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Choking under the wrong frame: The interrelation of framing, loss aversion and pressure on performance

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Abstract

Employers are always striving to enhance employees' productivity while decreasing cost. These costs are not only made up of salaries but also include time costs and the cost of errors. Time pressure often plays a key factor in determining performance as it can lead to an increase in performance but also to choking under pressure. Individual contract frames coupled with individual loss aversion may increase productivity at no extra cost as it might carry out the right amount of pressure to increase productivity. We examine the predictive power of individual loss aversion between the relationship of differently framed deadline-dependent incentive schemes and performance, thereby replicating the study of Essl and Jaussi (2017) and adding to it by varying the amounts of time pressure. Fifty-eight participants, mostly students, worked under varying time pressure on a real effort task under two payoff-equivalent contracts, framed either as a bonus or a malus contract. Performance decreased for all participants under increasing time pressure, apart from speed which increased when time pressure increased but only for participants under the malus contract. Furthermore, participants under the malus contract were faster under high time pressure. This suggests that the malus contract did exert more pressure than the bonus contract. However apart from these minor differences, neither frame nor loss aversion predicted performance. Reasons and limitations for the absence of the framing effect are discussed. We suggest that certain requirements must be met to create a strong framing effect such as high levels of elaboration, perceived threat, and endowment.

Keywords: performance, pressure, frame, framing, loss aversion, prospect theory

How to make incentives individually effective is an essential question for companies. But which is more efficient: Punishments or rewards? Malus contracts are commonly used, and some researchers suggest they are more efficient than bonus contracts (Brooks, Stremitzer, & Tontrup, 2012; Fryer, Levitt, List, & Sadoff, 2012; Goldsmith & Dhar, 2013; Hossain & List, 2012; Imas, Sadoff, & Samek, 2017). This is often explained using *prospect theory*, which states that a loss is evaluated as more important than an equivalent gain (Kahneman & Tversky, 1979). However, caution is called for, because even though the literature on the efficiency of *contract frames* is broad, the results are inconsistent (Armantier & Boly, 2015; Hossain & List, 2012; McEvoy, 2016; Nygren, 1997; Quidt, 2014; Quidt, Fallucchi, Koelle, Nosenzo, & Quercia, 2017). A possible explanation for this is that *loss aversion*, the tendency to value a loss more than an equivalent gain, seems to vary individually and may even be deeply rooted (Chen, Lakshminarayanan, & Santos, 2006; Harbaugh, Krause, & Vesterlund, 2001; Tom, Fox, Trepel, & Poldrack, 2007). Individual differences in loss aversion thus might change the effects that contract frames carry out and therefore account for these inconsistencies in literature.

Inconsistencies findings might also be due to differences in perceived pressure in the literature. The phenomenon that pressure leads to a decline in performance is called *choking under pressure* (Baumeister, 1984). Choking under pressure can be explained by distraction theory which proposes that pressure decreases performance by diverting attention to task irrelevant thoughts (Beilock & Carr, 2001; Wine, 1971). Those individuals high in loss aversion might be more pressured by a malus contract than those low in loss aversion and therefore might experience bigger diminutions in performance (Essl & Jaussi, 2017).
In this study, we intend to replicate the results of Essl and Jaussi (2017) who examined choking under pressure using a task in which participants had to count the zeros in tables containing zeros and ones within a fixed time span (which acted as moderate time pressure).

Additionally, a deadline-dependent incentive scheme[1] was applied: By answering within a certain time span, participants could receive extras, which were either framed as a bonus or a malus. The tasks were rewarded with points, which had a real money value and paid off at the end of the experiment. It was assumed that individual loss aversion would account for differences between the deadline-dependent incentive schemes and performance. While performance quality, defined by number of errors[2], did not reveal any significant results, participants high in loss aversion under the malus contract earned significantly fewer profit points, needed more time to respond, were more likely to exceed the 10 s deadline and suffered more malus payments than all other individuals. The authors propose that individuals high in loss aversion were more strongly pressured by the malus contract than individuals low in loss aversion, leading to greater decrements in performance.

We add to this relationship by varying time pressure and using an improved experimental manipulation. A preliminary examination was conducted to test the new measures and resulted in significant main effects of time pressure on the performance measures, revealing a linear decrease in performance as time pressure increased.[3] Thus even though we do not generally rule out a curvilinear relationship between time pressure and performance, we recognize that in this experiment the lowest level of induced pressure is not low enough to reveal such a relationship (McDaniel, 1990; Muse, Harris, & Feild, 2003).

We seek to uncover the influence of framing on performance under varying time pressure for individuals low, neutral or high in loss aversion. We propose that participants under the bonus contract will perform better than under the malus contract. In particular we expect that participants' performance under a bonus contract coupled with low loss aversion will decrease least under increasing time pressure compared to all other individuals. We

[1] The Deadline-dependent incentive scheme refers to the bonus or malus participants can receive if they answer within a certain time span. Thus it induces a certain frame as well as time pressure.
[2] This refers to the number of incorrectly counted amount of zeros contained in the tables.
[3] For supplemental materials regarding the preliminary examination please contact the author.

believe these differences arise from the different perception of the contracts. They are viewed as a hindrance (especially the malus contract) by those high in loss aversion, thereby putting more pressure on them and reducing their performance to a greater degree than those low in loss aversion who view the task as a challenge.

The results indicate that neither contract frame nor loss aversion influence performance under pressure, with the minor exception of speed. Increasing pressure generally decreased performance but increased speed for participants in the malus contract, contrary to participants in the bonus contract whose speed was independent of pressure. Furthermore, participants in the malus contract were faster under high pressure.

The primary contribution of our research is to test the effects of goal framing on performance in a pressurized situation. We vary the pressure in a real effort task in which the participants can earn money, as is often the case when working outside the laboratory. Furthermore, we use a very easily administrable loss aversion test to find individual responses to the contract frame. We contribute to the existing literature by testing goal framing under varying time pressure for a multitude of performance measures incorporating participants' individual loss aversion, which to our knowledge has not yet been tested.

Literature Review

Framing and Individual Loss Aversion

The literature on the impact of contract frame is broad but the results are inconsistent (Armantier & Boly, 2015; Fryer et al., 2012; Goldsmith & Dhar, 2013; Hossain & List, 2012; McEvoy, 2016; Nygren, 1997; Quidt et al., 2017): Nygren (1997) found that malus contracts impair decision making, Hossain and List (2012) found positive long-term effects of malus contracts on the productivity of workers in China compared to bonus contracts, Fryer et al. (2012) found that teachers increased their students math scores when paid according to a malus contract rather than a bonus contract, Goldsmith and Dhar (2013) found that students were less motivated under a bonus contract rather than a malus contract, Armantier and Boly

(2015) found that the combination of a bonus and malus contract increased the performance most, McEvoy (2016) found that students were more likely to attempt the third exam in the malus contract, Quidt et al. (2017) found no effect of contract frame on effort provision.

Another way of looking at contract frames is to measure to what extent they are accepted. While one might assume that there is a clear preference for bonus contracts the literature here again is not clear (Gonzalez & Hoffman, 2016; Mahmoodi, Prasanna, Hille, Patel, & Brosch, 2018; Quidt, 2014): While Quidt (2014) found that 25 % more job offers were accepted under the malus contract, Gonzalez and Hoffman (2016) suggested that it would be advisable to let individuals choose the contract, Mahmoodi et al. (2018) then again found that participants preferred bonus contracts for electricity tariffs, although tariffs combining rewards and penalties also achieved substantial acceptance.

Given these inconsistencies a more detailed analysis of framing effects under different conditions is needed. Individual loss aversion may play a role in the relationship between contract frame and performance, as it seems to predict the behavior in the workplace (Brink & Rankin, 2013; Fehr & Goette, 2002; Fehr, Goette, & Lienhard, 2008, as cited in Essl & Jaussi, 2017). Is it effective to measure individual loss aversion and match it up with a fitting contract frame? In this regard Brink and Rankin (2013) found that individual loss preference and loss aversion can explain which kind of contract is most preferred, Essl and Jaussi (2017) found that the combination of malus contracts and participants high in loss aversions lead to the biggest reduction in performance under mild time pressure, and Roskes, Elliot, Nijstad and Dreu (2013) discovered that performance was particularly impaired by time pressure when people were avoidance motivated.

Choking under Pressure

"Performance pressure has been defined as an anxious desire to perform at a high level in a given situation (Hardy, Mullen, & Jones, 1996) and is thought to vary as a function of the personally felt importance of a situation (Baumeister, 1984)" (Beilock & Carr, 2001, p. 701).

This subjective importance can lead to a decrease in performance, which is termed choking under pressure (Baumeister, 1984).

The phenomenon of choking under pressure can be explained with the help of two psychological theories. *Distraction theory* postulates that pressure causes attention to shift away from the task at hand and towards worrisome thoughts, whereas *explicit monitoring theory* postulates that pressure increases the anxiety to fail and shifts attention to the task, thus disrupting proceduralized performance (Beilock & Carr, 2001; DeCaro, Thomas, Albert, & Beilock, 2011; Sanders & Walia, 2012, as cited in Essl & Jaussi, 2017). These opposing mechanisms both result in skill failure. Researchers suggest that both mechanisms can apply, depending on the context and the task (Markman, Todd Maddox, & Worthy, 2006; Englert & Oudejans, 2014). Failed tasks that rely heavily on working memory are consistent with distraction theory (Beilock & DeCaro, 2007; Gimmig, Huguet, Caverni, & Cury, 2006; Markman et. al., 2006, as cited in DeCaro et al., 2011), while failed tasks that use proceduralized processes that normally run outside of conscious awareness are consistent with explicit monitoring theory (Baumeister, 1984; Beilock, Bertenthal, Mccoy, & Carr, 2004; Beilock & Carr, 2001; Kimble & Perlmuter, 1970; Langer & Imber, 1979; Masters, 1992, as cited in DeCaro et al., 2011). The kind of pressure that is applied may help to explain these differences (DeCaro et. al., 2011). Often pressure from being observed leads to a strong focus on skill execution, whereas pressure from offered incentives for specific outcomes commonly results in a shift of attention toward situational elements. Although both types of pressure are present in the working environment, pressure from offered incentives seems more relevant than ever. These incentives are intrinsically tied to deadlines, which are perceived as increasing (Godbey & Graefe 1993, Harris 1987, as cited in Roxburgh, 2004)

Time Pressure and Performance

In times of information technologies, time seems scarcer than ever. The acceleration of technologies fosters this tendency and especially in the working environment speedy results

are often the norm (Rosa, 2003). What is the consequence of increasing time pressure? On the one hand time pressure has been found to be negatively associated with a wide range of working behaviors (Elfering, Grebner, & Tribolet-Hardy, 2013; Amabile, Mueller, Simpson, Hadley, Kramer, & Fleming, 2002): Amabile et al. (2002) reported that time pressure negatively predicted creative cognitive processing, Elfering et al. (2013) reported that time pressure increased cognitive load which lead to more commuting accidents, as a result of increased cognitive failure. Time pressure has even been linked to musculoskeletal symptoms among employees (Bongers, Winter, Kompier, & Hildebrandt, 1993; Faucett & Rempel, 1994). On the other hand time pressure sometimes seems to have positive effects (Baas, Dreu, & Nijstad, 2008; Chajut & Algom, 2003; Gardner, 1990; Gardner & Cummings, 1988; Noefer, Stegmaier, Molter, Sonntag, 2009): Gardner and Cummings (1988) and Garnder (1990) suggested that time pressure can lead to activation; Chajut and Algom (2003) found that high pressure improves selective attention; Baas et al. (2008) found that creative performance was best under activating positive mood states and was accompanied by an approach motivation and promotion focus; Noefer et al. (2009) conducted a questionnaire study which resulted in a direct positive correlation between time pressure and skill variety with idea generation and implementation.

Inconsistencies regarding the pressure-performance literature may be in part due to methodical limitations. A review of the relationship between pressure and performance reveals that these inconsistencies mainly stem from three problems (Muse et al., 2003): The low stress condition is systematically underrepresented, stress has a negative connotation, and there are contextual range restrictions of manipulating stress. In conclusion the authors suggested that the potential curvilinear relationship between pressure and performance did not have a fair test.

Indeed psychologists researching the performance-pressure literature often characterize the relationship as curvilinear (Baer & Oldham, 2006; Byron, Khazanchi, &

Nazarian, 2010; Hofmans, Debusscher, Doci, Spanouli, & Fruyt, 2015; Zivnuska, Kiewitz, Hochwarter, Perrewe, & Zellars, 2002; Revelle, Amaral, & Turriff, 1976): Revelle et al. (1976) found that extroverts experienced an increase in the verbal ability tests in the high arousal condition compared to the low arousal condition, while introverts' verbal ability decreased in the high arousal condition; Zivnuska et al. (2002) found curvilinear effects of job tension on job satisfaction, value attainment, and turnover intent in a questionnaire study; Baer and Oldham (2006) found curvilinear effects of time pressure on creativity for employees who scored high on openness to experience while simultaneously receiving support for creativity; Byron et al. (2010) found a curvilinear relationship between evaluative pressure and creativity such that low pressure increased creative performance compared to no pressure, whereas high pressure decreased creative performance the most; Hofmans et al. (2015) conducted a 10-day daily diary study in which they could show that work pressure affected task performance via state core self-evaluations[4], with state core self-evaluations increasing as long as the employees felt that they are able to handle the work pressure.

