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The value and motivating mechanism of transparency in organizations

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Abstract

The question how transparency in organizations affects performance has received considerable interest from researchers in management, psychology, and organization science. The widely held view is that transparency benefits organizational performance, because it reduces employee uncertainty. However, causal empirical evidence on the value of transparency and its motivating mechanism is still scarce. In this paper, we report the findings from an experiment, in which an agent has only probabilistic beliefs about the true state of nature and needs to choose costly effort that benefits the principal. The true state relates to his fixed-wage, which can either be high or low. The principal needs to decide whether to create informative transparency by disclosing the true state to the agent via a costly, fixed-form message. Our results show a considerable value of transparency: even if transparency involves the disclosure of 'bad news' (the low state), effort almost doubles relative to non-disclosure. Looking at the motivating mechanism, we do not find that transparency motivates primarily because it reduces uncertainty for the agent. Instead, we find that uninformative transparency that merely involves communication of already known facts is equally effective. Many principals, however, misperceive the value of transparency and disclose information too restrictively.

Keywords: transparency; non-monetary incentives; communication; principal-agent relationship
JEL classification: D23; C91

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1 Introduction

Economists have long understood that the success of organizations depends on the effective coordination and motivation of their members (see the recent review by Gibbons & Roberts 2013). Traditionally, research in the area of motivation focused on the influence of monetary incentives on employee effort in principal-agent relationships (e.g., Holmstrom 1979). Over the last decade, however, interest in the effectiveness of non-monetary incentives such as respect, attention, job mission or the allocation of decision rights has been on the rise.[1] In this paper, we report on the findings from a controlled laboratory experiment on another, non-monetary incentive mechanism: the level of transparency in organizations.

The question how transparency in organizations affects performance has received considerable interest from researchers in management, psychology, and organization science. Schnackenberg & Tomlinson (2014) offer a comprehensive review of studies in these disciplines and define transparency as the "perceived value of intentionally shared information from a sender" (p. 5). This definition reflects on the authors' argument that at the heart of transparency there lies information disclosure, i.e., the timely provision of relevant information to *otherwise uninformed parties*, together with information accuracy and clarity. An emerging view is that transparency benefits organizational performance, because it contributes to trust in organization-stakeholder relationships (*ibid*). However, causal empirical evidence on the value of transparency for organizational performance is still scarce, because the effect of transparency in extant work is often confounded with other important success factors, such as the pre-existing level of trust in the work environment (Akkermans et al. 2004). The first goal of our paper is to address this gap in the context of employee motivation.

A widely held belief is that the value of transparency derives from the disclosure of

[1] See Ellingsen & Johannesson (2007) on respect, Dur (2009) on attention, Cassar (2014) on job mission, and Charness et al. (2012) and Fehr et al. (2013) on the allocation of decision rights.

uncertainty-reducing information to employees. For example, a number of recent articles in the business press document considerable non-transparency in firms about changes in corporate policies, goals, visions, and financial results (e.g., CNN-Money 2013, WSJ 2012), and warn that such uncertainty exposure results in reduced employee commitment and productivity. Along similar lines, scholars in management and psychology interpret the disclosure of relevant information that helps employees to "understand and contextualize their workplace" (p.3) as informational fairness from managers (Collins & Mossholder 2014). Informational fairness in turn represents an important dimension of organizational justice (Bies 2001), which relates positively to employee trust (Cohen-Charash & Spector 2001) and performance (e.g., Reb et al. (2006), Ambrose et al. (2002), and Sklarlicki & Folger (1997)). While these are compelling explanations for the value of transparency, they largely neglect another, potentially motivating mechanism of transparency: the positive effects of interpersonal communication as a common vehicle for information disclosure.

Considerable evidence in economics demonstrates the broad behavioral impact of interpersonal communication in strategic interactions. In the context of a weak-link game, for example, Brandts & Cooper (2007) show that one-way communication from a manager is more effective than financial incentives alone in overcoming coordination failure between employees. More broadly, communication has also been observed to affect transfers in the dictator game (e.g., Andreoni & Rao (2011), Mohlin & Johannesson (2008), and Bohnet & Frey (1999)) and offers in the ultimatum bargaining game (Zultan 2012). Andreoni & Rao (2011), for example, find that communication from the receiver increases transfers, and conclude that this effect stems largely from heightened empathy of dictators. While receivers in Andreoni & Rao (2011) were allowed to make specific transfer requests from the dictator, Zultan (2012) reports that communication does not have to be 'strategic' to be effective: even when pre-play communication was restricted to topics other than the game itself, offers in the ultimatum bargaining game were higher than without pre-play

communication. Could it thus be that the interpersonal communication involved is the real driver behind the hypothesized value of transparency? The second goal of our paper is to address this question.[2]

Knowledge about the motivating mechanism is of great relevance for practitioners, because of its implication for the management of transparency in the workplace. For example, if the value of transparency derived primarily from the provision of uncertainty-reducing information, the timing of communication would be crucial: information disclosure would only be motivating, as long as the involved information had not started to diffuse within the organization. If, however, employees mainly responded to the interpersonal communication from managers, disclosure would actually be motivating beyond this point of information diffusion.

