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# DO GOOD INTENTIONS PAY OFF? EMPLOYEE RESPONSES TO WELL-INTENDED ACTIONS WITH RISKY OUTCOMES\*

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## Abstract

How does a subordinate react to the superior's well-intended action when it is not certain that it will produce the intended outcome? The risk associated with the outcome creates moral wiggle room and thus poses a threat to the gift exchange between the superior and the subordinate. In a laboratory experiment, we first find that subordinates continue to reciprocate if the outcome risk is high. Second, however, subordinates' response to a well-intended action that increases outcome risk depends on their inequality aversion. Weakly inequality-averse subordinates repay a kind action with a kind reaction if it decreases, but not if it increases, their outcome risk, whereas strongly inequality-averse subordinates react alike in both cases. Hence, a well-intended action is less worthwhile for subordinates if it increases than if it decreases outcome risk.

**Keywords:** Gift-exchange game, inequality aversion, reciprocity, risk.

**JEL classification:** M41, M52, C91, D91.

**Data availability:** The data are available from the authors upon request.

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## **DO GOOD INTENTIONS PAY OFF? EMPLOYEE RESPONSES TO WELL-INTENDED ACTIONS WITH RISKY OUTCOMES**

We examine how risk affects incomplete contracts that involve trust, reciprocity, and fairness. When complete incentive contracts are not feasible, firms often take recourse to gift-exchange contracts (Brown et al. 2015). The superior acts kindly toward her subordinate, trusting him to return that gift—for example, by providing increased effort in return for a fixed wage (Hannan 2005). There is considerable evidence of gift exchange (Hannan 2005, Kuang and Moser 2009, 2011, Chen and Sandino 2012, Maas et al. 2012, Douthit et al. 2022). However, certain situational factors, such as unequal treatment (Brown et al. 2015), excessive labor supply (Choi 2014, Majerczyk 2018), a legal minimum wage (Brink et al. 2021), or formal control (Christ et al. 2012, Christ 2013, Abdel-Rahim and Liu 2021), can reduce the efficiency of gift-exchange contracts. We study whether ex-post risk about the superior’s gift to the subordinate is another such factor. For instance, will a subordinate reward his superior for her costly but possibly unsuccessful attempt to advocate on his behalf with senior management to raise his pay or adjust his targets?

Responses to others’ actions, such as a “gift” offered by a superior or, reversely, control implemented by her, are motivated by both reciprocity and fairness (Fehr and Schmidt 2006, Maas et al. 2012, Brown et al. 2015, Douthit and Stevens 2015). In a laboratory experiment, we first examine whether a subordinate reciprocates his superior’s well-intended but possibly unsuccessful support as an example of reciprocal behavior under a high risk about the outcome. Second, we study how inequality aversion (i.e., distributional fairness preferences) and risk combine to affect the subordinate’s response to the superior’s support.<sup>1</sup> Incomplete contracts are common, and they

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<sup>1</sup> We use “response” to refer to any behavioral reaction, whether it is driven by reciprocity, inequality aversion, or other motives. Likewise, “fair” behavior can be driven by inequality aversion (a preference for an equal, or “fair,” distribution of payoffs), but also by reciprocity.

are often subject to risk, or perceived as such, by the subordinate who stands to benefit from the superior's gift (or suffer from control implemented by her). From a managerial viewpoint, it is crucial to understand the impact of risk on incomplete contracts. From an academic viewpoint, it is interesting whether prior results generalize to gift-exchange contracts under risk. However, prior research on gift-exchange contracts in accounting has consistently assumed certainty.

Reciprocal managerial behavior matters in many areas of management accounting, such as contract design (Hannan 2005, Kuang and Moser 2009, 2011, Choi 2014, Majerczyk 2018, Brink et al. 2021), control system design (Williamson 2008, Christ et al. 2012, Christ 2013, Garrett et al. 2019, Abdel-Rahim and Liu 2021), budgeting (Douthit and Stevens 2015, Brunner and Ostermaier 2019), or target setting (Fisher et al. 2015, Groen 2018). Prior experimental research documents that subordinates react to the well-intended actions of their superiors, such as offering a fixed-wage contract, relaxing formal control, or adjusting a target, in various ways, including increased effort, more honesty, or stronger goal commitment. However, the implications of the superior's action were always certain in these experiments. For example, if the subordinate accepted a fixed-wage contract in any of these studies, this contract would be enforced, and there was no risk or uncertainty about the wage. Yet in many cases, the superior's well-intended action to attain a favorable outcome for her subordinate may or may not produce the intended outcome.

For instance, employees reciprocate a high fixed wage with high effort in an exchange of gifts (Hannan 2005, Kuang and Moser 2009, Choi 2014). However, while the superior advocates raising her subordinate's pay, management may decline because the business situation inhibits additional spending. Likewise, employees respond to achievable targets or target adjustments with more effort (Fisher et al. 2015, Kelly et al. 2015). Albeit the superior may attempt to renegotiate the targets for her department with management to shield her subordinate against an adverse event,

she may fail to convince management, and the targets remain out of reach for her subordinate. Similarly, employees reciprocate with more effort when they are involved in decision-making (Williamson 2008). Again, the superior may solicit for the decision favored by her subordinate, but management may not succumb. At best, the subordinate is aware of his superior's good intention or observes her well-intended action but knows that its success depends on factors beyond his superior's control, such as senior management's consent or the firm's performance.

It is not obvious how subordinates respond in such situations. Reciprocity requires that the subordinate returns the superior's favor. However, risk creates moral wiggle room, which the subordinate can use as an excuse to justify selfish behavior (Dana et al. 2007). Prior research provides mixed and only indirect evidence. On the one hand, there are gift-exchange games showing that a giftee is less inclined to reciprocate if the giver is left uncertain about whether the giftee has reciprocated (Regner 2018). On the other hand, similar experiments reveal that reciprocal behavior is not affected by such uncertainty (van der Weele et al. 2014). In all these studies, however, the giftee's response was risky, not the giver's gift. Other research shows that people care much about intentions (Christ 2013) and that a well-intended action is reciprocated although it is certain that this action has not produced the intended outcome (Charness and Levine 2007, Gago 2021). The latter evidence leads us to predict that subordinates reciprocate their superiors' good intentions with more effort even if there is high risk about the intended outcomes.

Subordinates' responses to superiors' actions are motivated by both inequality aversion and reciprocity (Maas et al. 2012, Brown et al. 2015, Douthit and Stevens 2015, Brunner and Ostermaier 2019). For example, subordinates respond with less effort, in a gift exchange, if the management does not share the profit with them (Hannan 2005) or if they find their wage to be unfairly low compared to their peers (Brown et al. 2015). Conversely, superiors reciprocate high

performance with costly effort to identify team members' individual contributions and reward them fairly (Maas et al. 2012). Risk reduces the willingness to share fairly (Freundt and Lange 2017, Cettolin et al. 2017). A well-intended action whose outcome is risky, however, necessarily changes the subordinate's exposure to risk. Based on Bicchieri's (2006) social norms theory, we conjecture that weakly inequality-averse subordinates, who are less sensitive to inequality, use the wiggle room arising from risk to evade the fairness norm. Hence, we predict that, first, they respond less to a well-intended action that increases risk than strongly inequality-averse subordinates; second, they respond less than to an otherwise identical action that reduces risk.

We design an experiment to test our predictions in the laboratory. In a dyadic one-shot interaction, the superior decides whether to advocate with management to award his subordinate a bonus. The superior's support increases the probability that her subordinate receives the bonus by 25 percentage points, but it does not secure the bonus. Soliciting for her subordinate is costly for the superior, and the subordinate can provide costly effort in return. The subordinate chooses his level of effort after learning whether the superior has advocated on his behalf, but before learning whether he will receive the bonus, that is, under ex-post risk about whether the superior's support was successful. We manipulate the ex-ante probability to receive the bonus at two levels: 25 percent and 50 percent. Thus, the ex-post probability can be 50 percent, either because the superior solicited for her subordinate (when the ex-ante probability is 25 percent) or although she did not solicit (when it is 50 percent). If the ex-post probability is 50 percent, the subordinate faces the highest risk about the bonus. Otherwise, the bonus is either more or less likely than not.