Additionally, some of the inconsistencies regarding contract frames may stem from differences in the literature with respect to the applied pressure and performance measurements. The authors of a meta-analysis found that on the one hand performance must be divided into speed, and quality (Szalma, Hancock, & Quinn, 2008). On the other hand, the task must be divided into perceptual and cognitive tasks as opposed to motor tasks. While time pressure increased speed, but decreased accuracy for perceptual and cognitive tasks, it decreased speed for motor tasks. Lepine, Podsakoff and Lepine (2005) identified two relevant types of pressures in their meta-analysis, which impacted performance in different ways: pressure viewed as hindrance and pressure viewed as challenge. They found a negative linear relationship for the former, and a positive linear relationship for the latter.

[4] Core self-evaluations are appraisals about one's own self-worth, capabilities, and competences related to job outcomes.

Hypothesis

Based on the literature discussed, in particular the results of Brink and Rankin (2013) who showed that individual loss preference and loss aversion could predict which contract was most favored, the findings of Roskes et al. (2013) who demonstrated that performance was especially impaired by time pressure when people were avoidance motivated and the results of Essl and Jaussi (2017) who demonstrated that those with high loss aversion working under a malus contract performed worst, we arrive at the following hypotheses.

Hypothesis 1. We expect that participants who work under a bonus contract will perform better than participants under a malus contract when under pressure. Therefore, the bonus contract will yield (1a) more points, (1b) faster responses (speed) ,(1c) more extras, and (1d) less mistakes than the malus contract.

Hypothesis 2. We expect that the performance of the participants who work under a bonus contract and are low in loss aversion will decrease least under increasing time pressure compared to all other participants. Therefore, those participants will experience the least reduction in (2a) points, (2b) extras as well as the least increase in (2c) number of errors under increasing time pressure compared to all other factor-level combinations.

Hypothesis 3. We expect that participants who work under a bonus contract and are low in loss aversion will (3a) earn more points, (3b) be faster, (3c) achieve more extras, and (3d) make less mistakes compared to all other factor-level combinations.

Hypothesis 4. We expect that participants who work under a malus contract and are high in loss aversion will (4a) earn less points, (4b) be slower, (4c) achieve less extras, and (4d) make more mistakes compared to all other factor-level combinations.

Method

Sample

The sample was recruited via social media and flyers in the NIG (Neues Institutsgebaeude) and comprised of 64 participants, of which 37 were female (58.7 %). Most

of the participants were students. The mean period of study was three years and the mean age was 26 years. The only requirement was that participants were fluent in the German language. Therefore, we had to abort the experiment for one participant because of lacking German skills and consequential comprehension problems in the experimental tasks. One participant took part in the experiment twice and was therefore excluded. Four participants had to be excluded because they changed their lottery decision more than twice thus, displaying non-monotonicity (in line with: Abeler, Falk, Goette, & Huffman, 2011; Essl & Jaussi, 2017; Gaechter, Johnson, & Herrmann, 2010). Therefore, the final sample comprised of 58 participants.

Materials

Equipment. The experiment was entirely computerized. Participants used keyboards and computer mice and were divided by separating walls.

Counting task. In the counting task participants had to count the number of zeros in tables which consisted of four rows with various lengths, containing randomly generated zeros and ones (Abeler et al., 2011). The number of zeros were varied between 20 and 28 for each table. Thereby the variation of zeros was increased by three compared to the design used by Essl and Jaussi (2017). The counting task has several advantages, as it does not require any prior knowledge, there is little learning possibility and because the nature of the task is rather boring and pointless individual differences in motivation can be minimized.

First and third stage. Before and after the main stage, two identical stages were introduced consisting of five tables each. These stages had no deadline-dependent incentive schemes and the piece rates for correct and incorrect answers were the same as in the main stage. This provided a measurement of individuals' baseline performance, and allowed participants to become familiar with the task. The stage after the main stage was introduced to analyze possible practice effects and fatigue effects.

Goal framing. We used a between-subject manipulation of the reward system based on goal framing. Goal framing has been defined as:

> The consequences of a particular behavior are specified in either positive or negative terms, and the impact of alternative framing in persuading the decision maker to engage (or not engage) in that behavior is assessed by comparing the rate of adoption of the behavior in the two framing conditions (Levin, Schneider, & Gaeth, 1998, p. 182).

We will refer to the positive frame as “bonus contract“, and to the negative frame as “malus contract“ throughout this study. In each of these contracts participants could gain extras by answering within a certain time frame (9, 12, 15s) which was varied for each table.

Time pressure. Time pressure was induced by offering participants extras, each worth 5 points if an answer was submitted within either 9, 12 or 15 seconds (as mentioned above). Participants were presented with the amount of time for the extras before the start of each individual task. A pilot session conducted by Essl and Jaussi (2017) showed that the average speed of answering was approximately 13 seconds. Thus, we chose to set the deadline at 9, 12 or 15 seconds ensuring that the task is feasible within the prescribed time, but still can induce low to high time pressure.

Performance. Performance was measured by the amount of points (as summarized in Table 1), speed, which refers to the duration between presentation of the task and submission of the answer, number of errors, which refers to the number of miscounted (and submitted) amount of zeros, and extras, which refers to the number of reached bonuses or maluses.

Points were allocated as follows. Participants under the bonus contract earned 10 points for correct, and one point for incorrect answers. If they provided an answer within a certain deadline of either 9, 12 or 15 seconds they received an extra (bonus) of five points. Under the malus contract, they could earn 15 points for correct answers, and six points for false responses. In contrast to the bonus contract, individuals lost five points if they failed to

provide an answer within a deadline of either 9, 12 or 15 seconds. Therefore, in both contracts, participants could receive 15 points for each table if they provided the correct answer within the given time frame, and 10 points if they answered correctly but exceeded the applied threshold. Because earnings were provided for false answers, the extras (bonus and malus components) were strictly based on speed. However, answering incorrectly but within the given time span only allowed the participants to earn six points instead of the possible 15 points. After completing each table, participants received direct feedback on their performance, on whether the answer was correct or incorrect and whether they received a bonus or a malus depending on the contract they were in. Then the next table was shown. The maximum available time for each table was 20 seconds. Thus, if no entry was made within 20 seconds, a message indicated that no points were earned for this table. An overview of the point system can be found in Table 1.

Table 1

Overview of the Point System

Points	Correct answer	Extras: Answer within 9s, 12s or 15s	Answer within maximum time (20s)
15	Yes	Yes	Yes
10	Yes	No	Yes
6	No	Yes	Yes
1	No	No	Yes
0	No	No	No

Loss aversion. Loss aversion is the tendency to value a loss more than an equivalent gain, resulting from the implications of prospect theory (Kahneman & Tversky, 1979). We use a lottery task with real payoffs, since other measurements have been criticized as unreliable (Brink & Rankin, 2013). The lottery task was adapted from Essl and Jaussi (2017) and the instructions were shortened (see Appendix C). In the loss aversion test, participants had to make six choices of whether to play a lottery. In each lottery, the winning price was fixed at 3 Euro, and the losing price varied from -1 to -3.50 Euro. There was a 50/50 chance

of gaining 3 Euro or losing 1 to 3.50 Euro. One lottery was randomly chosen and paid out at the end of the experiment (Cubitt, Starmer, & Sugden, 1998, as cited in Essl & Jaussi, 2017). The expected value of the lottery tickets decreased linearly. Rejections of small-stake lotteries which have a positive expected value can serve as an indicator for the individual's degree of loss aversion (Rabin, 2000). We classified participants who rejected lotteries with a losing price higher than -2.50 Euro (lotteries one to three) as individuals high in loss aversion (HLA), and participants who accepted lotteries even with a losing price equal to or smaller than -2.50 Euro (lotteries four to six) as those with low loss aversion (LLA). We classified those who accepted lotteries one to three but rejected lotteries four to six as risk neutral.

Design

We conducted a series of 2 x 3 x 3 repeated measure mixed analysis of variances (RMM ANOVAs) with frame (bonus/malus contract) as a between-subjects factor; profit points, speed, extras, and number of errors respectively under the time pressure conditions (nine, 12 and 15 seconds) as a within-subjects factor, and loss aversion (low loss aversion, neutral loss aversion and high loss aversion) as a second between-subjects factor. We conducted the analysis using the statistics software SPSS 25 (SPSS Statistics Version 25, IBM Corp., 2017).

Procedure

We used a real effort task to measure how differently framed contracts influence the quality and speed of performance. Participants received written instructions for each stage. The experiment was divided into four stages.

In the first stage participants received written instructions about the counting task. They had to complete 5 tasks. Participants under the bonus contract earned 10 points for correct, and one point for false answers. Under the malus contract, they earned 15 points for correct answers, and six points for false responses. They had 20 seconds to complete the task, otherwise no points would be received. There was no deadline-dependent incentive scheme.

At the end of the first stage participants received feedback about their performance, and the resulting payment in points.

In the main stage participants received instructions explaining the task, and the deadline-dependent incentive scheme. They had to complete 45 tasks. The allocation of points was the same as in the first stage, with the difference that there was a deadline-dependent incentive scheme in which extras could be either earned or lost. The given time span for the extras consisted of either 9, 12 or 15 seconds. The randomly varied deadline was indicated on the display before the task started. A countdown of the remaining time for the extras, and a countdown of the maximum time available (20s) were displayed along with the tables. After each round direct feedback was provided which indicated if the answer was correct, and if they had received an extra for answering within the deadline. Under one contract, participants received an extra framed as bonus (English translation: "If you need less than 9, 12 or 15 seconds to complete the task, you will receive a bonus of 5 points.") for entering the answer before a given deadline, under the other, participants obtained an extra framed as malus (English translation: "If you need more than 9, 12 or 15 seconds to complete the task, you will receive a malus of -5 points.") when exceeding the deadline.[5] Both contracts were pay-equivalent. Performance measures under these time pressure conditions (9s, 12s, 15s) functioned as the within-subject treatments.

At the end of the main stage participants again received feedback about their performance, and the resulting payment in points.

In the third stage participants received instructions indicating that this stage would be like the first stage, and consists of five tasks with no deadline-dependent incentive scheme. At the end of the third stage participants once again received feedback about their performance, and the resulting payment in points.

[5] These treatments are referred to as bonus contract or malus contract throughout the study.

Finally, the participants received instructions explaining the lottery decision task. They received six different lottery tickets, and had to either accept or reject each single one. These lottery tickets could either increase or decrease their total points depending on chance. One of the six lottery tickets was chosen at random, and if it had been accepted it was played (50 % chance of winning and 50 % chance of losing) and subsequently the gain or the loss of the ticket was either added or subtracted from their points.

Lastly the participants filled out a questionnaire on general demographics, and received their points total in money, at an exchange rate of 10 points = 0.1 Euro. Mean earnings for our final sample was 11.19 Euro, which includes the 5.00 Euro every participant received for showing up.

Results

Comparison of First and Third Stage

We compared the first with the third stage to highlight possible fatigue and practice effects by conducting paired sample t-tests. Since the point system differed slightly between frames profit points were examined per frame. The results for the bonus contract are summarized in Table 2 and show that profit points and number of errors did not differ, while speed increased with a large effect. The results for the malus contract are summarized in Table 3 and show that the number of errors decreased with a small to medium effect, while profit points increased with a medium effect, and speed increased with a large effect. This might be an indication that participants experienced a practice effect or a persistent effect of the deadline-dependent incentive scheme from the main stage. A noticeable difference between the bonus and the malus contract is that the number of errors was higher for the malus contract in the first stage but decreased to an even lower level in the third stage, compared to the bonus contract. We calculated the difference between the first stage and the third stage for speed and for number of errors to compare the extent of change between the bonus and the malus contract.

Table 2

Descriptive Statistics of the First and Third Stage under the Bonus Contract (n = 27)

Performance	First Stage	Third Stage	*t* (df = 26)	*p*	*d*
Profit Points					
M (*SD*); *Mdn*	45.6 (14.1); 50.0	46.0 (14.3); 50.0	-0.06	.954	-0.01
Speed (s)					
M (*SD*); *Mdn*	67.8 (10.2); 69.6	58.2 (9.3); 57.9	5.24	<.001**	1.01
Number of errors					
M (*SD*); *Mdn*	0.70 (0.87); 0.0	0.85 (1.10); 0.0	-0.66	.515	-0.13

Note. Participants could gain a maximum of 50 points respectively for the first and third stage.

