (2022). Estimating social preferences and gift exchange at work. *The American Economic Review, 112*(3), 1038–1074.
Denant-Boèmont, L., Diecidue, E., & l'Haridon, O. (2017). Patience and time consistency in collective decisions. *Experimental Economics, 20*(1), 181–208.
Directive. (2010). Directive 2010/76/EU. *Orkesterjournalen L*, 3–35, 329/3, 14.12.2010.
Dodd-Frank Wall Street Reform. (2010). *Dodd-Frank wall street reform and consumer protection act*. Pub. L. No. 111-203. Section 954.
Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J., & Wagner, G. (2011). Individual risk attitudes: Measurement, determinants, and behavioral consequences. *Journal of the European Economic Association, 9*(3), 522–550.
Duggan, G. B., Johnson, H., & Sørli, P. (2013). Interleaving tasks to improve performance: Users maximise the marginal rate of return. *International Journal of Human-Computer Studies, 71*(5), 533–550.
Eckerd, S., DuHadway, S., Bendoly, E., Carter, C. R., & Kaufmann, L. (2021). On making experimental design choices: Discussions on the use and challenges of demand effects, incentives, deception, samples, and vignettes. *Journal of Operations Management, 67*(2), 117–275.
Edmans, A., Gabaix, X., Sadzik, T., & Sannikov, Y. (2012). Dynamic CEO compensation. *The Journal of Finance, 67*(5), 1603–1647.
Erkens, M. H. R., Gan, Y., & Yurtoglu, B. (2018). Not all clawbacks are the same: Consequences of strong versus weak clawback provisions. *Journal of Accounting and Economics, 66*(1), 291–317.
Farrell, A. M., Kadous, K., & Towry, K. (2008). Contracting on contemporaneous versus forward-looking measures: An experimental investigation. *Contemporary Accounting Research, 25*(3), 773–802.
Fischbacher, U. (2007). Z-Tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics, 10*(2), 171–178.
Förster, J., Higgins, E. T., & Bianco, A. T. (2003). Speed/accuracy decisions in task performance: Built-in trade-off or separate strategic concerns? *Organizational Behavior and Human Decision Processes, 90*(1), 148–164.
Frederickson, J. R., & Waller, W. (2005). Carrot or stick? Contract frame and use of decision-influencing information in a principal-agent setting. *Journal of Accounting Research, 43*(5), 709–733.
Freitas, A. L., Gollwitzer, P., & Trope, Y. (2004). The influence of abstract and concrete mindsets on anticipating and guiding others' self-regulatory efforts. *Journal of Experimental Social Psychology, 40*(6), 739–752.
Fujita, K., Trope, Y., Liberman, N., & Levin-Sagi, M. (2006). Construal levels and self-control. *Journal of Personality and Social Psychology, 90*(3), 351–367.
Gill, D., & Prowse, V. (2012). A structural analysis of disappointment aversion in a real effort competition. *The American Economic Review, 102*(1), 469–503.
Gillan, S. L., & Nguyen, N. Q. (2016). Incentives, termination payments, and CEO contracting. *Journal of Corporate Finance, 41*, 445–465.
Gneezy, U., & Potters, J. (1997). An experiment on risk taking and evaluation periods. *Quarterly Journal of Economics, 112*(2), 631–645.
Goerg, S. J., Kube, S., & Radbruch, J. (2019). The effectiveness of incentive schemes in the presence of implicit effort costs. *Management Science, 65*(9), 4063–4078.
Halin, N., Marsh, J. E., Haga, A., Holmgren, M., & Sörqvist, P. (2014). Effects of speech on proofreading: Can task-engagement manipulations shield against distraction? *Journal of Experimental Psychology: Applied, 20*(1), 69–80.
Hannan, R. L., Hoffman, V. B., & Moser, D. V. (2005). Bonus versus penalty: Does contract frame affect employee effort?. In A. Rapoport, & R. Zwick (Eds.), *Experimental business research, II* pp. 151–169) Boston: Springer.