To achieve both our research goals, we design an experiment, which consists of a series of one-shot principal-agent games. In each iteration of the game a principal is matched with a different agent who needs to choose effort, which is costly for the agent and beneficial for the principal. The principal has an information advantage compared to the agent. That is, the principal knows the agent's exogenously assigned wage level prior to the agent's effort choice. Importantly, she also has the opportunity to disclose it to the agent via a costly, fixed-form message. Without disclosure, non-transparency prevails, which implies that the agent faces uncertainty about his wage level when choosing his effort: all he knows is that a random draw determines whether his wage level will be high or low and that both outcomes are equally likely.

This experimental condition, labeled *Informative Transparency*, allows us to measure the causal effect of transparency on performance, and to calculate separate values of trans-

[2] A growing literature discusses the positive association between empathy and trust (see e.g., Feng et al. (2004), Silvester et al. (2007), Williams (2007), and Williams (2012)). Accordingly, evidence in support of communication as the primary motivating mechanism would still be consistent with the view in Schnackenberg & Tomlinson (2014) that transparency improves performance through greater trust in organization-stakeholder relationships.

parency for the disclosure of the low and the high wage. While it is intuitive to assume that the disclosure of good news is more motivating than the disclosure of bad news, it is less clear whether the disclosure of bad news is motivating at all. We are unaware of previous research on this question. Furthermore, observing a series of one-shot interactions enables us to study the values of transparency when subjects gain experience. These values are of central interest for decision makers, because in most organizational contexts, both agents and principals are experienced with the setting.

In a control condition, labeled *Uninformative Transparency*, we remove one of the central components of the game: the principal's information advantage. Now, both the principal *and* the agent are always truthfully informed about the wage level. All other aspects of the *Informative Transparency* condition remain the same. In particular, the principal can still disclose the wage level to the agent via a costly, fixed-form message. However, it is common knowledge that such disclosure does not reduce uncertainty for the agent as there is no informational value of interpersonal communication. Comparing agent's effort choices across the two experimental conditions thus allows us to distinguish between uncertainty-reducing information provision and the interpersonal communication involved as the motivating mechanism behind the value of transparency.

Our experiment shows that transparency has a causal effect on agents' behavior, and that the value of transparency is considerable. In particular, we find a positive value of transparency for both, the low and the high wage. These findings support the existing notion from scholars in management, psychology, and organization science that transparency benefits organizational performance. However, counter to the prevailing view in these disciplines, we do not find that *Informative Transparency* increases organizational performance beyond what *Uninformative Transparency* does. The key implication of our study for transparency in organizations is thus that "It does not have to involve news to be motivating!" Turning to the information disclosure of principals, we show that many of them

misperceive the value of transparency, and fail to disclose everything they should. This lack of transparency does not resolve, but instead amplifies when principals gain experience with the interaction.

Besides having clear managerial relevance, the findings from our study add to existing knowledge in three different strands of literature. First, our study marks an important empirical contribution to the economic literature on incentives in organizations. Economists have only recently become interested in the performance implications of transparency in organizations. Jehiel (2015) provides the first analysis in a moral-hazard setting: he develops a principal-agent model, in which the principal has private knowledge about her monitoring technology, and the difficulty of the agent's task, with the opportunity for the principal to disclose them to the agent. Jehiel shows that the principal can strategically set the level of transparency to induce higher effort from the agent, and derives conditions under which it is optimal for the principal not to disclose all her private information to the agent. Our results complement Jehiel's work insofar as they provide new insights on the value and motivating mechanism of transparency in a different organizational setting.

Second, our study informs research on persistent productivity differences among seemingly similar enterprises. Gibbons & Henderson (2013) provide an extensive review of this literature and report that several studies in this area find a positive correlation between a firm's performance and its adoption of 'high-performance work systems'. Among these systems, communication, in particular, the sharing of information with employees in a timely manner, features prominently. Our findings extend this literature and show that communication can indeed have a causal effect on firm performance.

Third, our study extends the literature on communication in principal-agent relationships. Charness & Dufwenberg (2006) and Charness & Dufwenberg (2011) report that communication is effective in a setting with hidden action, and hidden information, respectively. Their settings differ from our setting, because they look at relationships, in

which the agent has an information advantage, while we look at relationships, in which the principal has an information advantage.