**$p \leq .01$, * $p \leq .05$

Table 3

Descriptive Statistics of the First and Third Stage under the Malus Contract (n =31)

Performance	First Stage	Third Stage	*t* (df = 30)	*p*	*d*
Profit Points					
M (*SD*); *Mdn*	63.2 (12.6); 66.0	69.1 (11.8); 75.0	-3.32	.002**	-0.60
Speed (s)					
M (*SD*); *Mdn*	68.8 (9.7); 69.0	57.6 (11.3); 57.2	5.48	<.001**	0.98
Number of errors					
M (*SD*); *Mdn*	1.03 (1.22); 1.0	0.61 (1.23); 0.0	2.64	.013*	0.47

Note. Participants could gain a maximum of 75 points respectively for the first and third stage.

**$p \leq .01$, * $p \leq .05$

The degree of change between frames for speed did not differ significantly (bonus: $M = -9.57$, $SD = 9.50$ vs. malus: $M = 11.14$, $SD = 11.32$), $t(55.93) = 0.574$, $p = .568$, see Figure 1, while the degree of change between frames for number of errors did significantly differ (bonus: $M = 0.148$, $SD = 1.167$ vs. malus: $M = -0.419$, $SD = 0.886$;), $t(48.14) = -2.062$, $p = .045$, see Figure 2.

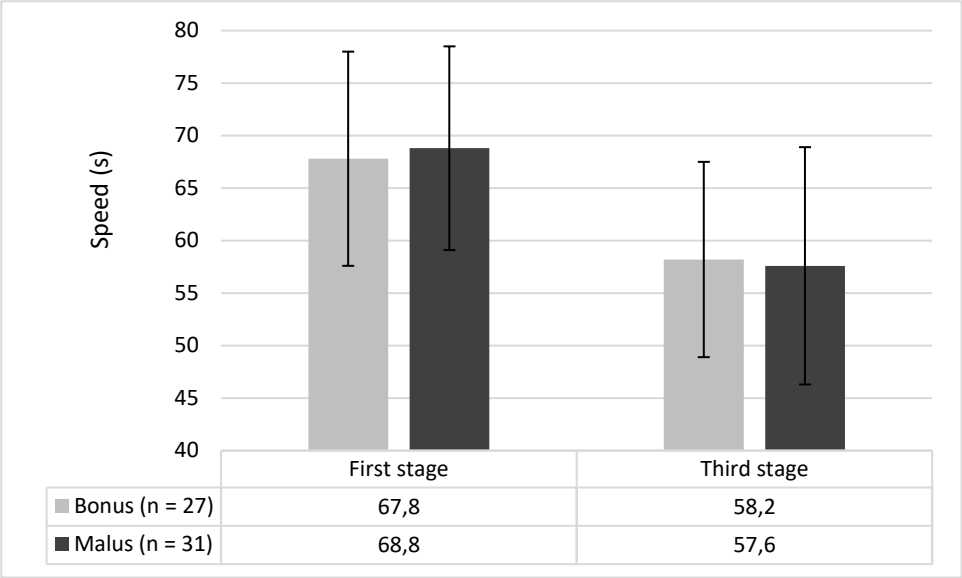


Figure 1. Degree of change between frames for speed.

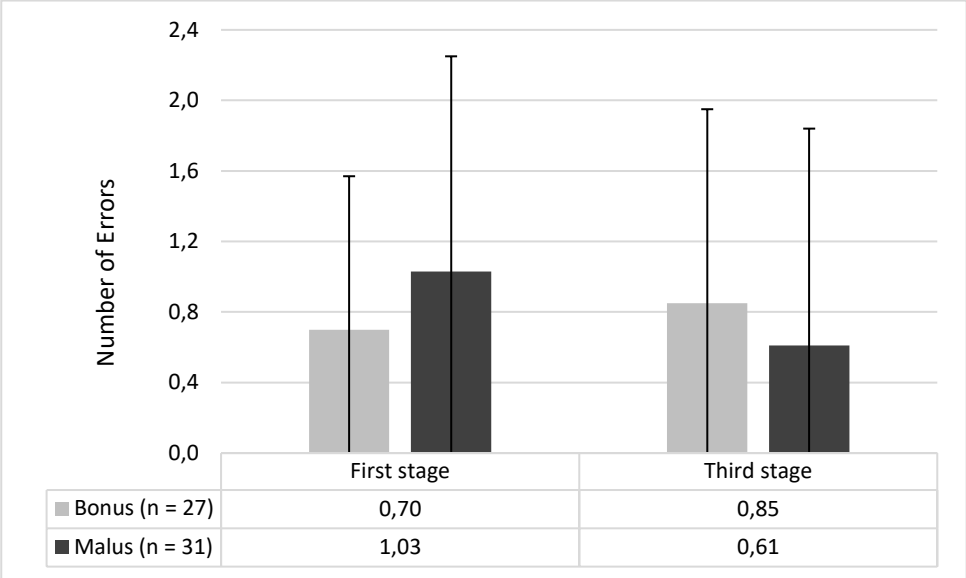


Figure 2. Degree of change between frames for number of errors.

We took a closer look at the first and third stage comparison of speed between the three loss aversion groups. We conducted a three-way (2x2x3) RMM ANOVA, with speed of the first and third stage as a within-subject factor, frame as a between-subject factor, and loss aversion as a second between-subject factor. No significant interactions were found, Speed at First and Last Stage x Loss Aversion x Frame $F(2, 52) = 0.15$, $p = .865$; Speed at First and Last Stage x Frame $F(1, 52) = 0.65$, $p = .425$; Speed at First and Last Stage x Loss Aversion $F(2, 52) = 1.16$, $p = .321$(all ps $> .05$). The main effect of speed between the first and third

stage (within-subject) was significant, $F(1, 52) = 43.98$, $p < .001$, $\eta^2_p = .46$, with a large increasing effect. There was no significant interaction between Loss Aversion x Frame, $F(2, 52) = 1.70$, $p = .192$. The main effect of frame was not significant either, $F(1, 52) = 0.82$, $p = .370$, while the main effect of loss aversion was significant, $F(2, 52) = 3.39$, $p = .041$, $\eta^2_p = .12$, with a medium effect. Therefore, we followed up with one-way ANOVAs to compare the first stage and third stage separately for speed between the three loss aversion groups. This resulted in a significant difference for the first stage, $F(2, 57) = 4.74$, $p = .013$. Bonferroni post hoc pairwise comparisons between the loss aversion groups revealed that the LLA group was slower than the neutral group ($p = .021$) and the HLA group ($p = .037$), as seen in Figure 3. However, the third stage did not reveal any significant differences between the loss aversion groups, $F(2, 57) = 1.05$, $p = .357$.

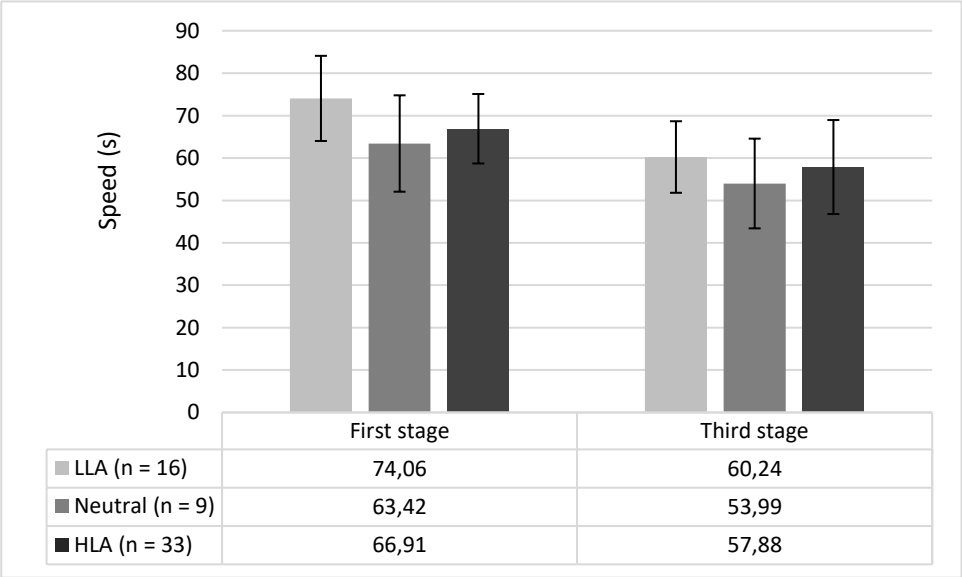
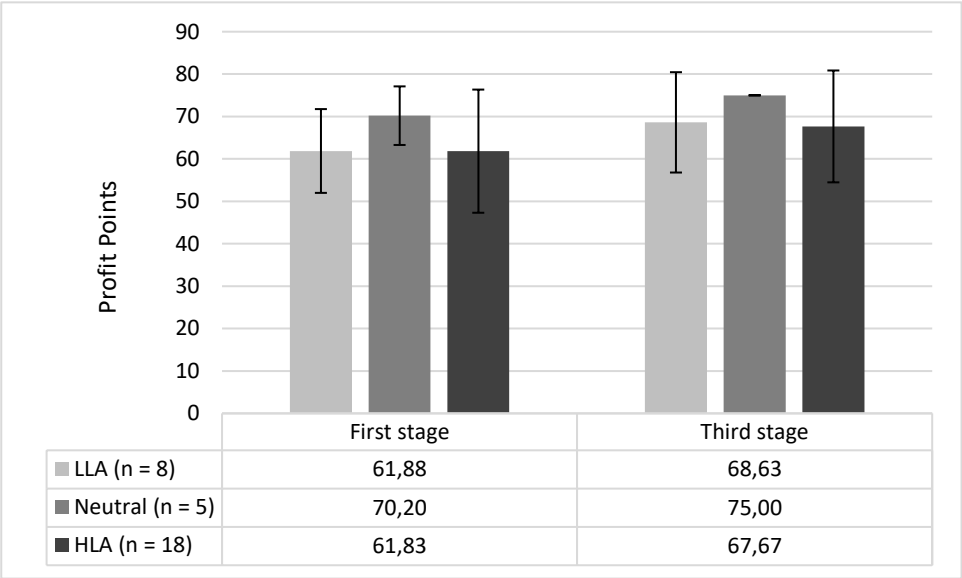


Figure 3. First and third stage comparison of speed between loss aversion groups (speed, *M*±1 *SD*).

We compared the first and third stage in the malus contract for profit points between the three loss aversion groups. We conducted a two-way (2x3) RMM ANOVA, with profit points from the first and third stage as a within-subject factor and loss aversion as a between-subject factor. No significant interaction was found for Profit Points at First and Last Stage x Loss Aversion $F(2, 28) = 0.06$, $p = .945$. The main within effect of profit points at first and

last stage was significant, $F(1, 28) = 7.59$, $p = .010$, $\eta^2_p = .21$, with a large increasing effect, as shown in Figure 4. No significant difference between the loss aversion groups could be observed, $F(2, 28) = 1.01$, $p = .377$. No significant effects were found in the bonus contract, Profit Points at First and Last Stage x Loss Aversion $F(2, 24) = 1.82$, $p = .184$. The main within effect of profit points at first and last stage was not significant either, $F(1, 24) = 0.18$, $p = .676$ and no significant difference between the loss aversion groups could be observed, $F(2, 24) = 0.11$, $p = .900$.



	First stage	Third stage
LLA (n = 8)	61,88	68,63
Neutral (n = 5)	70,20	75,00
HLA (n = 18)	61,83	67,67

Figure 4. First and third stage comparison of profit points between loss aversion groups under the malus contract (profit points, *M*±1 *SD*).

We compared the first and third stage for number of errors between the three loss aversion groups. We conducted a three-way (2x2x3) RMM ANOVA, with the number of errors in the first and third stage as a within-subject factor, frame as a between-subject factor and loss aversion as a second between-subject factor. No significant interactions were found, Number of Errors at First and Last Stage x Loss Aversion x Frame $F(2, 52) = 0.676$, $p = .513$; Number of Errors at First and Last Stage x Frame $F(1, 52) = 2.095$, $p = .154$; Number of Errors at First and Last Stage x Loss Aversion $F(2, 52) = 0.439$, $p = .647$ (all *p*s > .05). The main effect of number of errors at first and last stage was not significant, $F(1, 52) = 1.278$, $p = .264$. A look at the between-subjects effect revealed no significant interaction between Loss

Aversion x Frame, $F(2, 52) = 0.602$, $p = .551$. The main effects of frame, $F(1, 52) = 0.602$, $p = .551$, and loss aversion, $F(2, 52) = 0.544$, $p = .584$, were not significant either. The results indicate that while there was no fatigue effect there was a general practice effect, as all participants became faster.

Descriptive Statistics

Without taking time pressure into consideration, participants under the bonus and malus contract did not differ from each other, as seen in Table 4.