Hannan, R. L., McPhee, G. P., Newman, A. H., & Tafkov, I. D. (2019). The informativeness of relative performance information and its effect on effort allocation in a multi-task environment. *Contemporary Accounting Research, 36*(3), 1607–1633.
Hartmann, F., & Slapničar, S. (2015). An experimental study of the effects of negative, capped and deferred bonuses on risk taking in a multi-period setting. *Journal of Management & Governance, 19*(4), 875–896.
Heath, C., & Tversky, A. (1991). Preference and belief: Ambiguity and competence in choice under uncertainty. *Journal of Risk and Uncertainty, 4*(1), 5–28.
Hong, F., Hossain, T., & List, J. A. (2015). Framing manipulations in contests: A natural field experiment. *Journal of Economic Behavior and Organization, 118*, 372–382.
Hossain, T., & List, J. A. (2012). The behavioralist visits the factory: Increasing productivity using simple framing manipulations. *Management Science, 58*(12), 2151–2167.
Imas, A., Sadoff, S., & Samek, A. (2016). Do people anticipate loss aversion? *Management Science, 63*(5), 1–15.
Iskandar-Datta, M., & Jia, Y. (2013). Valuation consequences of clawback provisions. *The Accounting Review, 88*(1), 171–198.
Janssen, C. P., Brumby, D. P., Dowell, J., Chater, N., & Howes, A. (2011). Identifying optimum performance trade-offs using a cognitively bounded rational analysis model of discretionary task interleaving. *Topics in Cognitive Science, 3*(1), 123–139.
Kachelmeier, S. J. (2019). Discussion of "The informativeness of relative performance information and its effect on effort allocation in a multitask environment". *Contemporary Accounting Research, 36*(3), 1628–1633.
Kachelmeier, S. J., Thornock, T. A., & Williamson, M. G. (2016). Communicated values as informal controls: Promoting quality while undermining productivity? *Contemporary Accounting Research, 33*(4), 1411–1434.
Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*(2), 263–291.
Kivetz, Y., & Tyler, T. R. (2007). Tomorrow i'll be me: The effect of time perspective on the activation of idealistic versus pragmatic selves. *Organizational Behavior and Human Decision Processes, 102*(2), 193–211.
Lambert, R. A. (2001). Contracting theory and accounting. *Journal of Accounting and Economics, 32*(1–3), 3–87.
Lazear, E. P. (1991). Labor economics and the psychology of organizations. *The Journal of Economic Perspectives, 5*(2), 89–110.
Levy, B. A., & Begin, J. (1984). Proofreading familiar text: Allocating resources to perceptual and conceptual processes. *Memory & Cognition, 12*(6), 621–632.
Liberman, N., & Trope, Y. (1998). The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal level theory. *Journal of Personality and Social Psychology, 75*(1), 5–18.
Lindenberg, S. (2001). Intrinsic motivation in a new light. *Kyklos, 54*(2–3), 317–342.
Lindenberg, S., & Foss, N. J. (2011). Managing joint production motivation: The role of goal framing and governance mechanisms. *Academy of Management Review, 36*(3), 500–525.
Lublin, J. S. (2010). Law sharpens 'clawback' rules for improper pay. *Wall Street Journal* (July 25). Available at: https://www.wsj.com/articles/SB10001424052748704249004575385500170389086.
Luft, J. (1994). Bonus and penalty incentives contract choice by employees. *Journal of Accounting and Economics, 18*(2), 181–206.
Masicampo, E. J., & Baumeister, R. F. (2011). Unfulfilled goals interfere with tasks that require executive functions. *Journal of Experimental Social Psychology, 47*(2), 300–311.
Murphy, K. J., & Jensen, M. C. (2024). CEO bonus plans —And how to fix them. *Journal of Applied Corporate Finance, 36*(3), 95–110.
Nguyen, T., Grinfeld, G., Liberman, N., & Wakslak, C. J. (2023). Effects of temporal distance on a dynamic measure of action identification. *Journal of Experimental Social Psychology, 108*, Article 104493.
O'Hanlon, J., & Peasnell, K. (1998). Wall Street's contribution to management accounting: The Stern Stewart EVA financial management system. *Management Accounting Research, 9*(4), 421–444.