In line with our predictions, subordinates continue to reciprocate if their payoff risk is high, but their response to their superiors' well-intended action depends on their inequality aversion if it increases their payoff risk. Specifically, first, subordinates provide more effort if their superiors

advocate for them to increase the probability of the bonus to 50 percent than if it has been 50 percent from the beginning. An additional analysis shows that this holds regardless of subordinates' inequality aversion. As the probability of the bonus is 50 percent in both cases ex post, we attribute the incremental effort to the motive to reciprocate superiors' solicitation. Second, weakly inequality-averse subordinates provide less incremental effort than strongly inequality-averse subordinates if their superiors have advocated to increase the bonus probability from 25 to 50 percent, turning an unlikely into a risky bonus; likewise, they provide less incremental effort than if their superiors have advocated to increase the probability from 50 to 75 percent, turning a risky into a likely bonus. In summary, inequality aversion affects the subordinate's response to the superior's well-intended action, but it does not interfere with the subordinate's motive to reciprocate.

Our study contributes to the literature in several ways. First, we document that reciprocal behavior is robust to high ex-post outcome risk. While managers often decide how to respond to others' intentions before these turn, or fail to turn, into the intended outcomes, prior research is limited by the assumption of certainty. Our findings suggest that the motive to reciprocate continues to inform managerial behavior even if outcomes are not (perceived as) certain, and that both weakly and strongly inequality-averse managers reciprocate. Second, however, managers' response to a well-intended action that increases their outcome risk does depend on their inequality aversion. The wiggle room arising from high risk allows them to evade the fairness norm unless they are strongly inequality-averse and thus sensitive to the norm. Hence, although managers continue to reciprocate if outcome risk is high, inequality aversion moderates their response to well-intended actions that increase outcome risk. These findings are a step toward a better understanding of how risk, reciprocity, and inequality aversion influence managerial behavior.

Our findings provide important managerial insights. For the manager, the question is whether a well-intended action is worth taking when its outcome is risky. Assuming that such a kind action is costly to take, it is worthwhile if the subordinate responds with a kind reaction. Indeed, a well-intended action elicits reciprocal behavior even when risk is high and even among subordinates who are tempted to exploit the moral wiggle room arising from that risk. That said, an action whose outcome is risky necessarily changes the risk the subordinate is exposed to, and the same action is more worthwhile if it decreases than if it increases risk. An action that reduces the subordinate's risk elicits positive responses among subordinates regardless of their inequality aversion (i.e., their sensitivity to the fairness norm). An action that increases risk elicits positive responses among subordinates with strong but not among those with weak inequality aversion. Of course, if a manager can infer a subordinate's inequality aversion, for example, from prior interaction or job characteristics, she can better decide how worthwhile taking the action is.

The remainder of this paper proceeds as follows: we continue with the theory development and derive the hypotheses (Section II). Next, we describe our experimental design (Section III). Thereafter, we summarize the results (Section IV). Finally, we conclude with a brief discussion of our findings and implications for managerial practice and future research (Section V).

## **II. PREVIOUS WORK AND HYPOTHESES**

### **Risk and reciprocity**

Concurrent evidence from different accounting areas suggests that managers reciprocate others' actions and underlying intentions. A case in point is gift-exchange contracts (Hannan 2005, Kuang and Moser 2009, 2011, Choi 2014, Brown et al. 2015, Majerczyk 2018, Brink et al. 2021, Abdel-Rahim and Liu 2021). The superior acts kindly toward the subordinate, hoping that he repays this gift of hers with an equally kind reaction. For example, she can commit to a fixed wage



payment instead of contracting on performance. While the subordinate can pocket the wage and do nothing in return, subordinates often repay the trust put in them by providing effort. Gift-exchange contracts are common because incentive contracts are not always feasible (Brown et al. 2015). Gift exchange is not limited to employment contracts, including fixed-wage contracts, signing bonuses, and internal hiring (Choi 2014, Davidson 2019, Chan et al. 2021). It also occurs in areas such as control system design (Christ et al. 2012, Christ 2013), budgeting (Douthit and Stevens 2015, Brunner and Ostermaier 2019), and target setting (Fisher et al. 2015, Groen 2018).

Prior research is unified by the assumption that the actions of the superior and subordinate and their implications are certain in such settings. The subordinate can bargain on his fixed-wage payment if he accepts the gift-exchange contract offered by his superior. If the superior sets a target, there is no doubt that the subordinate will be granted the bonus if he hits the target (Fisher et al. 2015). If the superior involves the subordinate in decision-making, that decision will be certainly implemented (Williamson 2008). However, it is often not certain that the superior's good intention toward her subordinate turns into the intended outcome. For example, managers have limited decision authority in large hierarchical firms. A superior who wants to raise her subordinate's pay may make an observable and thus credible attempt to convince senior management to get their approval, but she may fail to get it nonetheless. The superior may also be relocated to a different position, and her successor may not feel bound by her commitment, or the economic situation of the company may not allow additional spending or the revision of the target.

For the subordinate, the question is whether to reciprocate the superior's kind but potentially unsuccessful solicitation. The answer to this question is not straightforward. While the superior, as the giver, has proven her good intention, the subordinate does not know whether he will receive the intended gift. Uncertainty or risk creates moral wiggle room, which can be

exploited as an excuse for selfish and socially harmful behavior (Dana et al. 2007). A series of experiments about reciprocity leave the giver uncertain about the giftee's reaction (van der Weele et al. 2014, Exley 2016, Grossman and van der Weele 2017, Regner 2018). That is, the giver will never know for sure whether the giftee has reciprocated, and the giftee can thus fail to reciprocate without any risk of being "caught." The evidence from these studies is inconclusive. While van der Weele et al. (2014) find that reciprocal behavior is robust to this type of uncertainty, Regner (2018) shows that risk and uncertainty reduce reciprocal behavior. Incidentally, while these experiments highlight the role of risk or uncertainty, the risk is never on the giftee's side.

There is also research suggesting that the giver's intention matters much, and potentially even more than the outcome of her well-intended action, for the giftee's decision to reciprocate. In an experiment by Charness and Levine (2007), the employee can end up with the same wage level either by bad luck and despite the employer's good intention or because of the employer's lack of good intention. Employees turn out to reciprocate the employer's good intention, even if the outcome is bad. Conversely, Christ (2013) shows that employees reciprocate negatively for formal control when they know for sure that it is ill-intentioned, but not when the employer's intention is ambiguous or even positive. Likewise, Gago (2021) finds that recipients in dictator games reciprocate negatively in response to a bad intention, regardless of whether it produces the intended outcome. That said, there is no doubt about the outcome of the employer's or dictator's action in any of these studies. When the employee or receiver decides to reward or punish the kind or unkind action, they know that this action has produced the intended outcome.

In our setting of interest, the subordinate knows about the superior's good intention because of the superior's observable and credible effort to solicit for him, but he does not know whether the superior's action will have the intended outcome. There is no direct prior evidence of reciprocal

behavior under ex-post risk. In light of the important role of intentions documented in the literature (Charness and Levine 2007, Christ 2013, Gago 2021), we expect that the subordinate reciprocates the superior's well-intended action by providing costly effort even when he does not know yet whether it will produce the intended outcome. While there is research suggesting that the giftee exploits the moral wiggle room arising from uncertainty or risk on the giver's side (van der Weele et al. 2014, Gago 2021), we note that this evidence is indirect and inconclusive. Although the superior might take the risk that the superior's well-intended action does not produce the intended outcome as an excuse for his failure to reciprocate, we do not expect that any such effect will crowd out intention-based reciprocity under ex-post risk. Hence, we hypothesize:

**H1:** Subordinates reciprocate their superiors' well-intended actions, even when it is not certain yet whether these actions will produce the intended outcomes.