Table 4

Descriptive Statistics Between Frames

Performance		Bonus (n= 27)	Malus (n= 31)	*t (df)*	*p*-value
Profit Points	Mean (*SD*)	508.3 (75.1)	503.4 (95.3)	-0.22	.827
	Mdn	507.0	504.0	(55.48)	
Speed (s)	Mean (*SD*)	486.0 (75.0)	471.8 (112.1)	-0.57	.569
	Mdn	472.5	455.1	(52.69)	
Extras	Mean (*SD*)	29.1 (8.3)	29.9 (12.0)	0.31	.759
	Mdn	29.0	31.0	(53.37)	
Number of errors	Mean (*SD*)	9.4 (6.1)	10.6 (9.9)	0.58	.564
	Mdn	9.0	8.0	(50.93)	

Note. The table shows means, standard deviations, and medians. The last column reports p-values of Welch‘s t-test

There were no significant differences between the loss aversion groups, as seen in Table 5.

Table 5

Descriptive Statistics Between Loss Aversion

		LLA (16)	Neutral (9)	HLA (33)	*p*-value
Profit Points	Mean (*SD*)	471.3 (73.5)	544.4 (86.5)	511.8 (87.5)	.092
	Mdn	478.0	574.0	518.0	
Speed (s)	Mean (*SD*)	510.6 (94.8)	434.9 (73.1)	474.7 (99.1)	.151
	Mdn	492.2	440.5	455.3	
Extras	Mean (*SD*)	25.4 (10.5)	33.9 (7.7)	30.3 (10.6)	.133
	Mdn	26.5	35.0	32.0	
Number of errors	Mean (*SD*)	11.4 (5.8)	8.3 (8.0)	9.9 (9.4)	.184
	Mdn	11.0	4.0	7.0	

Note. The table shows means and standard deviations. No significant differences between the groups were found for profit points $H(2) = 4.772$, $p = .092$, for speed (s) $H(2) = 3.783$, $p = .151$, for extras $H(2) = 4.035$, $p = .133$ and for number of errors $H(2) = 3.382$, $p = .184$

Table 6 displays a comparison of all factor-level combinations.

Table 6

Descriptive Statistics for the 2x3 Factor Level Combinations

Performance	Bonus Neutral (4)	Malus Neutral (5)	Malus HLA (18)	Bonus HLA (15)	Bonus LLA (8)	Malus LLA (8)
Profit Points						
Mean (*SD*)	579 (71)	517 (96)	516 (100)	506 (73)	477 (65)	466 (86)
Mdn	596	485	535	507	478	464
Speed (s)						
Mean (*SD)*	415 (35)	450 (95)	456 (112)	497 (79)	500 (66)	521 (121)
Mdn	414	483	451	492	492	523
Extras						
Mean (*SD)*	36.5 (3.7)	31.8 (9.8)	32.2 (11.6)	28.0 (8.9)	27.4 (7.4)	23.5 (13.2)
Mdn	37.0	28.0	36.5	29.0	28.0	22.0
Number of errors						
Mean (*SD)*	6.0 (6.8)	10.2 (9.1)	10.5 (11.4)	9.1 (6.8)	11.6 (3.8)	11.3 (7.5)
Mdn	3.5	15.0	6.5	8.0	10.5	11.5

Note. No significant differences between the groups were found for profit points $H(5) = 6.028$, $p = 0.304$, for speed $H(5) = 5.928$, $p = 0.313$ for extras $H(5) = 6.611$, $p = 0.251$, and for number of errors $H(5) = 4.576$, $p = 0.470$

Means, standard deviations and medians of all factor level combinations separated for all three time pressure conditions for profit points and speed are displayed in table 7, while table 8 displays the aforementioned statistical values for extras and number of errors.

Table 7

Descriptive Statistics of Profit Points and Speed for the 2x3 Factor Level Combinations between Pressure Conditions

Performance	Malus LLA (8)	Malus Neutral (5)	Malus HLA (18)	Bonus LLA (8)	Bonus Neutral (4)	Bonus HLA (15)
Profit Points 9s						
Mean (*SD*)	129.25 (26.38)	135.00 (41.94)	146.17 (35.49)	123.13 (25.91)	150.25 (51.43)	136.40 (29.38)
Mdn	120.50	128.00	140.00	120.00	167.00	141.00
Profit Points 12s						
Mean (*SD*)	160.50 (39.02)	179.00 (42.07)	178.93 (37.45)	164.38 (28.15)	209.00 (15.43)	177.27 (30.48)
Mdn	160.00	188.00	185.00	165.00	211.00	187.00
Profit Points 15s						

Mean (*SD*)	175.88 (28.90)	203.20 (23.82)	191.39 (39.14)	189.38 (21.98)	219.25 (6.95)	192.67 (26.63)
Mdn	188.50	207.00	202.50	197.5	220.50	196.00
Speed (s) 9s						
Mean (*SD*)	166.77 (48.30)	131.25 (58.07)	145.28 (40.22)	163.98 (21.88)	135.48 (14.85)	168.21 (30.20)
Mdn	170.91	159.46	142.55	165.38)	132.41	170.99
Speed (s) 12s						
Mean (*SD*)	177.07 (36.62)	160.16 (24.78)	153.58 (38.54)	168.51 (25.17)	138.96 (6.78)	160.00 (26.11)
Mdn	172.97	162.17	150.98	163.16	140.56	164.53
Speed (s) 15s						
Mean (*SD*)	177.13 (39.45)	159.21 (25.42)	156.97 (35.98)	167.66 (22.61)	140.72 (17.63)	169.64 (26.49)
Mdn	182.27	160.88	151.63	168.22	137.32	169.50

Table 8

Descriptive Statistics of Extras and Number of Errors for the 2x3 Factor Level Combinations between Pressure Conditions

Performance	Malus LLA (8)	Malus Neutral (5)	Malus HLA (18)	Bonus LLA (8)	Bonus Neutral (4)	Bonus HLA (15)
Extra 9s						
Mean (*SD*)	3.88 (5.36)	6.00 (6.56)	7.00 (5.90)	3.25 (3.58)	7.25 (2.63)	3.80 (4.26)
Mdn	1.50	2.00	7.50	3.00	7.00	2.00
Extra 12s						
Mean (*SD*)	8.25 (5.15)	11.20 (3.35)	11.33 (4.65)	10.38 (3.29)	14.50 (1.00)	10.93 (4.11)
Mdn	8.00	11.00	14.00	11.00	15.00	13.00
Extra 15s						
Mean (*SD*)	12.00 (2.88)	14.60 (0.89)	14.11 (2.03)	14.75 (0.46)	14.75 (0.50)	13.67 (1.88)
Mdn	12.00	15.00	15.00	15.00	15.00	15.00
Number of errors 9s						
Mean (*SD*)	4.38 (3.96)	5.00 (6.04)	4.28 (4.40)	4.63 (1.69)	3.25 (3.20)	3.47 (2.53)
Mdn	3.50	3	3.00	4.50	2.00	2.00
Number of errors 12s						
Mean (*SD*)	3.25 (3.01)	3.00 (3.08)	3.06 (3.35)	3.88 (1.48)	1.50 (1.73)	2.93 (2.69)
Mdn	2.50	3.00	2.00	4.00	1.00	2.00
Number of errors 15s						
Mean (*SD*)	3.63 (1.85)	2.20 (2.28)	3.11 (4.11)	3.13 (1.55)	0.50 (0.58)	2.67 (2.77)

Mdn	4.00	2.00	2.00	2.50	0.50	2.00

Main analysis

Covariates. Since the sample size was rather small, the factor level combinations of the between-subject factors (frame, loss aversion) were tested and all together did not differ between the covariates gender, age, and years of study, *p*s >.05. Sex did not vary significantly between frame, $\chi^2(1) = 0.037$, $p = .847$, or between loss aversion groups, $\chi^2(2) = 0.016 = .992$. Age did not vary significantly between frame, bonus (M=22.00, SD=11.83); malus (M=25.00, SD=6.72), $t(56)$=-0.995, $p = .324$, or loss aversion groups, LLA (M=26.50, SD=5.93), Neutral (M=21.89, SD=3.41), HLA (M=26.70, SD=11.83), as tested with an one-way ANOVA ($F(2, 55) = 0.978$, $p = .383$). Years of study did not vary significantly between frame, bonus (M=2.65, SD=2.19); malus (M=2.68, SD=1.91), $t(56)$=-0.054, $p = .957$, or loss aversion groups, LLA (M=2.81, SD=2.21), Neutral (M=2.22, SD=1.97), HLA (M=2.71, SD=2.00), as tested with an one-way ANOVA ($F(2, 55) = 0.260$, $p = .772$). This is an indication of a successful randomization. Therefore, any possible influences of the covariates on the independent variables can be disregarded.

Data preparation. Requirements for the main analysis (RMM ANOVAs) were tested using outlier tests (Grubbs & Beck, 1972), boxplots, residual fit plots, normal plots of residuals, and the golden ratio in statistics for determining critical skewed data (Gunver, Senocak, & Vehid, 2018). Data from profit points, speed, extras, and number of errors, under different time pressure conditions had to be winsorized (Tukey, 1962), and logarithmized (Bland & Altman, 1996) to achieve normally distributed data.

Profit points.

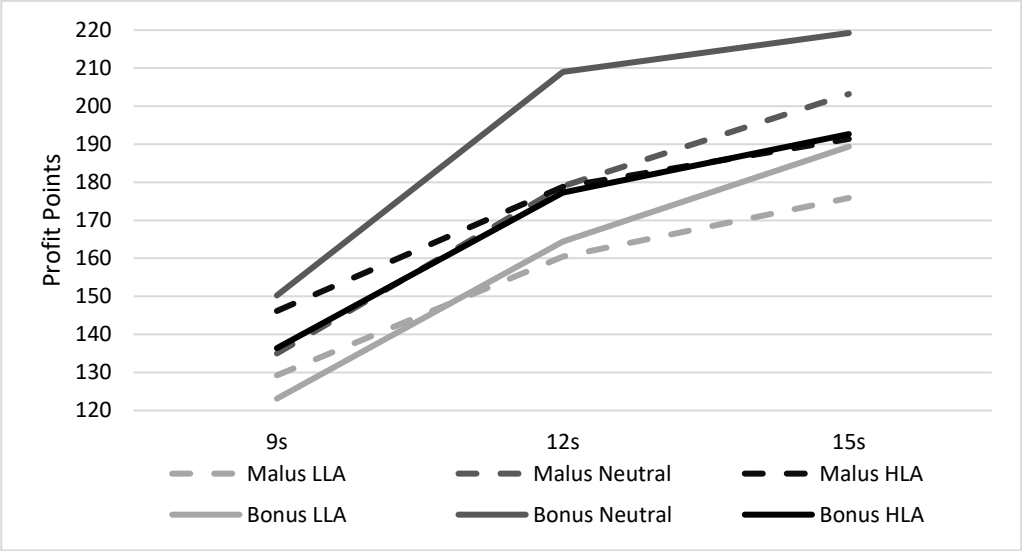


Figure 5. Factor level combinations of profit points under time pressure.

We conducted a three-way (3x2x3) RMM ANOVA, with profit points under pressure (9s, 12s, 15s) as a within-subject factor, frame as a between-subject factor and loss aversion as a second between-subject factor. Figure 5 gives an overview of all factor level combinations of profit points under time pressure. Since sphericity assumption for the within-subject condition was violated (p = .001), degrees of freedom were corrected using Huynh-Feldt estimates of sphericity (ε = .909). No significant interactions were found for the within-subject factors Profit Points under Pressure (9s, 12s, 15s) x Loss Aversion x Frame F(3.64, 94.50) = 0.259, p = .888; Profit Points under Pressure (9s, 12s, 15s) x Frame F(1.82, 94.50) = 1.100, p = .332; Profit Points under Pressure (9s, 12s, 15s) x Loss Aversion F(3.64, 94.50) = 0.978, p = .418 (all ps > .05). The main effect of profit points under pressure (9s, 12s, 15s) (within-subject) was significant, F(1.82, 94.50) = 1.817, p < .001, η^2_p = . 63, with a large effect. A look at the between-subjects effect revealed no significant interaction between Loss Aversion x Frame, F(2, 52) = 0.446, p = .642. The main effects of frame, F(1, 52) = 0.573, p = .452, and loss aversion, F(2, 52) = 1.946, p = .153, were not significant. Bonferroni post hoc pairwise comparisons of the within-subject factor profit points under pressure (9s, 12s, 15s) revealed a positive increase, ps >.001, see Figure 6.