O'Hanlon, J., & Peasnell, K. (2002). Residual income and value-creation: The missing link. *Review of Accounting Studies, 7*(2–3), 229–245.
Oblak, K., Ličen, M., & Slapničar, S. (2018). The role of cognitive frames in combined decisions about risk and effort. *Management Accounting Research, 39*, 35–46.
Payne, J. W., Bettman, J. R., & Johnson, E. J. (1993). *The adaptive decision maker*. Cambridge: Cambridge University Press.
Payne, S. J., Duggan, G. B., & Neth, H. (2007). Discretionary task interleaving: Heuristics for time allocation in cognitive foraging. *Journal of Experimental Psychology: General, 136*(3), 370–388.
Presslee, A., Vance, T., & Webb, R. A. (2013). The effects of reward type on employee goal setting, goal commitment and performance. *The Accounting Review, 88*(5), 1805–1831.
Reb, J., & Connolly, T. (2007). Possession, feelings of ownership, and the endowment effect. *Judgment and Decision Making, 2*(2), 107–114.
Roehm, M. L., & Roehm, H. A., Jr. (2011). The influence of redemption time frame on responses to incentives. *Journal of the Academy of Marketing Science, 39*(3), 363–375.
Rogers, T., & Bazerman, M. H. (2008). Future lock-in: Future implementation increases selection of 'should' choices. *Organizational Behavior and Human Decision Processes, 106*(1), 1–20.
Rogerson, W. (1997). Intertemporal cost allocation and managerial investment incentives: A theory explaining the use of economic value added as a performance measure. *Journal of Political Economy, 105*(4), 770–795.
Schultze, W., Weiler, A., Lotze, M., & Cheng, M. (2026). Managerial compensation, bonus banks, and long-term orientation. *Managerial and Decision Economics, 47*(1), 143–164.
Shelley, M. K. (1994). Gain/loss asymmetry in risky intertemporal choice. *Organizational Behavior and Human Decision Processes, 59*(1), 124–159.

Spencer, S. J., Zanna, M. P., & Fong, G. T. (2005). Establishing a causal chain: Why experiments are often more effective than mediational analyses in examining psychological processes. *Journal of Personality and Social Psychology, 89*(6), 845–851.
Staats, B. R., & Gino, F. (2012). Specialization and variety in repetitive tasks: Evidence from a Japanese bank. *Management Science, 58*(6), 1141–1159.
Stefaniak, C., Stikeleather, B., & Waddoups, N. (2025). The effect of different approaches to administering a fixed wage raise on employee productivity. *Accounting, Organizations and Society, 114*, Article 101587.
Stewart, B. (1991). *The quest for value*. New York: Harper Business.
Sweeney, A. M., & Freitas, A. L. (2014). Relating action to abstract goals increases physical activity reported a week later. *Psychology of Sport and Exercise, 15*(4), 364–373.
Thomas, T. F. (2016). Motivating revisions of management accounting systems: An examination of organizational goals and accounting feedback. *Accounting, Organizations and Society, 53*, 1–16.
Treasury Laws Amendmen Treasury laws amendment (banking executive accountability and related measures) act 2018. 2018. No. 5, schedule 1 part 1 division 4 part IIAA.
Trope, Y., & Liberman, N. (2003). Temporal construal. *Psychological Review, 110*(3), 403–421.
Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review, 117*(2), 440–463.
Vallacher, R. R., & Wegner, D. M. (1989). Levels of personal agency: Individual variation in action identification. *Journal of Personality and Social Psychology, 57*(4), 660–671.
Weber, E., Blais, A.-R., & Betz, N. E. (2002). A domain-specific risk-attitude scale: Measuring risk perceptions and risk behaviors. *Journal of Behavioral Decision Making, 15*(4), 263–290.
White, K., MacDonnell, R., & Dahl, D. W. (2011). It's the mindset that matters: The role of construal level and message framing in influencing consumer efficacy and conservative behaviors. *Journal of Marketing Research, 48*(3), 472–485.
Zhu, J. Y. (2018). Myopic agency. *The Review of Economic Studies, 85*(2), 1352–1388.