### **Risk and inequality aversion**

Subordinates' responses to others' actions can be driven by reciprocity but also by inequality aversion (Maas et al. 2012, Choi 2014, Brown et al. 2015, Douthit and Stevens 2015, Brunner and Ostermaier 2019). Inequality aversion motivates people to strive for a more equal distribution of monetary outcomes (Maas et al. 2012). Reciprocity and inequality aversion are distinct motives, but they can produce the same (fair) behavior. In a gift exchange, the subordinate provides costly effort to respond to the superior's gift. As the superior shares in the subordinate's productive work, effort is the subordinate's currency to return that gift. However, the subordinate's effort choice may also be driven by his desire to reach a more equal split of the payoff between him and his superior. Prior research has controlled the effect of inequality aversion to identify intention-based reciprocity (Charness and Levine 2007, Choi 2014, Douthit and Stevens 2015,

Brunner and Ostermaier 2019).<sup>2</sup> In addition, however, it is interesting to measure rather than control inequality aversion and explore how risk affects its role in the subordinate's response.

A well-intended action by the superior that may or may not produce the intended outcome creates a risk for the subordinate. This risk is highest if a well-intended outcome is as likely to occur as not. Hence, while an action that increases the chances for the subordinate to receive a bonus will always increase his expected payoff, it might increase or decrease his payoff risk, depending on his ex-post chance to receive the bonus. If the intended outcome is more likely than not, the subordinate finds himself in a favorable situation, where the risk is low. If the outcome is less likely than not, the situation is unfavorable, but the risk is still low. If there is a fifty-fifty chance for the outcome to occur, the situation can be seen as either favorable or unfavorable, depending on the subordinate's vantage point, but his risk is higher than in either other case. Hence, even if the superior's gift to her subordinate (i.e., the increase in probability and the expected payoff resulting from her support) is the same in both cases, calling for the same level of reciprocal behavior of the subordinate, it either increases or decreases the subordinate's payoff risk.

Inequality aversion is thought of as a stable personal characteristic: some people mind inequality more, others less. However, risk influences how fairly people act in a given situation. While there is no direct evidence from gift-exchange experiments, dictator games show that dictators are less willing to share with receivers, whether the receiver's payoff or that of the dictator is risky (Brock et al. 2013, Freundt and Lange 2017, Cettolin et al. 2017). The moral wiggle room arising from risk is a likely explanation. People are not normally willfully unfair, but they do have egocentric biases, which tempt them to develop self-serving fairness rules (Thompson and Loewenstein 1992, Kachelmeier and Towry 2002, Arnold et al. 2018). Situations where it is

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<sup>2</sup> We take a similar approach as Charness and Levine (2007) for our test of H1.

ambiguous what should be considered fair invite such self-serving interpretations, leading people to consider distributions that favor themselves to be fair (Babcock and Loewenstein 1997, Arnold et al. 2018). Thus, payoff risk makes it easier for dictators to excuse their selfish behavior and give less to their recipients than when they are certain about their own payoff (Freundt and Lange 2017, Cettolin et al. 2017).

Bicchieri's (2006) social norms theory maintains that people have a preference to comply with social norms, such as fairness, but compliance is contingent on the situation. A situation may or may not activate this preference and bring it to bear on their behavior. While the accounting literature on honesty has often invoked Bicchieri's theory (Douthit and Stevens 2015, Abdel-Rahim and Stevens 2018, Brunner and Ostermaier 2019, Abdel-Rahim et al. 2021a, 2021b), fairness is indeed Bicchieri's (2006) primary example (ch. 3). Regarding the fragility of fairness, Bicchieri (2008) notes that "pro-social norms are highly context-sensitive" and "ambiguous situations will allow self-serving bias to emerge" (p. 235). Bicchieri (2006) takes Dana et al.'s (2007) moral wiggle room experiment to show how uncertainty allows people to avoid the activation of their preference for fairness and offers them an "opportunity for norm evasion" (p. 128). Inequality aversion measures the preference for distributional fairness, and hence, risk deactivates this preference and prevents it from translating into fair behavior.

We conjecture that the impact of risk on a subordinate's behavior depends on the strength of his inequality aversion or, using Bicchieri's (2006) term, his sensitivity to the norm of fairness. A subordinate who is strongly inequality-averse is unlikely to engage in unfair behavior. As he does not wish to serve himself, there is no need to excuse his self-serving behavior with risk. Being sensitive to the fairness norm, his response does not depend that much on the situation to activate his preference for fairness. Conversely, a subordinate who does not mind inequality in the first

place is more inclined to engage in selfish behavior. Risk comes in handy as an excuse to do so, particularly in the absence of a situational cue to the contrary, which could compensate for his lack of sensitivity. Hence, we expect that subordinates who do not mind inequality will respond less to well-intended actions that increase their payoff risk than subordinates who are averse to inequality. Likewise, we expect that weakly inequality-averse subordinates respond more to well-intended actions that reduce their payoff risk than to actions that increase it. We therefore predict:

**H2a:** Subordinates with weak inequality aversion respond less to their superiors' attempt to attain a more favorable but risky situation than subordinates with strong inequality aversion.

**H2b:** Subordinates with weak inequality aversion respond more to their superiors' attempt to attain a more favorable and less risky situation than to their attempt to attain a more favorable and riskier situation.

### III. EXPERIMENTAL DESIGN

#### Setting

For our study, we adapt the gift-exchange experiment introduced by Fehr et al. (1993), which has often been used in the accounting literature (Hannan 2005, Kuang and Moser 2009, 2011, Chan et al. 2021, Douthit et al. 2022). Participants are randomly assigned as superiors and subordinates, who interact anonymously in dyadic firms for a single period. The subordinate receives a fixed compensation of 40 thalers, where 5 thalers convert to €1. The superior's pay, in turn, depends on the subordinate's level of effort. The superior cannot directly influence how much the subordinate is paid. However, she can try and get the firm's management to pay the subordinate a bonus of 10 thalers. The superior does not pay that bonus from her own pocket, but it is costly for her to solicit for her subordinate with management.

First, the superior decides on whether to advocate for the subordinate or not. The subordinate then learns whether his superior has decided to advocate for him and chooses his level of effort. The initial probability for the subordinate to receive the bonus is either 25 or 50 percent, and the superior's support increases the probability by 25 percentage points. When the subordinate decides on his effort, he does not know yet whether he will receive the bonus. Finally, it is randomly determined whether the subordinate receives the bonus according to the ex-post probability, which is the same as the ex-ante probability if his superior has not solicited for him, or higher by 25 percentage points if she has. Figure 1 illustrates the sequence of events.

—Insert Figure 1 about here.—

The superior's payoff is given by  $[(120 \text{ thalers} - \text{subordinate's compensation}) \times \text{subordinate's effort}]$ , where the right-hand side simplifies to  $[80 \text{ thalers} \times \text{subordinate's effort}]$  when substituting 40 thalers for the subordinate's compensation. If the superior intervenes with management on behalf of her subordinate to help him get the bonus, she incurs an additional cost, and her payoff is given by  $[(120 \text{ thalers} - \text{subordinate's compensation} - \text{cost of supporting the subordinate}) \times \text{subordinate's effort}]$ , where the right-hand side simplifies to  $[60 \text{ thalers} \times \text{subordinate's effort}]$  when substituting 40 thalers for the subordinate's compensation and 20 thalers for the cost of supporting him.

Conversely, the subordinate's payoff is given by  $[\text{subordinate's compensation} + \text{bonus} - \text{subordinate's cost of effort}]$ , or  $[50 \text{ thalers} - \text{subordinate's cost of effort}]$  if he receives the bonus, and  $[\text{subordinate's compensation} - \text{subordinate's cost of effort}]$ , or  $[40 \text{ thalers} - \text{subordinate's cost of effort}]$  if the subordinate does not receive the bonus. Panel A of Table 1 shows the cost of effort. Panel B depicts the superior's and the subordinate's payoffs for either decision of the superior and

each level of effort chosen by the subordinate in response, whether the ex-ante probability of the bonus is high or low.

—Insert Table 1 about here.—

### **Independent and dependent variables**

We use three independent variables. First, we manipulate the subordinate's probability of receiving the bonus at two levels: 25 and 50 percent. Second, the superior's decision whether to solicit for her subordinate provides another variable, which is endogenous but is given from the subordinate's perspective. The third independent variable is the subordinate's inequality aversion, which we measure. The primary dependent variable to capture the subordinate's response is the level of effort that he provides.