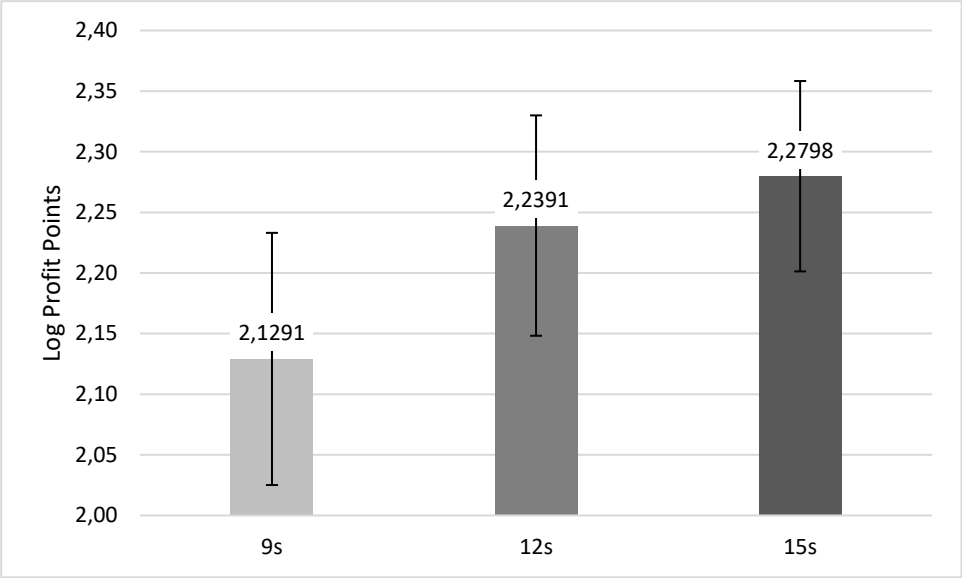


Figure 6. Profit points under time pressure (n = 58; log profit points, *M*±1 *SD*).

Hypothesis 1. The bonus contract will yield (1a) more profit points than the malus contract.

Hypothesis 2. We expect that participants who work under a bonus contract and are low in loss aversion will experience the least reduction in (2a) profit points compared to all other factor-level combinations.

Hypothesis 3. We expect that participants who work under a bonus contract and are low in loss aversion will (3a) earn more profit points compared to all other factor-level combinations.

Hypothesis 4. We expect that participants who work under a malus contract and are high in loss aversion will (4a) earn less profit points compared to all other factor-level combinations.

Therefore, hypotheses 1a, 2a, 3a, and 4a were rejected.

Speed.

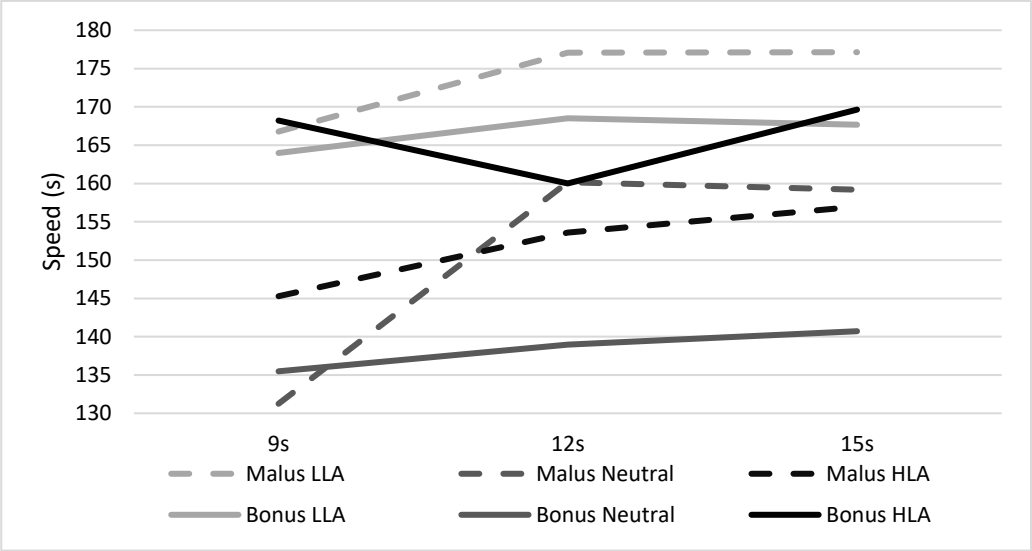


Figure 7. Factor level combinations of profit points under time pressure.

We conducted a three-way (3x2x3) RMM ANOVA with speed under pressure (9s, 12s, 15s) as a within-subject factor, frame as a between-subject factor and loss aversion as a second between-subject factor. Figure 7 gives an overview of all factor level combinations of profit points under time pressure. A look at the between-subjects effect revealed no significant interaction between Loss Aversion x Frame, $F(2, 52) = 0.590$, $p = .558$. The main effects of frame, $F(1, 52) = 0.101$, $p = .752$, and loss aversion, $F(2, 52) = 1.774$, $p = .180$, were not significant either. Since sphericity assumption for the within-subject condition was violated ($p < .001$), degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\varepsilon = .581$). No significant interactions were found for Speed under Pressure (9s, 12s, 15s) x Loss Aversion x Frame $F(2.32, 60.38) = 0.904$, $p = .423$; for Speed under Pressure (9s, 12s, 15s) x Loss Aversion $F(2.32, 60.38) = 1.831$, $p = .163$. A significant interaction between Speed under Pressure (9s, 12s, 15s) x Frame $F(1.16, 60.38) = 4.913$, $p = .026$, $\eta^2_p = .086$, with a moderate effect was found. Therefore, the main effect of Speed under Pressure (9s, 12s, 15s) x Frame had to be interpreted in a more differentiated way. We conducted a two-way 3x2 RMM ANOVA with speed under pressure (9s, 12s, 15s) as a within-subject factor, and frame as a between-subject factor. Since sphericity assumption for the within-subject condition was

violated ($p < .001$), degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\varepsilon = .580$). We found a marginally significant within-subject interaction $F(1.16, 64.99) = 3.742$, $p = .051$, $\eta^2_p = .063$, with a moderate effect. Follow-up one tailed[6] Welch's independent t-tests revealed a significant difference for the speed under 9s, $t(42.67) = -1.691$ $p = .049$, while for the speed under 12s, $t(49.91) = -0.175$ $p = .431$, and for the speed under 15s, $t(52.73) = -0.519$ $p = .303$, no significant differences were revealed. Therefore, participants under the malus contract were faster than under the bonus contract when working under 9s time pressure, whereas no differences under the other time pressure conditions were revealed, as displayed in Figure 8. To understand the simple main effect of speed under pressure (9s, 12s, 15s) we conducted two RMM ANOVAs, separated by frame. Since sphericity assumption for the within-subject condition in the bonus contract was violated ($p = .025$), degrees of freedom were corrected using Huynh-Feldt estimates of sphericity ($\varepsilon = .841$). There was no significant main effect of time pressure on speed in the bonus contract $F(1.68, 43.45) = 1.982$, $p = .156$. Since sphericity assumption for the within-subject condition was violated in the malus contract ($p < .001$), the degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\varepsilon = .546$). There was a significant main effect of time pressure on speed $F(1.09, 32.74) = 5.001$, $p = .029$, $\eta^2_p = .143$, with a large effect. Bonferroni post hoc pairwise comparisons of the within-subject factor under the malus contract (speed under time pressure) revealed a marginally significant difference between the 9s and 15s time pressure condition, $p = .066$.

[6] Because of the directional hypothesis, alpha level was one-tailed (Wonnacott & Wonnacott, 1984).

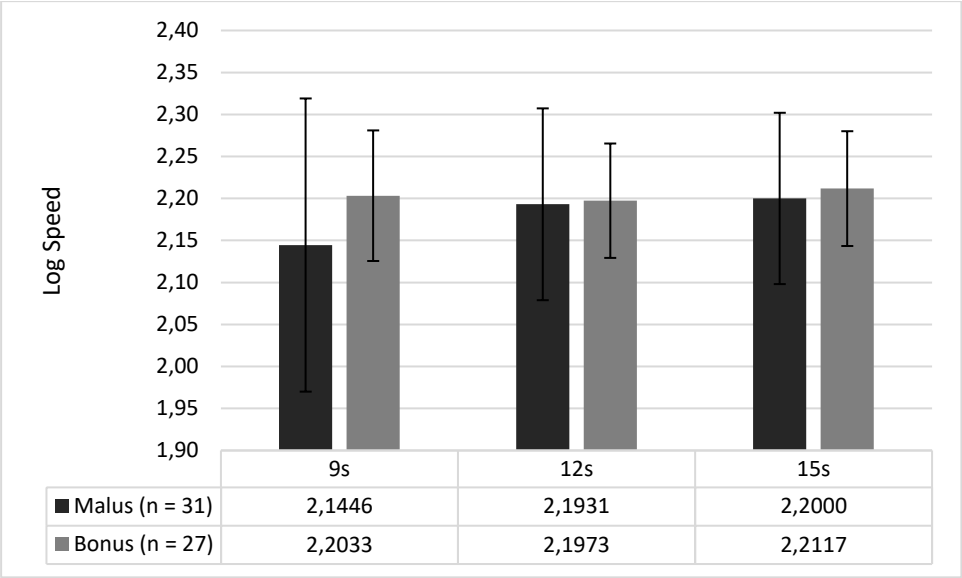


Figure 8. Speed under time pressure between frames (log speed, *M*±1 *SD*).

Hypothesis 1. The bonus contract will yield (1b) faster responses (speed) than the malus contract.

Hypothesis 3. We expect that participants who work under a bonus contract and are low in loss aversion will (3b) be faster compared to all other factor-level combinations.

Hypothesis 4. We expect that participants who work under a malus contract and are high in loss aversion will (4b) be slower compared to all other factor-level combinations.

Therefore, hypotheses 1b, 3b, and 4b were rejected.

Extras.

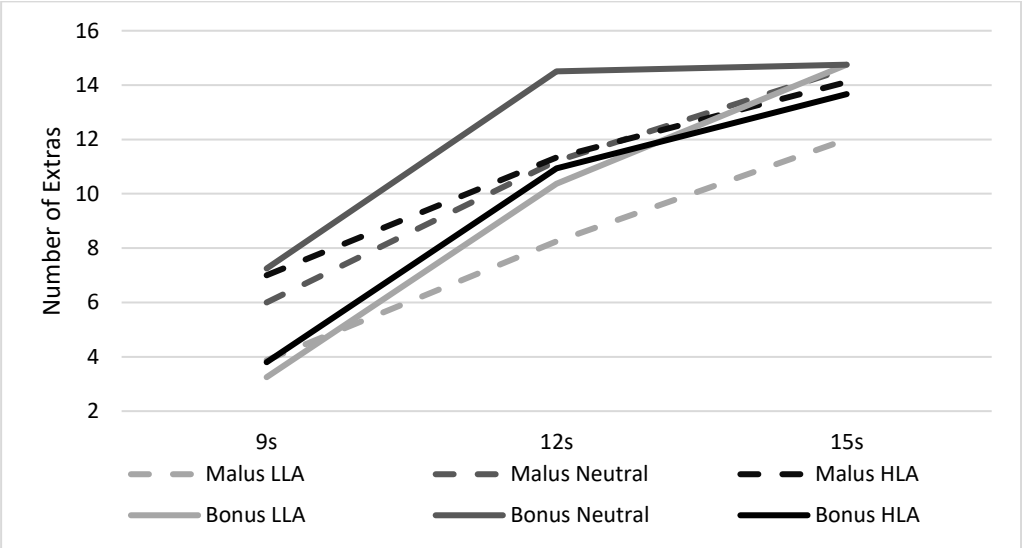


Figure 9. Factor level combinations of extras under time pressure.

We conducted a three-way (3x2x3) RMM ANOVA, with extras under pressure (9s, 12s, 15s) as a within-subject factor, frame as a between-subject factor and loss aversion as a second between-subject factor. Figure 9 gives an overview of all factor level combinations of extras under time pressure. Since sphericity assumption for the within-subject factor was violated ($p < .001$), degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\varepsilon = .591$). No significant interactions were found, Extras under Pressure (9s, 12s, 15s) x Loss Aversion x Frame $F(2.37, 61{,}48) = 0.952$, $p = .404$; Extras under Pressure (9s, 12s, 15s) x Frame $F(1.18, 61{,}48) = 0.403$, $p = .562$; Extras under Pressure (9s, 12s, 15s) x Loss Aversion $F(2.37, 61{,}48) = 1.088$, $p = .351$ (all ps > .05).

The main effect of extras under pressure (9s, 12s, 15s) (within-subject) was significant, $F(1.18, 61.48) = 80.734$, $p < .001$, $\eta^2_p = .608$, with a large effect. Bonferroni post hoc pairwise comparisons of the within-subject factor revealed a positive increase, ps >.001, see Figure 10.

A look at the between-subjects effect revealed no significant interaction between Loss Aversion x Frame, $F(2, 52) = 1.209$, $p = .307$. The main effects of frame, $F(1, 52) = 0.475$, $p = .494$, and loss aversion, $F(2, 52) = 2.009$, $p = .144$, were not significant.