Note that neither the superior's cost of supporting her subordinate nor the subordinate's expected payoff from being supported depends on the ex-ante probability of the bonus. The expected payoff from being supported is 2.5 thalers, which is the bonus, 10 thalers, times the difference in probability, 25 percentage points.<sup>3</sup>

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<sup>3</sup> The increase in expected utility is the same, too, regardless of the subordinate's utility function and thus risk aversion. Let  $U$  denote the subordinate's utility function. His payoff with bonus is 50 thalers; without, 40. For an ex-ante probability of 25 percent, the gain in expected utility from the superior's support is given by  $0.25[U(50) - U(40)] = [0.5U(40) + 0.5U(50)] - [0.75U(40) + 0.25U(50)]$ . For an ex-ante probability of 50 percent, it also evaluates to  $0.25[U(50) - U(40)] = [0.25U(40) + 0.75U(50)] - [0.5U(40) + 0.5U(50)]$ .

Alternatively, we might want to keep the expected value of the compensation constant while the ex-ante probability varies. We would then need to adjust the subordinate's fixed compensation (e.g., reduce it to 37.5 thalers if the ex-ante probability is 50 percent). In this case, however, the increase in expected utility,  $0.25[U(47.5) - U(42.5)]$ , is no longer independent of the subordinate's utility function and thus risk aversion. Our experiment does not address the question of how subordinates would respond in such a case.



## **Inequality aversion**

Following the one-shot game depicted in Figure 1, we use a modified dictator game to measure inequality aversion (Blanco et al. 2011, Müller and Rau 2019). The dictator decides how much of 1,000 points (if any) to sacrifice, at most, for an equal distribution of payoffs. Specifically, the dictator makes 22 choices between an equal distribution of payoffs, incrementing from (0, 0) to (1,050, 1,050), on the one hand, and keeping the whole payoff for herself or himself on the other hand. The choice of (0, 0) over (1,000, 0) indicates strong inequality aversion because the dictator sacrifices her whole payoff of 1,000 points, leaving both players with nothing, just to avoid an unequal distribution. Conversely, a dictator who prefers (1,000, 0) over (1,050, 1,050) is not even willing to forego 50 points for an equal distribution, indicating very weak inequality aversion. The switching-point choice, where the dictator first moves from (1,000, 0) to an equal distribution, serves as an estimate of the dictator's inequality aversion, which is converted into an inequality coefficient or equality equivalent (Blanco et al. 2011, eq. 3; Müller and Rau 2019).

First, note that the modified dictator game tests for the respondent's aversion to favorable inequality. (In any of the 22 choices, the dictator receives at least as much as the other player.) Table 2 shows that the subordinate's payoff is higher for low levels of effort than the superior's payoff. Anticipating that subordinates will strive for less unequal distributions, this test fits our setting better than the corresponding test for aversion against unfavorable inequality proposed by Blanco et al. (2011). Second, the modified dictator game captures an individual's general preference about the distribution of payoffs without referring to any specific distribution problem. While inequality aversion matters for our decision problem according to H2a and H2b, this test provides us therefore with an independent measure of that preference. Incidentally, Blanco et al.'s modified dictator game does not assume that the respondent rejects any unequal distribution.

Instead, the inequality coefficient measures how unequal a distribution the respondent generally considers fair, where inequality favors the respondent.

Procedurally, each participant assumes the role of the dictator. Regardless of their role as superior or subordinate, the participants are randomly rematched in pairs, and one of the 22 choices is randomly chosen to determine the payoffs to ensure that they do not extend the gift-exchange game. Following Blanco et al. (2011), we keep the points as units for this task and convert 1,000 points into 10 thalers. Inconsistent choices, whereby the dictator switches between a selfish and an equal distribution more than once, are difficult to interpret. To preclude answers that violate transitivity, we program the software to accept consistent answers only. Participants who would submit inconsistent answers were notified and asked to correct them.

## **Procedures**

The experiment was conducted in the laboratory of a large European university. The participants interacted anonymously through a computer network using software programmed in oTree (Chen et al. 2016). We used ORSEE to recruit 184 volunteers from the university's pool of volunteers (Greiner 2015). Of these, 75 participants were female, and 109 were male. The participants' age averaged 23.38 years (SD 2.96). The experiment took about half an hour, and participants' compensation averaged €12.17.

## **IV. RESULTS**

### **Summary statistics**

Our dependent variable is the level of effort provided by the subordinates. Table 2 breaks down effort, first, by the ex-ante probability, which we manipulate, and second, by whether the superior has solicited for the subordinate, thus resulting in a higher (if she has) or the same ex-post

probability (if she has not). Third, effort is further broken down based on subordinates' inequality aversion. We use Blanco et al.'s (2011) coefficient to split the sample of subordinates at the median into subordinates with strong and weak inequality aversion. Figure 2 depicts the results for illustration. Panel A shows the average level of effort by ex-ante and ex-post probabilities (i.e., depending on the superiors' decision to advocate for their subordinates). The graph in Panel A plots the means from the bottom of Table 2, which average across strong and weak inequality aversion. Panel B splits effort additionally by inequality aversion.

—Insert Table 2 about here.—

Focusing first on the summary statistics at the bottom of Table 2, which pool the subordinates' effort levels across strong and weak inequality aversion, we see from the numbers of observations that two-thirds of the superiors advocate for their subordinates to help them to obtain the bonus, both when the ex-ante probability is high and when it is low. The subordinates who have been supported by their superiors indeed provide more effort: on a scale ranging from 0.1 to 1.0, the level of effort increases from 0.320 to 0.458, on average, in response to the superior's support if the ex-ante probability is low, and from 0.287 to 0.558, if it is high. Panel A of Figure 2 depicts these four means. In particular, the subordinates exert more effort if their superiors have solicited for them to increase the ex-ante probability of the bonus to 50 percent than if the probability has been 50 percent from the beginning and the superiors have not solicited for them ( $0.458 > 0.287$ , Bars 3 and 2 in Panel A of Figure 2). We use this difference to measure the subordinates' reciprocal behavior in response to their superiors' support and to test H1.

—Insert Figure 2 about here.—

Panel B of Figure 2, which breaks the subordinates' effort further down by inequality aversion, indicates that the subordinates with strong inequality aversion provide more effort in any situation. The (untabulated) average level of effort provided by the strongly inequality-averse subordinates is 0.510 (SD 0.208); by the weakly inequality-averse subordinates, 0.356 (SD 0.231) across all treatments and superiors' decisions to solicit or not solicit for their subordinates. Thus, strongly inequality-averse subordinates seek to reduce the difference between the superiors' and their own payoffs. However, the difference in effort depends on the ex-post probability of the bonus. It is small if the ex-post probability is either low or high (i.e., 25 or 75 percent, Bars 1 vs. 2 and 7 vs. 8), and it is large if the ex-post probability is 50 percent, regardless of whether the superiors have sponsored their subordinates (Bars 3 vs. 4 and 5 vs. 6). The inequality between payoffs always favors the subordinates. Blanco et al.'s (2011) test of aversion to favorable inequality therefore captures the subordinates' motivation to reduce inequality by their effort choices.

The situation where the ex-post probability is 50 percent is also where the risk is highest. Under an ex-post probability of 25 percent, it is less likely than not for the subordinate to receive the bonus; under an ex-post probability of 75 percent, it is more likely than not for him to receive it. Under an ex-post probability of 50 percent, the odds for and against the bonus are the same. The results depicted in Panel B of Figure 2 speak to H2a, which predicts that weakly inequality-averse subordinates respond less than strongly inequality-averse subordinates when moving from an unfavorable but relatively certain to a more favorable but risky situation (Bars 1 and 3 vs. Bars 2 and 4). Likewise, it speaks to H2b, which predicts that weakly inequality-averse subordinates respond less when moving from an unfavorable but relatively certain situation to a risky one than from a risky situation to a more favorable and relatively certain one (Bars 1 and 3 vs. Bars 5 and

7). The difference between Bars 1 and 3 seems smaller than both the difference between Bars 2 and 4 and the differences between Bars 5 and 7.

### **Risk and reciprocity**

H1 implies that the subordinate reciprocates the superior's solicitation, even when he does not yet know whether this support will earn him the bonus. To test this prediction, we compare how much effort subordinates provide when they have the same ex-post probability of 50 percent to receive the bonus but different ex-ante probabilities. If the probability was 25 percent ex ante and the superior has solicited for him and thus raised it to 50 percent, the subordinate has something to reciprocate; if the probability was 50 percent and the superior has done nothing (i.e., to raise it to 75 percent), the subordinate has nothing to reciprocate. Bars 2 and 3 at the center of Panel A of Figure 2 summarize the subordinates' effort choices in these two cases. In line with H1, the subordinates exert more effort if their superiors have advocated for them than otherwise, and this difference is significant ( $0.458 > 0.287$ ,  $t_{44} = 2.45$ ,  $p = 0.018$ , two-sided). Hence, we observe reciprocal behavior even when there is a high risk of whether the superior's good intention toward the subordinate will turn into a good outcome.

We might also take the increase in effort in response to the superior's decision to support her subordinate to infer reciprocity (Bars 2 vs. 1 and Bars 4 vs. 3, respectively, in Panel A of Figure 2). Effort increases if the superiors solicit for their subordinates, both under a low ex-ante probability ( $0.458 > 0.320$ ,  $t_{44} = 1.96$ ,  $p = 0.057$ ) and under a high ex-ante probability ( $0.558 > 0.287$ ,  $t_{44} = 4.51$ ,  $p < 0.001$ ). However, while the subordinate reciprocates with higher effort for the superior's decision to advocate for him according to our theory, this effect might be confounded by inequality aversion. If the superior solicits for the subordinate, the subordinate's expected payoff increases relative to the superior's payoff, and the provision of costly effort for the benefit

of the superior reduces this difference. Hence, the subordinate might provide more effort to reduce the inequality between his expected payoff and the superior's payoff. Taking a similar approach as Charness and Levine (2007), we consider the setting where the ex-post probability is invariably 50 percent, while the superior's decision varies, to obtain a cleaner measure of reciprocal behavior.<sup>4</sup>

In case of an ex-post probability of 50 percent, we can even explore how the subordinate's reciprocal behavior depends on his inequality aversion. We first run the test of H1 for weakly and strongly inequality-averse subordinates separately to determine whether both reciprocate. Panel B of Figure 2 suggests that weakly inequality-averse subordinates provide more effort if their superiors have supported them to turn an unlikely bonus into a risky one and if the bonus has been risky from the beginning and their superiors have not done anything to increase the probability of the bonus (Bars 5 vs. 3). The same seems true for strongly inequality-averse subordinates (Bars 6 vs. 4). The level of effort provided by the weakly inequality-averse subordinates is by 0.198 higher on average ( $0.315 > 0.117$ ,  $t_{84} = 2.11$ ,  $p = 0.038$ ), and the level of effort provided by the strongly inequality-averse subordinates, by 0.161 ( $0.561 > 0.400$ ,  $t_{84} = 2.07$ ,  $p = 0.041$ ). The difference between the differences is not significant ( $0.198 > 0.161$ ,  $t_{84} = 0.31$ ,  $p = 0.759$ ). Hence, the

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<sup>4</sup> This setting does not fully rule out an effect of inequality aversion either. The superior incurs a cost to increase the probability from 25 to 50 percent, which she does not if it the probability has been 50 from the beginning. Consequently, inequality is larger in the former case. A robustness test shows, however, that inequality aversion cannot explain subordinates' response.

Specifically, the difference between the subordinate's expected payoff and the superior's payoff adjusts the subordinate's effort for inequality. Regressing this difference on the superior's decision to support the subordinate and the subordinate's inequality aversion, the effect of the decision, which motivates the subordinate to reciprocate, is significantly negative. Hence, when returning the superior's gift, subordinates overcompensate the cost of the gift, increasing effort beyond what inequality aversion could possibly explain.

subordinates reciprocate regardless of their inequality aversion, and their inequality aversion does not moderate their reciprocal behavior.

### **Risk and inequality aversion**

Does the subordinate respond with more effort when the superior's well-intended action turns a risky bonus into a likely one than when it turns an unlikely bonus into a risky one? By design, the subordinate's expected payoff increases in both cases by the same amount, as the probability rises by 25 percentage points. In contrast, risk either increases or decreases depending on the ex-ante probability of the bonus. H2a and H2b imply that the answer to this question depends on the subordinate's inequality aversion. Both hypotheses relate to differences between the differences in subordinates' responses rather than their responses. To test these hypotheses, we run a regression of effort on the ex-ante probability, the superior's decision to support the subordinate, inequality aversion, and their interactions. Panel A of Table 3 reports the results; Panels B shows comparisons based on these results. First, we discuss the focal differences in the weakly and strongly inequality-averse subordinates' responses to their superiors' decisions to solicit for them. Thereafter, we test the hypothesized differences between these differences.

—Insert Table 3 about here.—

Panel B of Figure 2 shows that the weakly inequality-averse subordinates' effort is the same, on average, regardless of whether their superiors advocate for them or not, if the ex-ante probability of the bonus is low (0.313 vs. 0.315, Bars 1 and 3). According to Panel A of Table 3, the average effort levels do not differ statistically ( $\beta = 0.003$ ,  $t_{84} = 0.03$ ,  $p = 0.973$ ). Hence, the weakly inequality-averse subordinates do not reward their superiors for turning an unlikely bonus

into a risky one. Conversely, they do increase their effort by 0.404 to reward them for the same investment if it turns a risky bonus into a likely one (Bars 5 and 7). This increase is significant according to Panel B of Table 3 ( $0.117 < 0.521$ ,  $t_{84} = 4.35$ ,  $p < 0.001$ ). The tabulated results further show that the strongly inequality-averse subordinates reward their superiors for soliciting for them independently of risk. They increase their effort by 0.232 if their superiors support them to turn an unlikely bonus into a risky one ( $0.561 > 0.329$ ,  $t_{84} = 2.74$ ,  $p = 0.008$ , Bars 4 vs. 2), and by 0.187 if they turn a risky bonus into a likely one ( $0.587 > 0.400$ ,  $t_{84} = 2.40$ ,  $p = 0.019$ , Bars 8 vs. 6).

H2a maintains that weakly inequality-averse subordinates respond less than strongly inequality-averse subordinates when risk increases. Notably, an insignificant difference of 0.003 in the effort provided by the weakly inequality-averse subordinates compares to a significant increase of 0.232 by the strongly inequality-averse subordinates. This difference corresponds to the coefficient of the interaction term of the superior's decision to advocate for the subordinate and strong inequality aversion, which is significant according to Panel A of Table 3 ( $\beta = 0.230$ ,  $t_{84} = 1.90$ ,  $p = 0.060$ ).<sup>5</sup> Likewise, H2b predicts that weakly inequality-averse subordinates respond more to their superiors' investments if it turns a risky bonus into a likely one than when it turns an unlikely bonus into a risky one. We compare the insignificant 0.003 difference in effort provided by the weakly inequality-averse subordinates if risk rises to the significant 0.404 increase if it falls. The difference between the differences is captured by the coefficient of the interaction term of the

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<sup>5</sup> We compare the differences between Bars 1 and 3 and between Bars 2 and 4 in Panel B of Figure 2. In terms of coefficients, Bar 1 is 0.313 tall (the intercept); Bar 3,  $0.315 \approx 0.313 + 0.003$  (up to a rounding error); Bar 2,  $0.329 = 0.313 + 0.016$ ; Bar 4,  $0.561 \approx 0.313 + 0.016 + 0.230$  (up to a rounding error). Taking the difference between the differences, we are left with the coefficient on the interaction term, 0.230.



superior supporting the subordinate and high ex-ante probability ( $\beta = 0.402$ ,  $t_{84} = 3.18$ ,  $p = 0.002$ ).