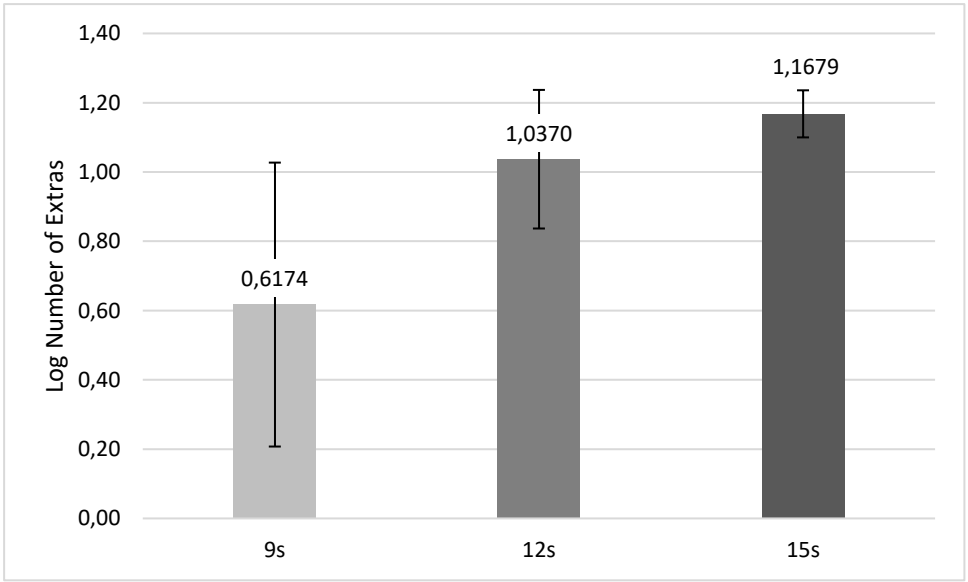


Figure 10. Extras under time pressure (n = 58; log number of extras, *M*±1 *SD*).

Hypothesis 1. The bonus contract will yield (1c) more extras than the malus contract.

Hypothesis 2. We expect that the participants who work under a bonus contract and are low in loss aversion will experience the least reduction in (2b) extras compared to all other factor-level combinations.

Hypothesis 3. We expect that participants who work under a bonus contract and are low in loss aversion will (3c) achieve more extras compared to all other factor-level combinations.

Hypothesis 4. We expect that participants who work under a malus contract and are high in loss aversion will (4c) achieve less extras compared to all other factor-level combinations. Therefore, hypotheses 1c, 2b, 3c, and 4c were rejected.

Number of errors.

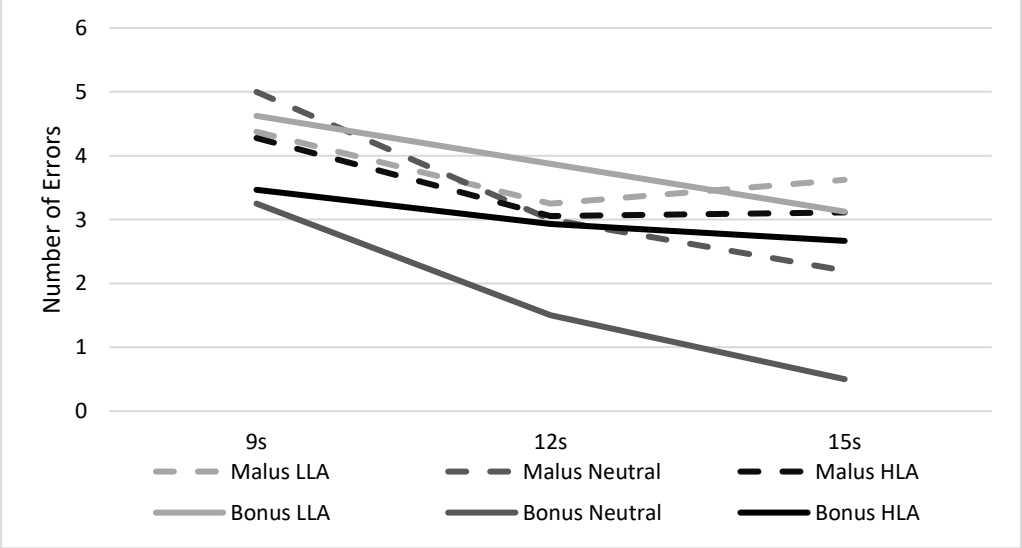


Figure 11. Factor level combinations of number of errors under time pressure.

We conducted a three-way (3x2x3) RMM ANOVA, with number of errors under pressure (9s, 12s, 15s) as a within-subject factor, frame as a between-subject factor and loss aversion as a second between-subject factor. Figure 11 gives an overview of all factor level combinations of number of errors under time pressure. No significant interactions were found for Number of Errors under Pressure (9s, 12s, 15s) x Loss Aversion x Frame $F(4, 104) = 0.543$, $p = .705$; Number of Errors under Pressure (9s, 12s, 15s) x Frame $F(2, 104) = 1.082$, p

= .343; Number of Errors under Pressure (9s, 12s, 15s) x Loss Aversion $F(4, 104) = 1.054$, $p = .383$ (all ps > .05).

The main effect of number of errors under pressure (9s, 12s, 15s) (within-subject) was significant, $F(2, 104) = 8.972$, $p < .001$, $\eta^2_p = .147$, with a large effect. Bonferroni post hoc pairwise comparisons of the within-subject factor revealed a positive increase, ps >.001, as seen in Figure 12.

A look at the between-subjects effect revealed no significant interaction between Loss Aversion x Frame, $F(2, 52) = 0.428$, $p = .654$. The main effects of frame, $F(1, 52) = 0.045$, $p = .832$, and loss aversion, $F(2, 52) = 2.033$, $p = .141$, were not significant.

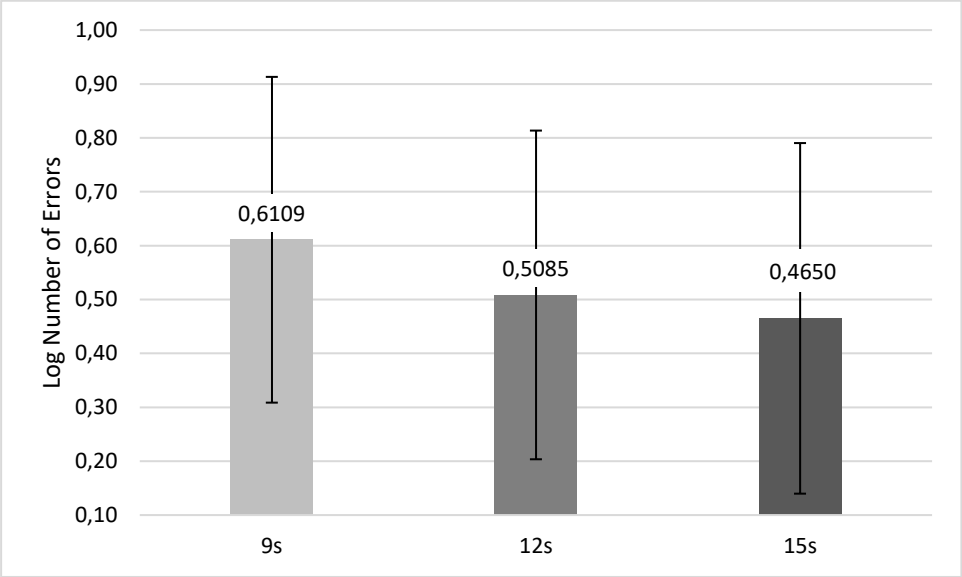


Figure 12. Number of errors under time pressure (n = 58; log number of errors, *M*±1 *SD*).

Hypothesis 1. The bonus contract will yield (1d) less errors than the malus contract.

Hypothesis 2. We expect that the participants who work under a bonus contract and are low in loss aversion will experience the least increase in (2c) number of errors compared to all other factor-level combinations.

Hypothesis 3. We expect that participants who work under a bonus contract and are low in loss aversion will (3d) make less errors compared to all other factor-level combinations.

Hypothesis 4. We expect that participants who work under a malus contract and are high in loss aversion will (4d) make more errors compared to all other factor-level combinations.

Therefore, hypotheses 1d, 2c, 3d, and 4d were rejected.

Discussion

Our predictions that a malus contract would lead to increased pressure especially for individuals high in loss aversion compared to the bonus contract and individuals low in loss aversion, leading to greater diminutions in performance, was not proven true. Surprisingly neither contract frame nor individual loss aversion exerted any substantial influence on performance under pressure, with the exception that participants under the malus contract were faster in the high time pressure condition (9s) and generally sped up as pressure increased compared to participants in the bonus contract. As expected, pressure generally decreased performance, apart from speed.

Our results are in contrast to the results of Essl and Jaussi (2017) which showed that participants high in loss aversion under the malus contracts earned significantly fewer profit points, needed more time to respond, and suffered more malus payments than all other individuals. One explanation for these differences is that participants in our design reacted in a more homogeneous way to the time pressure. The different time pressure conditions might have overshadowed the potentially pressurizing effects of the contract frame. However, the obvious explanation is that our null effects are just what they are and framing does not carry out a strong effect on performance, at least not under our conditions. Relating thereto the author of a recent discussion on the reproducibility in psychology emphasizes that the purpose and contribution of a replication should be to establish a phenomenon's boundary conditions (Iso-Ahola, 2017). Hence the next section will cover limitations and boundary conditions, their implications with regard to the reliability, stability and strength of the framing effect and suggestions for future research.

Boundary Conditions, Limitations and Future Research

The first and third stage were conducted to check for possible fatigue and practice effects. All participants were significantly faster in the third round compared to the first round indicating a general practice effect. However, the other performance measures are harder to interpret since there were individual differences between framing and loss aversion conditions. In the first stage low loss averse participants were slower compared to neutral or high loss averse participants, indicating that those low in loss aversion were less pressured by the countdown (20 s). It was also revealed that participants under the malus contract achieved more profit points, were faster , and made less errors in the last stage than in the first stage compared to those under a bonus contract who only became faster. Under the malus contract the degree of change of number of errors was bigger than under the bonus contract. These differences made us take a closer look at our reward system in the first and third stage. These stages were the same as in the main stage with the exception that no extras were offered for speedy results. Unfortunately, this may have had the inadvertent effect that quality was more strongly rewarded for participants under the bonus contract. The ratio of profit points achieved for correct answers compared to false ones was 10 to one in the bonus contract, while it was merely two and a half to one in the malus contract. As Rubin, Samek and Sheremeta (2018) illustrated in their experiment in which participants had to add up sets of five randomly generated 2-digit numbers by hand as quickly as possible, incentivizing quality to a higher degree in turn decreased the error rate. This was especially apparent for more loss-averse participants (Rubin et al., 2018). Therefore, in our design the combination of a malus contract (loss frame) and a corresponding comparable week quality incentive might have caused the increase in errors in the first phase under the malus contract. In the subsequent main stage the incentive scheme was changed, here the point ratio (of correct to false answers) was tilted 10 to one for all conditions, thereby turning the focus to a greater degree on quality. This might have primed participants in the malus contract, resulting in this

substantial change which was observed in the last stage. This asymmetric incentivizing might have counterbalanced the intended effect of the contract frames, as under the bonus contract participants had to be more careful not to make mistakes in order to maximize their payments, compared to the malus contract. This might have made the participants under the bonus contract more loss averse and thereby diminished any observable differences between the frames.

To understand the limitations and conditions of the framing effect one must understand the mechanisms behind how the malus contract may be superior for performance, compared to the bonus contract. For one the malus contract may communicate a higher expectation that achieving the task is the default since a reward is often perceived as a sort of recognition for voluntary overperformance, while a punishment is often perceived as a sanction for not meeting the expectation (Brooks, et al., 2012). Furthermore, the malus contract may induce an endowment effect, as the money is granted from the beginning and abstracted only as a result of bad performance in the future, thereby increasing the perceived value of the malus contract and increasing effort (Thaler, 1980; Brooks et al., 2012). It is possible that our design did not lead to an endowment of our malus contract. Firstly, since the payments for each table consisted of multiple smaller payments provided for different performance measures, the payment may not have been perceived as an entity, which may be necessary for the endowment effect (Hossain & List, 2012). However, the use of a label such as “bonus” for a payment has been shown to lead to the endowment effect (Brooks et al., 2012). Secondly while the instructions did endow the malus payments rather than the bonus payments, we might have unintentionally endowed the bonus contract as well, since the countdown for each table of the bonus contract said: “Bonus will end in 9 seconds” (English translation, example of the 9 second time pressure condition), thereby implying that the bonus is currently possessed. Goal framing has been described as more complicated than other forms

of framing hence making it more susceptible to linguistic, and contextual effects (Levin et al., 1998).