Both effects are significant. The results of our experiment support H2a and H2b.<sup>6</sup>

It is puzzling at first that weakly inequality-averse subordinates reciprocate (Bars 5 vs. 3 in Panel B of Figure 2) but do not respond to a well-intended action that calls for a reciprocal reaction (Bars 3 vs. 1). The superior's support to increase the probability of the bonus from 25 to 50 percent has two opposite effects on the weakly inequality-averse subordinate. On the one hand, it motivates him to reciprocate with increased effort. On the other hand, it leaves him at a high risk, giving him wiggle room to evade the fairness norm. It turns out that these effects cancel each other. This specific result hinges on the parameters of our experiment. Anticipating that risk curbs the (positive) effect of inequality aversion on effort among weakly more than among strongly inequality-averse subordinates, H2a only predicts that the former respond less rather than that they do not respond. When risk is high, both weakly and strongly inequality-averse subordinates reciprocate. However, strongly inequality-averse subordinates, unlike weakly inequality-averse subordinates, are motivated to work for a fair distribution even then. Consequently, their average level of effort is higher, both when they reciprocate and when they do not.

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<sup>6</sup> An alternative explanation for H2a would be that subordinates with weak inequality aversion are more risk-averse, on average, than strongly inequality-averse subordinates. They would then retain effort if their own payoff is at risk, unlike strongly inequality-averse subordinates.

First, however, H2b argues against this explanation. The subordinate's gain of expected utility from the superior's well-intended action is the same, whether it increases the probability of the bonus from 25 to 50 or from 50 to 75 percent, regardless of his risk aversion (see fn. 3). If risk aversion explains the (non-)response of weakly inequality-averse subordinates when the superior increases the probability from 25 to 50 percent, we should see the same (non-)response when she increases it from 50 to 75 percent. Second, Müller and Rau (2019), who measure both inequality aversion and risk aversion, find no correlation between these (p. 83).

## V. CONCLUSION

We conducted a laboratory experiment to examine how subordinates react to superiors' well-intended actions when it is not certain that these actions will produce the intended outcomes. On the one hand, reciprocity requires that kind actions be repaid with kind reactions, and gift-exchange experiments document that this is what often happens. On the other hand, risk is a handy excuse to evade this norm and fail to reciprocate. Our laboratory experiment shows, first, that reciprocal behavior persists even if risk is high. Moreover, while the response to a kind action is also motivated by fairness preferences, subordinates reciprocate regardless of their inequality aversion. Second, however, subordinates with weak inequality aversion repay a well-intended action with more effort if this action reduces, but not if it increases risk, whereas strongly inequality-averse subordinates react positively in both cases. Hence, although managers continue to reciprocate if their payoff risk is high regardless of their inequality aversion, inequality aversion moderates their response to well-intended actions that increase their payoff risk.

These findings contribute to the literature on reciprocity, particularly gift exchange. While reciprocity has been pervasively studied in settings where the giver's action and the giftee's reaction are certain, our knowledge about reciprocal behavior under outcome risk or uncertainty remains limited. Reciprocity, in a narrow sense, is robust to risk; however, the giftee's response also depends on his inequality aversion, which combines with risk to moderate the giftee's response. Our findings are managerially relevant. It is easy to think of situations where the superior attempts to advocate for the subordinate, who decides how to respond without knowing whether that attempt will be successful. Our experiment employs a stylized setting but speaks to a large class of situations. The bottom line is that well-intended actions with risky outcomes are not always worth taking. If the superior cannot infer the subordinate's fairness preferences from prior

interaction or otherwise, she should be aware that the same action is more worthwhile if it reduces than if it increases risk. If she happens to know his preferences, she can tailor her decision to these.

Although we find that inequality aversion combines with risk to influence subordinates' responses, we cannot infer the importance of the effect of inequality aversion, relative to that of reciprocity, as a motive of managerial behavior in the field. Our experiment leaves the subordinate in a fairly strong position, as inequality favors him over the superior. This design choice follows the literature and is matched with the proper measure of aversion against favorable inequality. Moreover, thinking about fair solutions to a given decision problem, such as our gift-exchange game, a subordinate does not necessarily compare his total wealth with that of his superior, which may incidentally be unknown to him. Nonetheless, the distribution of wealth typically indeed favors the superior, and it would be interesting to test whether our results hold under alternative parametrizations. Likewise, additional variation in the ex-ante probabilities and the options for the superior to solicit for the subordinate would provide richer data and potentially allow us to obtain further insights into subordinates' responses and how superiors anticipate them.

More generally, we document positive reciprocity in a gift-exchange game, where the subordinate responds to the superior's well-intended but potentially unsuccessful action. It would be exciting to determine whether our findings generalize to negative reciprocity in response to management control systems. Prior research shows that subordinates resent their superiors for offering penalty rather than bonus contracts (Christ et al. 2012) or incentive instead of trust contracts (Brunner and Ostermaier 2019), and they disapprove of punishment mechanisms (Abdel-Rahim and Liu 2021). While a gift signals trust, control signals distrust, which is reciprocated with low effort and other dysfunctional behavior. This is particularly true for ill-intended control (Christ 2013). We conjecture that subordinates retaliate against superiors for their attempt to implement

control mechanisms, although these are not eventually implemented, thereby complementing our findings. However, having cast some light on how risk, reciprocity, and inequality aversion inform managerial behavior, we leave this question for future research.

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## APPENDIX

### Welcome

Welcome to this experiment! You will make decisions and answer questions on this computer. You will be paid for participating.

Please follow the experimenter's instructions. All information will be provided on your screen. Do not speak during the experiment.

If you have any questions, raise your hand. The experimenter will come to you and answer your questions quietly.

The data that you enter are anonymous. No other participant can trace your decisions to you. Data are not tracked to you, but only to your computer.

The experiment is finished when the experimenter declares it finished. If you finish earlier than others, stay at your place.

Please turn off your phone. Participants who speak or whose phone rings will be excluded without compensation.

### Compensation

The currency in this experiment is thalers, not euros. The exchange rate is as follows: 1 thaler = €0.20.

You will receive a fixed compensation of 20 thalers for participating. Your further compensation depends on the decisions that you and other participants make.

The compensation is paid confidentially and in cash at the end of the experiment. The other participants will not learn about your compensation.

### Task

Half of the participants in this experiment are superiors, the other half are subordinates. Participants are randomly assigned as superiors and subordinates.

Superiors and subordinates are randomly matched one-on-one to work together. Nobody learns the identity of the person whom he or she has worked together with.

Each subordinate works together with one superior for one single round. There is only one round in this experiment.

The superior is endowed with 120 thalers. He pays the subordinate a fixed compensation of 40 thalers. In return, the subordinate works for the superior.

The superior's compensation depends on the effort provided by the subordinate. Effort is costly for the subordinate. You will learn soon how effort and cost are related.

The company may raise the subordinate's compensation. The compensation is raised with a probability of 25 [50] percent from 40 to 50 thalers.<sup>7</sup>

The compensation increase is not paid for by the company, *not* the superior. The superior *cannot* decide whether the subordinate's compensation is raised.

However, the superior can intervene on behalf of the subordinate to have the compensation raised. This intervention increases the probability that the compensation is raised from 25 [50] to 50 [75] percent.<sup>7</sup>

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<sup>7</sup> Depending on the condition, the probability is either 25 percent or 50 percent. The superior can increase it by 25 percentage points—i.e., from 25 to 50 or from 50 to 75 percent.



It is costly for the superior to support the subordinate to have the compensation raised. The cost of supporting the subordinate is 20 thalers.

The subordinate decides how much effort to provide. The cost of effort depends on the level of effort provided.

The superior's and subordinate's compensations are determined as follows:

*Superior's compensation*

<u>Without support for an increase of compensation</u> $(120 - 40) \times \text{effort}$	<u>With support for an increase of compensation</u> $(120 - 40 - 20) \times \text{effort}$
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*Subordinate's compensation*

<u>Without increase of compensation</u> $40 - \text{cost of effort}$	<u>With increase of compensation</u> $50 - \text{cost of effort}$
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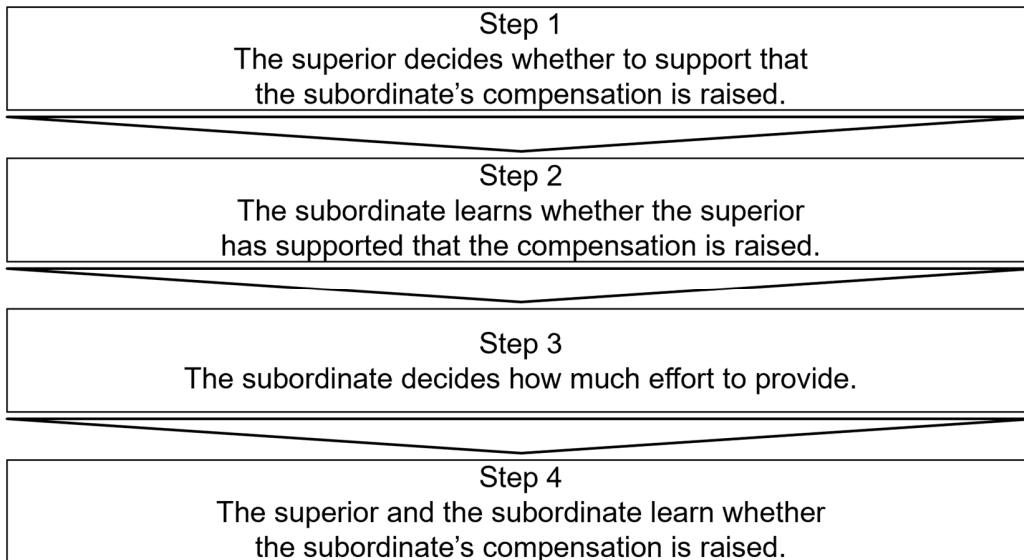
*Subordinate's cost of effort*

<u>Effort</u>	<u>0.1</u>	<u>0.2</u>	<u>0.3</u>	<u>0.4</u>	<u>0.5</u>	<u>0.6</u>	<u>0.7</u>	<u>0.8</u>	<u>0.9</u>	<u>1.0</u>
<u>Cost</u>	0	1	2	4	6	8	10	12	15	18

You do not need to memorize these formulae.<sup>8</sup> However, make sure that you have understood them before you proceed with the experiment.

**Sequence of events**

The following figure illustrates the sequence of events.



<sup>8</sup> The formulae and the effort–cost table are displayed again to the subordinate and the superior when they make their decisions.

### Comprehension questions

Answer the following questions before continuing.<sup>9</sup>

1. The sequence of events includes four steps. Below is an unordered list of these steps. Number these steps with 1, 2, 3, and 4 to order them.

\_\_\_ The subordinate decides how much effort to provide.

\_\_\_ The superior and the subordinate learn whether the subordinate's compensation is raised.

\_\_\_ The subordinate learns whether the superior has supported that the compensation is raised.

\_\_\_ The superior decides whether to support that the subordinate's compensation is raised.

2. How many times do one superior and one subordinate cooperate in this experiment? Enter the correct number.

\_\_\_ time(s)

3. How many times are superiors and subordinates randomly matched one-on-one? Enter the correct number.

\_\_\_ time(s)

4. Suppose the superior does not support that the subordinate's compensation is raised. What is then the probability that the subordinate's compensation will be raised?

\_\_\_ percent

5. Suppose the superior supports that the subordinate's compensation is raised. What is then the probability that the subordinate's compensation will be raised?

\_\_\_ percent

6. Who decides whether the subordinate's compensation will be raised?

A. The superior.

B. The subordinate.

C. Neither.

The following questions refer to the superior's and subordinate's compensations. Here are the formulae and the tables as a reminder:

#### *Superior's compensation*

<u>Without support for an increase of compensation</u>	<u>With support for an increase of compensation</u>
$(120 - 40) \times \text{effort}$	$(120 - 40 - 20) \times \text{effort}$

#### *Subordinate's compensation*

<u>Without increase of compensation</u>	<u>With increase of compensation</u>
$40 - \text{cost of effort}$	$50 - \text{cost of effort}$

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<sup>9</sup> The correct answers are as follows. Question 1: 3, 4, 2, and 1. Question 2: 1. Question 3: 1. Question 4: 25 or 50, depending on the treatment. Question 5: 50 or 75, depending on the treatment. Question 6: C. (The company makes the decision.) Question 7: 30. Question 8: 40. Question 9: 30. Question 10: 40. (Questions 7–10 illustrate the superior's compensation for any combination of decisions.) Question 11: 44. Question 12: 44. Question 13: 34. Question 14: 34. (Questions 11–14 illustrate the subordinate's compensation, paralleling Questions 7–10. The examples also show that a level of effort of 0.5 does not result in an equal distribution of payoffs.)

*Subordinate's cost of effort*

<u>Effort</u>	<u>0.1</u>	<u>0.2</u>	<u>0.3</u>	<u>0.4</u>	<u>0.5</u>	<u>0.6</u>	<u>0.7</u>	<u>0.8</u>	<u>0.9</u>	<u>1.0</u>
Cost	0	1	2	4	6	8	10	12	15	18

7. Suppose the superior supports that the subordinate's compensation is raised; the subordinate decides for a level of effort of 0.5; the subordinate's compensation is raised. What is the superior's compensation?

\_\_\_ thaler(s)

8. Suppose the superior does not support that the subordinate's compensation is raised; the subordinate decides for a level of effort of 0.5; the subordinate's compensation is raised. What is the superior's compensation?

\_\_\_ thaler(s)

9. Suppose the superior supports that the subordinate's compensation is raised; the subordinate decides for a level of effort of 0.5; the subordinate's compensation is not raised. What is the superior's compensation?

\_\_\_ thaler(s)

10. Suppose the superior does not support that the subordinate's compensation is raised; the subordinate decides for a level of effort of 0.5; the subordinate's compensation is raised. What is the superior's compensation?

\_\_\_ thaler(s)

11. Suppose the superior supports that the subordinate's compensation is raised; the subordinate decides for a level of effort of 0.5; the subordinate's compensation is raised. What is the subordinate's compensation?

\_\_\_ thaler(s)

12. Suppose the superior does not support that the subordinate's compensation is raised; the subordinate decides for a level of effort of 0.5; the subordinate's compensation is raised. What is the subordinate's compensation?

\_\_\_ thaler(s)

13. Suppose the superior supports that the subordinate's compensation is raised; the subordinate decides for a level of effort of 0.5; the subordinate's compensation is not raised. What is the subordinate's compensation?

\_\_\_ thaler(s)

14. Suppose the superior does not support that the subordinate's compensation is raised; the subordinate decides for a level of effort of 0.5; the subordinate's compensation is not raised. What is the subordinate's compensation?

\_\_\_ thaler(s)

**Decision screens**

The screens where the participants entered their decisions remind them of the formulae and tables from the instructions to enable them to make informed decisions.

**Questions**

Along with demographic data, we measure participants inequality aversion with Blanco et al.'s (2011) modified dictator game. The instructions for the game are as follows.

This question matters for your compensation for this experiment.

The following table has 22 rows with two possible payoffs to you (“X”) and another participant who is randomly matched with you (“Y”). This is not the participant whom you were previously matched with as superior and subordinate.

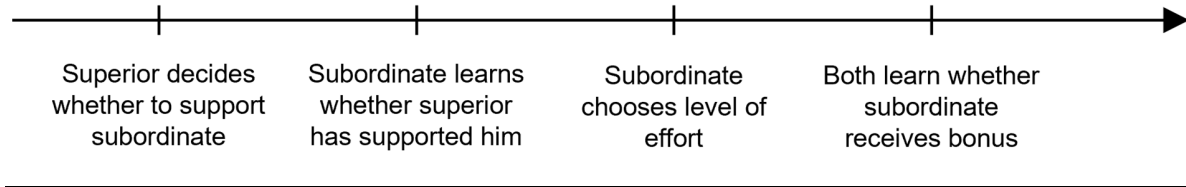
In each line, please select either Option 1 or Option 2. One row will be randomly selected to determine the payoffs at the end of the experiment.

The exchange rate for this question is as follows: 1,000 points = 10 thalers.