A further possible explanation for our null results is that the loss aversion test was administered at the end. This makes the loss aversion test susceptible to biases such as to the house money effect (Ackert, Charupat, Church, & Deaves, 2006; Thaler & Johnson, 1990) where after a prior gain people are more risk seeking, the break-even effect (Thaler & Johnson, 1990) where prior losses make outcomes which offer the opportunity to "break even" especially attractive, or cognitive load as it reduces risk neutral choices (Benjamin, Brown, & Shapiro, 2006). However, the results do not support these specific sources of bias. The group that performed best was determined to be risk neutral and not risk seeking as the house money effect would suggest. Since there was no external reference point, low earnings (relative to the whole sample) were not identified as such by the participants themselves, making the perception of “prior losses“, which are necessary for the break-even effect, highly unlikely. Finally, the influence of cognitive load on risk behavior can arguably be disregarded since no differences in the number of loss neutral participants between frames were observed even though distraction theory may suggest that participants under a malus contract would experience higher cognitive load through worrisome thoughts. Nevertheless, we advise extending the lottery test by increasing the number of lottery tickets and additionally measuring individual risk preference in order to achieve a more accurate assessment (see Brink & Rankin, 2013).

With respect to the boundary conditions of framing it has been shown that low involvement, low cognitive effort as well as low perceived threat may reduce or reverse the framing effect (e.g., involvement, cognitive effort: Maheswaran & Meyers-Levy, 1990; Steffen et al., 1994; Wegener, Petty, & Klein, 1994; Hazer & Highhouse, 1997, as cited in Levin et al., 1998; Igou & Bless, 2004; e.g., perceived threat: Block & Keller, 1995; Rothman, Salovey, Antone, Keough, & Martin, 1993, as cited in Levin et al., 1998). There

might have been a lack of cognitive effort and involvement as the task itself was of rather simplistic nature. In this regard, results of a study which used risky choice framing suggests that time pressure reduces framing (Experiment 1-2, Svenson & Benson, 1993). Threat perception admittedly might have been low since participants could not lose their own money, and got an additional fee for showing up regardless of their performance. Threat perception has been shown to induce regret, a mechanism associated with the superiority of malus contracts (Levin et al., 1998).

While goal framing did not exert any substantial influence on performance under our conditions, participants under the malus contract reacted stronger to the pressure by speeding up, and were faster under high pressure compared to participants under the bonus contract. For some industries (e.g., gastronomy) speedy results are of upmost importance as the interrelationship between quantity and quality may be positive (Song, Jang, Wiggins, Nowlin, 2018), so that malus contracts may be of advantage here. In this regard future research could bring in some clarity by testing framing under pressure with power tests. However apart from time pressure increasing speed for participants under the malus contract we did not find any evidence of low pressure increasing performance. Perhaps our lowest pressure condition was still too high to reveal a positive influence on performance measures (McDaniel, 1990; Muse et al., 2003), as the use of a visible countdown such as ours has been shown to induce pressure to a sufficient degree, and to hinder performance (Turan, Savaş, Duraner, & Toere 2017). Thus, we recommend using diary studies, as experimental settings probably already carry out some degree of pressure, thereby subverting any effort in highlighting the relationship between performance and pressure which may very well be curvilinear.

Our findings are consistent with other literature showing no or very small effects of goal framing (DellaVigna & Pope, 2018; Lalor & Hailey, 1989; Lauver & Rubin, 1990; Levin et al., 1998; Rutte, Wilke, & Messick, 1987; Lerman, Ross, Boyce, Gorchov, McLaughlin, Rimer, & Engstrom, 1992; Steffen, Sternberg, Teegarden, & Shepherd, 1994; Quidt, 2014;

Quidt et al., 2017). We conclude that the effect of goal framing on performance might be very small and only apparent under certain conditions such as some degree of cognitive effort, which may be reduced by time pressure, involvement, perceived threat, and endowment.

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Appendix A

List of tables

Appendix B

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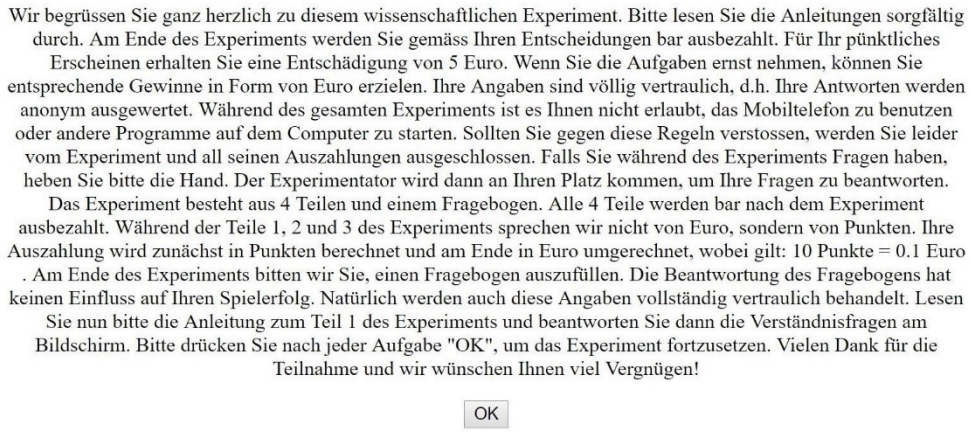
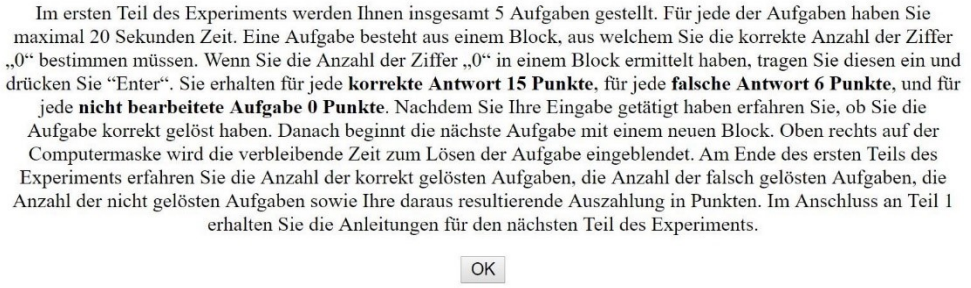
Appendix C

Experimental Screens

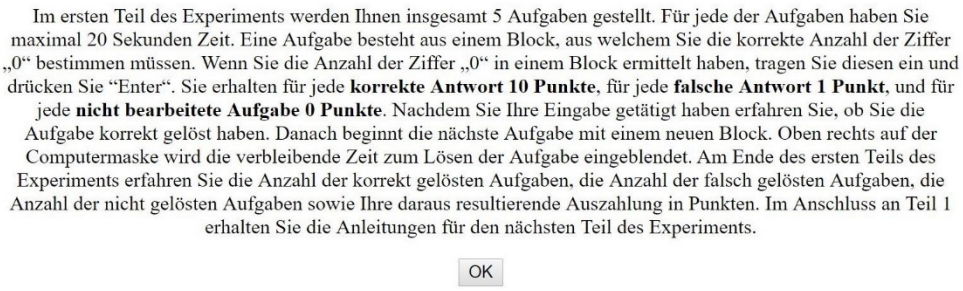
Bonus and malus contract.



Malus contract.



Bonus contract.



Bonus and malus contract.

Bitte beantworten Sie die folgenden Verständnisfragen. Ihre Antworten haben keinen Einfluss auf die Auszahlung in diesem Experiment, sondern dienen lediglich dazu festzustellen, ob alle Teilnehmer den Ablauf des Experiments richtig verstanden haben.

OK

Frage 1: Angenommen Sie geben die korrekte Anzahl Nullen an.
Wie hoch wäre Ihre Auszahlung in dieser Runde?

OK

Frage 2: Angenommen Sie geben eine falsche Antwort.
Wie hoch wäre Ihre Auszahlung in dieser Runde?

OK

Sie bekommen nun ein Übungsbeispiel. Ihre Antworten haben keinen Einfluss auf die Auszahlung in diesem Experiment, sondern dienen lediglich dazu festzustellen, ob alle Teilnehmer den Ablauf des Experiments richtig verstanden haben.

OK

19 Sekunden

10000010011
10101010101
01100111000
101101010110

Nun startet Teil 1. Dieser Teil ist wie das Übungsbeispiel, dass Sie gerade gemacht haben.
Die Punkte in diesem Teil tragen zu Ihrer Auszahlung bei.

OK

15 Sekunden

011111101101010
000001100001
000111101101
10111110110110

Sie haben in diesem Teil des Experiments folgende Anzahl an Zahlenblöcken korrekt gezählt: **1**
Sie haben in diesem Teil des Experiments folgende Anzahl an Zahlenblöcken falsch gezählt: **4**
Sie haben in diesem Teil des Experiments folgende Anzahl an Zahlenblöcken nicht beantwortet: **2**
Ihr Gewinn aus diesem Teil des Experiments beträgt: **27 Punkte**.

OK

Malus contract.

Im zweiten Teil des Experiments werden Ihnen insgesamt 45 Aufgaben gestellt. Für jede der Aufgaben haben Sie maximal 20 Sekunden Zeit. Eine Aufgabe besteht wieder aus einem Block, aus welchem Sie die korrekte Anzahl der Ziffer „0“ bestimmen müssen. Die Eingabemaske gleicht der des ersten Teils des Experiments. Wenn Sie die Anzahl der Ziffer „0“ in einem Block ermittelt haben, tragen Sie diesen ein und drücken Sie “Ok“.

Ihre Auszahlung:

- Für jede richtige Antwort erhalten Sie 15 Punkte.
- Für jede falsche Antwort erhalten Sie 6 Punkt.
- Machen Sie innerhalb der 20 Sekunden keine Eingabe, erhalten Sie 0 Punkte.
- Wenn Sie zum Lösen der Aufgabe mehr als **9, 12 oder 15 Sekunden** benötigen, erhalten Sie einen **Malus von -5 Punkten.**

Sie erfahren immer vor einer Aufgabe ob die Zeit für den Malus 9, 12 oder 15 Sekunden beträgt. Nachdem Sie Ihre Eingabe getätigt haben, erhalten Sie jeweils eine Rückmeldung, ob Sie die Aufgabe richtig gelöst haben und ob Sie einen Bonus erhalten haben. Dann startet die nächste Aufgabe an Ihrem Bildschirm.

OK

Bonus contract.

Im zweiten Teil des Experiments werden Ihnen insgesamt 45 Aufgaben gestellt. Für jede der Aufgaben haben Sie maximal 20 Sekunden Zeit. Eine Aufgabe besteht wieder aus einem Block, aus welchem Sie die korrekte Anzahl der Ziffer „0“ bestimmen müssen. Die Eingabemaske gleicht der des ersten Teils des Experiments. Wenn Sie die Anzahl der Ziffer „0“ in einem Block ermittelt haben, tragen Sie diesen ein und drücken Sie “Ok“.

Ihre Auszahlung:

- Für jede richtige Antwort erhalten Sie 10 Punkte.
- Für jede falsche Antwort erhalten Sie 1 Punkt.
- Machen Sie innerhalb der 20 Sekunden keine Eingabe, erhalten Sie 0 Punkte.
- Wenn Sie zum Lösen der Aufgabe weniger als **9, 12 oder 15 Sekunden** benötigen, erhalten Sie einen **Bonus von 5 Punkten.**

Sie erfahren immer vor einer Aufgabe ob die Zeit für den Bonus 9, 12 oder 15 Sekunden beträgt. Nachdem Sie Ihre Eingabe getätigt haben, erhalten Sie jeweils eine Rückmeldung, ob Sie die Aufgabe richtig gelöst haben und ob Sie einen Bonus erhalten haben. Dann startet die nächste Aufgabe an Ihrem Bildschirm.

OK

Malus contract.

Beispiele:

- Sie erfahren vor einer Aufgabe, dass die Zeit für den Malus 12 Sekunden beträgt. Sie lösen eine Aufgabe richtig und benötigen weniger als 12 Sekunden. Sie verdienen dabei in dieser Runde 15 Punkte für Ihre korrekte Antwort und erhalten keinen Malus von -5 Punkten, da Sie weniger als 12 Sekunden benötigten um die Aufgabe zu lösen.
- Sie erfahren vor einer Aufgabe, dass die Zeit für den Malus 12 Sekunden beträgt. Sie lösen eine Aufgabe falsch und benötigen weniger als 12 Sekunden. Sie verdienen dabei in dieser Runde 1 Punkt für Ihre falsche Antwort und erhalten keinen Malus von -5 Punkten, da Sie zum Lösen der Aufgabe weniger als 12 Sekunden brauchten.

Nachdem Sie alle 45 Aufgaben bearbeitet haben, erfahren Sie die Anzahl der korrekt gelösten Aufgaben, die Anzahl der falsch gelösten Aufgaben, die Anzahl der nicht gelösten Aufgaben, die Anzahl der erhaltenden Bonuszahlungen sowie Ihre daraus resultierende Auszahlung in Punkten aus diesem Teil des Experiments.
Lösen Sie nun die Verständnisfragen am Bildschirm und starten Sie dann mit der Bearbeitung der Aufgaben. Im Anschluss an Teil 2 werden direkt an Ihrem Computer die Anleitungen für Teil 3 erscheinen. Auch die Anleitungen für Teil 4 werden direkt an Ihrem Bildschirm erscheinen. Im Anschluss an Teil 4 können Sie Ihre Gewinne aus allen Teilen des Experiments in Form von Euro am Bildschirm sehen.

OK

Bonus contract.

Beispiele:

- Sie erfahren vor einer Aufgabe, dass die Zeit für den Bonus 12 Sekunden beträgt. Sie lösen eine Aufgabe richtig und benötigen weniger als 12 Sekunden. Sie verdienen dabei in dieser Runde 10 Punkte für Ihre korrekte Antwort und erhalten einen Bonus von 5 Punkten, da Sie weniger als 12 Sekunden benötigten um die Aufgabe zu lösen.
- Sie erfahren vor einer Aufgabe, dass die Zeit für den Bonus 12 Sekunden beträgt. Sie lösen eine Aufgabe falsch und benötigen weniger als 12 Sekunden. Sie verdienen dabei in dieser Runde 1 Punkt für Ihre falsche Antwort und erhalten einen Bonus von 5 Punkten, da Sie zum Lösen der Aufgabe weniger als 12 Sekunden brauchten.

Nachdem Sie alle 45 Aufgaben bearbeitet haben, erfahren Sie die Anzahl der korrekt gelösten Aufgaben, die Anzahl der falsch gelösten Aufgaben, die Anzahl der nicht gelösten Aufgaben, die Anzahl der erhaltenden Bonuszahlungen sowie Ihre daraus resultierende Auszahlung in Punkten aus diesem Teil des Experiments.
Lösen Sie nun die Verständnisfragen am Bildschirm und starten Sie dann mit der Bearbeitung der Aufgaben. Im Anschluss an Teil 2 werden direkt an Ihrem Computer die Anleitungen für Teil 3 erscheinen. Auch die Anleitungen für Teil 4 werden direkt an Ihrem Bildschirm erscheinen. Im Anschluss an Teil 4 können Sie Ihre Gewinne aus allen Teilen des Experiments in Form von Euro am Bildschirm sehen.

OK

Bonus and malus contract.

Bitte beantworten Sie die Verständnisfragen. Ihre Antworten haben keinen Einfluss auf die Auszahlung in diesem Experiment, sondern dienen lediglich dazu festzustellen, ob alle Teilnehmer den Ablauf des Experiments richtig verstanden haben.

OK

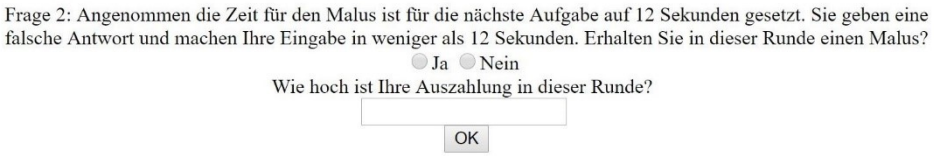
Malus contract.

Frage 1: Die Zeit für den Malus ist für die nächste Aufgabe auf 12 Sekunden gesetzt. Sie geben die korrekte Anzahl Nullen an und machen Ihre Eingabe in mehr als 12 Sekunden.
Erhalten Sie in dieser Runde einen Malus?

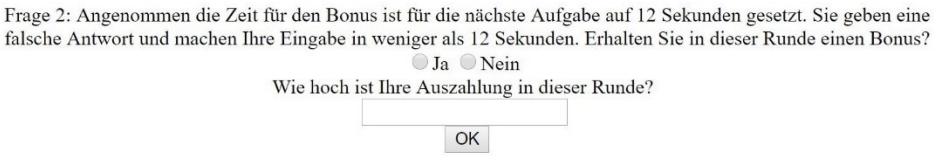
Ja Nein

Wie hoch ist Ihre Auszahlung in dieser Runde?

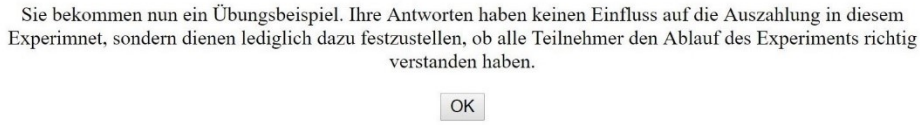
OK



Bonus contract.



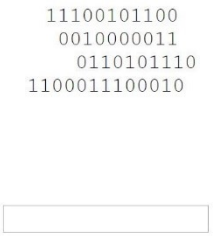
Bonus and malus contract.



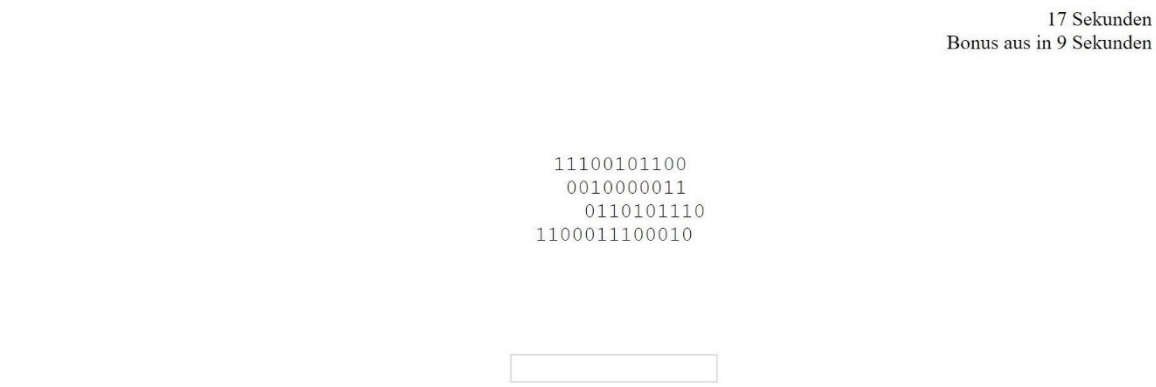
Malus contract.

Bonus contract.

Malus contract.



Bonus contract.



Bonus and malus contract.

Bonus and malus contract.

Sie haben in diesem Teil des Experiments folgende Anzahl an Zahlenblöcken korrekt gezählt: **0**
Sie haben in diesem Teil des Experiments folgende Anzahl an Zahlenblöcken falsch gezählt: **45**
Sie haben in diesem Teil des Experiments folgende Anzahl an Zahlenblöcken nicht beantwortet: **45**
Ihr Gewinn aus diesem Teil des Experiments beträgt: **0 Punkte**.

OK

Malus contract.

In diesem Teil 3 werden Ihnen erneut Aufgaben gestellt, die gleich sind wie im Teil 1. Sie haben für jede Aufgabe 20 Sekunden Zeit. Es kann kein Malus mehr erreicht werden. Richtig gelöste Aufgaben ergeben 15 Punkte. Falsch gelöste Aufgaben ergeben 6 Punkte. Machen Sie keine Eingabe, erhalten Sie 0 Punkte.

OK

Bonus contract.

In diesem Teil 3 werden Ihnen erneut Aufgaben gestellt, die gleich sind wie im Teil 1. Sie haben für jede Aufgabe 20 Sekunden Zeit. Es kann kein Bonus mehr erreicht werden. Richtig gelöste Aufgaben ergeben 10 Punkte. Falsch gelöste Aufgaben ergeben 1 Punkte. Machen Sie keine Eingabe, erhalten Sie 0 Punkte.

OK

Bonus and malus contract.

15 Sekunden

011111101101010
000001100001
000111101101
10111110110110

Die Punkte in diesem Teil tragen zu Ihrer Auszahlung bei.

OK

Sie haben in diesem Teil des Experiments folgende Anzahl an Zahlenblöcken korrekt gezählt: **0**
Sie haben in diesem Teil des Experiments folgende Anzahl an Zahlenblöcken falsch gezählt: **5**
Sie haben in diesem Teil des Experiments folgende Anzahl an Zahlenblöcken nicht beantwortet: **4**
Ihr Gewinn aus diesem Teil des Experiments beträgt: **6 Punkte**.

OK

Im Folgenden bieten wir Ihnen sechs Lotterien an. Sie können jeweils entscheiden, ob Sie an der angebotenen Lotterie teilnehmen möchten oder nicht. Am Ende des Teils 4 wird eine Lotterie zufällig ausgewählt und ausbezahlt. Mit Hilfe eines Zufallgenerators wird eine der sechs Lotterien für die Auszahlungsberechung herangezogen.

Jede Lotterie hat die gleiche Wahrscheinlichkeit ausgewählt zu werden. Auch die Gewinnwahrscheinlichkeit wird mit Hilfe eines Zufallsgenerators bestimmt und liegt bei 50 %.

OK

Lotterie

Sie sehen unten 6 verschiedene Lotterientscheidungssituationen, in denen Sie sich entweder für eine Teilnahme oder keine Teilnahme entscheiden können. Sie müssen sich in allen 6 Situationen für eine Teilnahme oder keine Teilnahme entscheiden.

Mit 50% Wahrscheinlichkeit 3 Euro gewinnen & mit 50% Wahrscheinlichkeit 1 Euro verlieren. Ja Nein
Mit 50% Wahrscheinlichkeit 3 Euro gewinnen & mit 50% Wahrscheinlichkeit 1.50 Euro verlieren. Ja Nein
Mit 50% Wahrscheinlichkeit 3 Euro gewinnen & mit 50% Wahrscheinlichkeit 2 Euro verlieren. Ja Nein
Mit 50% Wahrscheinlichkeit 3 Euro gewinnen & mit 50% Wahrscheinlichkeit 2.50 Euro verlieren. Ja Nein
Mit 50% Wahrscheinlichkeit 3 Euro gewinnen & mit 50% Wahrscheinlichkeit 3 Euro verlieren. Ja Nein
Mit 50% Wahrscheinlichkeit 3 Euro gewinnen & mit 50% Wahrscheinlichkeit 3.50 Euro verlieren. Ja Nein

OK

Es wurde Lotterie Nummer 2 gewählt, und Sie haben teilgenommen.
Sie haben 1.5 Euro verloren.

OK

Fragebogen

Geschlecht ○ Mann ○ Frau

Was ist Ihr Höchster Bildungsabschluss?

- ○ Kein Schulabschluss
- ○ Grund-/Hauptschulabschluss
- ○ Realschule (Mittlere Reife)
- ○ Gymnasium (Abitur)
- ○ Abgeschlossene Berufsausbildung
- ○ Fachhochschule
- ○ Universität

Falls Sie studieren/studiert haben, wieviele Jahre?

Falls Sie Strategien genutzt haben um möglichst viele Punkte zu machen, beschreiben Sie diese in Stichworten:

Anmerkung/Kommentar/Feedback:

Abstract (Zusammenfassung)

Arbeitgeber sind stets bestrebt, die Produktivität ihrer Arbeitnehmer zu steigern aber gleichzeitig die Kosten zu senken. Diese Kosten setzen sich nicht nur aus Gehältern zusammen, sondern beinhalten auch Zeitkosten und Kosten für Fehler. Zeitdruck spielt eine große Rolle zur Bestimmung der Leistung, da Zeitdruck einerseits die Leistung erhöhen kann, aber andererseits zum Versagen unter Druck führen kann. Verträge könnten angepasst an die individuelle Verlustaversion unterschiedlich präsentiert werden (mittels Framing-Effekt) und somit die Produktivität ohne zusätzliche Kosten erhöhen, da sie dann eine optimale Menge an Druck ausüben. Wir untersuchen die prädiktive Rolle der individuellen Verlustaversion auf das Verhältnis zwischen unterschiedlich präsentierten, zeitsensiblen Anreizsystemen und der Leistung und replizieren somit das Experiment von Essl und Jaussi (2017). Wir erweitern ihr Experiment durch den Einsatz von variierendem Zeitdruck. Achtundfünfzig Teilnehmer, mehrheitlich Studenten, arbeiteten an einer Aufgabe unter zwei auszahlungsäquivalenten Verträgen, die entweder als Bonus-Vertrag oder Malus-Vertrag präsentiert wurden. Die Leistung aller Teilnehmer sank unter zunehmendem Zeitdruck, mit der Ausnahme der Geschwindigkeit. Während sich unter einem Malus-Vertrag die Geschwindigkeit mit zunehmendem Zeitdruck erhöhte war diese beim Bonus-Vertrag nicht der Fall. Darüber hinaus waren die Teilnehmer des Malus-Vertrages unter hohem Zeitdruck schneller. Dies deutet darauf hin, dass der Malus-Vertrag mehr Druck als der Bonus-Vertrag ausübt. Abgesehen von diesen geringfügigen Unterschieden wirkte sich weder die Präsentation noch die Verlustaversion auf die Leistung aus. Gründe und Einschränkungen für das Ausbleiben des Framing-Effekts werden diskutiert. Wir schließen darauf, dass bestimmte Anforderungen erfüllt sein müssen, um einen Framing-Effekt zu erzielen, wie ein hohes Maß an Elaboration, Bedrohungswahrnehmung und die Anwesenheit des Besitztumseffekts.

Schlagwörter: Leistung, Zeitdruck, Druck, framing, Verlustaversion, prospect theory