<u>Line</u>	<u>Option 1</u>	<u>Option 2</u>
1	Participant X: 1,000; Participant Y: 0	Participant X: 0; Participant Y: 0
2	Participant X: 1,000; Participant Y: 0	Participant X: 50; Participant Y: 50
...	...	...
22	Participant X: 1,000; Participant Y: 0	Participant X: 1,050; Participant Y: 1,050

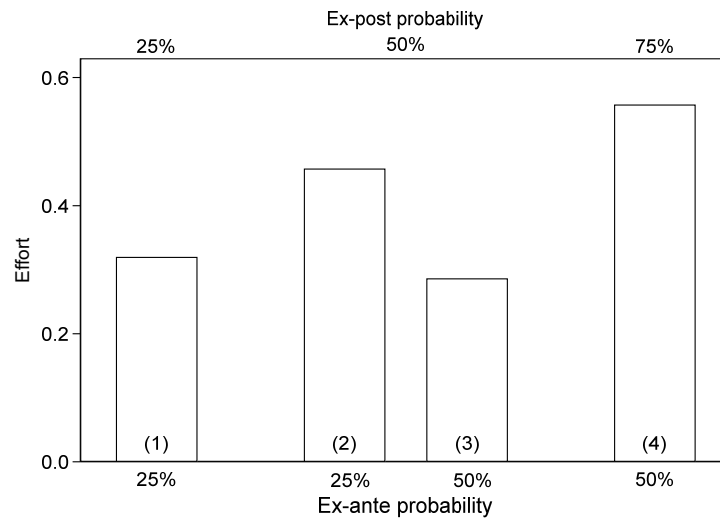
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**FIGURE 1**  
**Sequence of Events**

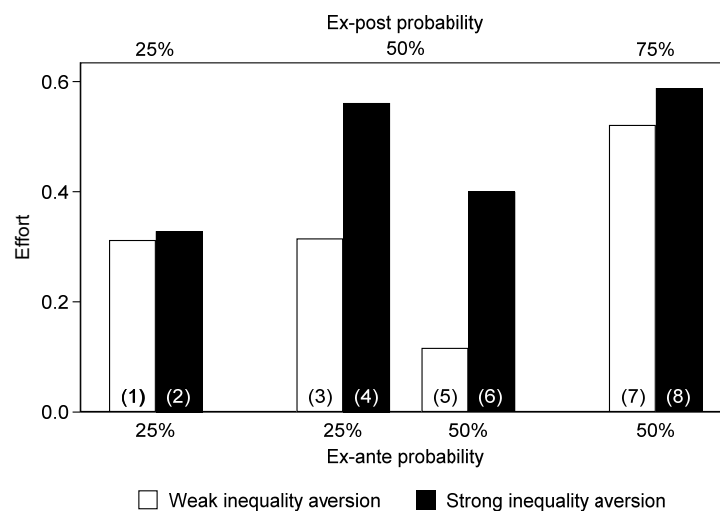


**FIGURE 2**  
**Summary Statistics**

**Panel A: Effort by Ex-ante Probability and Ex-post Probability**



**Panel B: Effort by Ex-ante Probability, Ex-post Probability, and Inequality Aversion**



Subordinates' mean effort depending on the ex-ante probability for them to receive a bonus (25 or 50 percent) and their superiors' decisions to support that they get the bonus.

The ex-post probability of 50 percent reveals reciprocity as it results in two different ways: (1) The superior supports the subordinate to raise the ex-ante probability of 25 to 50 percent; (2) the ex-ante probability is 50 percent and the superior does not support the subordinate.

The leftmost bars cover the situation where the ex-ante probability is 25 percent and the superior does not support the subordinate; the rightmost bars, the situation where the ex-ante probability is 50 percent and the superior supports the subordinate to raise it to 75 percent.

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**TABLE 1**  
**Design Parameters**

**Panel A: Cost of Effort**

<u>Effort</u>	<u>0.1</u>	<u>0.2</u>	<u>0.3</u>	<u>0.4</u>	<u>0.5</u>	<u>0.6</u>	<u>0.7</u>	<u>0.8</u>	<u>0.9</u>	<u>1.0</u>
Cost	0	1	2	4	6	8	10	12	15	18

**Panel B: Superior's and Subordinate's Payoffs**

<u>Effort</u>	<u>Superior supports subordinate</u>			<u>Superior doesn't support subordinate</u>		
	<u>Sup.'s pay</u>	<u>Subordinate's pay</u>		<u>Sup.'s pay</u>	<u>Subordinate's pay</u>	
		<u>Low prob.</u>	<u>High prob.</u>		<u>Low prob.</u>	<u>High prob.</u>
0.1	6	45	47.5	8	42.5	45
0.2	12	44	46.5	16	41.5	44
0.3	18	43	45.5	24	40.5	43
0.4	24	41	43.5	32	38.5	41
0.5	30	39	41.5	40	36.5	39
0.6	36	37	39.5	48	34.5	37
0.7	42	35	37.5	56	32.5	35
0.8	48	33	35.5	64	30.5	33
0.9	54	30	32.5	72	27.5	30
1.0	60	27	29.5	80	24.5	27

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**TABLE 2**  
**Summary of Subordinate's Effort Choices**

	<u>Low ex-ante probability</u>		<u>High ex-ante probability</u>	
	<u>Sup. doesn't support</u>	<u>Sup. supports</u>	<u>Sup. doesn't support</u>	<u>Sup. supports</u>
Weak inequality aversion	0.313 (0.223) [8]	0.315 (0.203) [13]	0.117 (0.041) [6]	0.521 (0.201) [14]
Strong inequality aversion	0.329 (0.221) [7]	0.561 (0.191) [18]	0.400 (0.194) [9]	0.588 (0.169) [17]
Total	0.320 (0.21) [15]	0.458 (0.23) [31]	0.287 (0.21) [15]	0.558 (0.184) [31]

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Means and standard deviations (in parentheses) of effort. The numbers of observations figure in brackets. Effort choices can range from 0.1 to 1.0 (see Panel A of Table 1).

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**TABLE 3**  
**Effects of Ex-Ante Bonus Probability, Inequality Aversion, and Superior's Support on Effort**

**Panel A: Regression Estimates**

<u>Variable</u>	<u>Coefficient</u>	<u>Std. error</u>	<u>t-statistic</u>	<u>p-value</u>
Superior supports subordinate <sup>a</sup>	0.003	0.086	0.03	0.973
Strong inequality aversion <sup>b</sup>	0.016	0.100	0.16	0.871
High ex-ante probability <sup>c</sup>	-0.196	0.103	-1.90	0.061
Sup. supports sub. × Strong inequality aversion	0.230	0.121	1.90	0.060
Sup. supports sub. × High ex-ante probability	0.402	0.126	3.18	0.002
Strong ineq. aversion × High ex-ante prob.	0.267	0.141	1.90	0.061
Sup. supports sub. × Strong ineq. av. × High e.-a. prob.	-0.446	0.171	-2.60	0.011
Intercept <sup>d</sup>	0.313	0.067	4.64	< 0.001

**Panel B: Inequality Aversion and Uncertainty—Comparisons between Conditions<sup>e</sup>**

<u>Compared conditions</u>	<u>Diff.</u>	<u>Std. error</u>	<u>t-statistic</u>	<u>p-value</u>
Weakly inequality-averse subordinates under low ex-ante probability: Sup. supports vs. doesn't support sub.	0.003	0.086	0.03	0.973
Weakly inequality-averse subordinates under high ex-ante probability: Sup. supports vs. doesn't support sub.	0.404	0.093	4.35	< 0.001
Strongly inequality-averse subordinates under low ex-ante probability: Sup. supports vs. doesn't support sub.	0.232	0.085	2.74	0.008
Strongly inequality-averse subordinates under high ex-ante probability: Sup. supports vs. doesn't support sub.	0.188	0.079	2.40	0.019

<sup>a</sup> Superior supports subordinate: 1, if the superior supports her subordinate so that he receives the bonus; 0, else.

<sup>b</sup> Strong inequality aversion: 1, if the subordinate's inequality aversion is at or above the median; 0, else.

<sup>c</sup> High ex-ante probability: 1, if the ex-ante probability of the bonus is 50 percent; 0, if it is 25 percent.

<sup>d</sup> The intercept equals the average level of effort provided by the weakly inequality-averse subordinates if the ex-ante probability is low and the superiors do not support them to increase the probability of the bonus.

<sup>e</sup> The first comparison is captured by the coefficient on "Superior supports subordinate" in Panel A, as explained in the text.

Likewise, the effects predicted by H2a and H2b are captured by the coefficients on "Superior supports subordinate × Strong inequality aversion" and "Superior supports subordinate × High ex-ante probability" in Panel A, as explained in the text (fn. 5).