The rest of this paper is organized as follows. Section 2 explains our experimental design. Section 3 presents our empirical results, and Section 4 concludes.

2 Experimental design and procedure

2.1 Experimental conditions

Our experimental design consists of two experimental conditions, *Informative Transparency* and *Uninformative Transparency*, with the latter being the control condition. In both conditions, principals and agents interact with each other in a series of one-shot games. The series of games is a repetition of the same principal-agent game, where a principal and an agent interact with each other at most once. The game consists of two stages and in each stage the strategy method is used to elicit players' choices. We first discuss the *Informative Transparency* condition.

In the first stage of the game, a random draw determines the wage level of the agent. It is common knowledge that the realization of the wage w is either low ($w_L = 80$) or high ($w_H = 160$), and that both outcomes are equally likely. We can thus write the wage determination process as the lottery $L = (p_{w_L}, p_{w_H}) = (0.5_{w_L}, 0.5_{w_H})$, where p_w denotes the probability for wage level $w \in \{w_L, w_H\}$. Furthermore, it is clear that the principal has no influence on the outcome of this random draw.[3] The principal has to submit two decisions before observing the outcome of the random draw. In particular, she needs to

[3]By abstracting from the question of responsibility for the wage level, our design excludes any potential for monetary gift-exchange between principal and agent. Experimental evidence by Charness (2004) shows that randomly determined wages do not lead to considerable misattribution. However, one of our practice questions before the experiment asks subjects about the principal's responsibility for the wage, to make sure that they are aware of the wage determination procedure. Another way to think about this aspect of our design is that the fixed-wage level stems from decisions made at a higher management level in the organization, or from external regulations such as a minimum wage.

decide for each possible wage level if she wants to disclose it to the agent by engaging in one-sided, costly communication. Such communication can only occur via a truthful, pre-defined, fixed-form message that also includes the outcome of the random draw.[4]

The justification for these three features of communication is as follows. First, we design communication to be costly to mirror managers' opportunity cost of communication in real-world settings. Second, we implement communication as a fixed-form, written message to keep the wording and communication styles constant across principals and wage levels. We also informed agents that principals have no influence on the style or content of the message nor have to type the message themselves. In consequence, communication cannot induce agent responses to real-effort from principals. Third, we restrict principals to truth-telling in our game, since we are not interested in studying principals' use of communication to outwit subordinates.

If the principal decides to establish transparency through information disclosure, denoted by $D = 1$, she incurs cost $c = 6$, otherwise, $D = 0$ and no costs arise. To cover communication costs, each principal receives an initial endowment of 10. The principal's set of disclosure strategies is given by $\{(0,0);(0,1);(1,0);(1,1)\}$, where for each strategy the first (respectively second) component indicates whether the low (respectively high) wage is disclosed or not. For example, if the principal selects the disclosure strategy $(1,0)$, then the low wage is disclosed whereas the high wage is not.

In the second stage of the game, the agent needs to make three effort choices, depending on whether the principal disclosed the low wage, disclosed the high wage, or did not disclose the wage level. Under transparency, the agent needs to select an integer value from the set $\{0,\ldots,80\}$ for the low wage, and from the set $\{0,\ldots,160\}$ for the high wage, while under

[4]By including the outcome of the random draw, the message helps agents to understand the specific workplace situation that they are in, and explains the procedure that led to this situation. Transparency in our experiment is thus closely linked to the previously mentioned concept of informational fairness, because "procedures used to determine employee outcomes" (p.3) are a prominent type of relevant information that employees expect informationally fair supervisors to disclose (Collins & Mossholder 2014).

non-transparency, the agent is able to select any integer value from the set $\{0, \ldots, 160\}$.[5] The agent's payoff Π_A depends on his chosen effort level e, and the realization of the wage level w. In case of non-transparency, the agent's wage is given by the aforementioned lottery L. For the principal, the payoff depends on her disclosure decision D, and the agent's effort choice e, where each unit of effort is doubled by the experimenter. The associated payoffs for agents and principals, denoted by Π_A and Π_P respectively, take the form:

$$\Pi_A = w - e \quad \text{where} \quad w \in \{80, 160, L\}, \quad \text{and} \quad \Pi_P = 10 + 2e - 6D.$$

The *Uninformative Transparency* condition differs from the *Informative Transparency* condition insofar as the information advantage of the principal is removed. It is common knowledge that the agent also learns about the wage level, such that the principal's communication will not contain news for the agent. That is, even without information disclosure from the principal, the agent does not face uncertainty about his wage level. As in the *Informative Transparency* condition before, we use the strategy method to elicit players' choices. Accordingly, the principal needs to submit two disclosure decisions (one for each possible wage level), and the agent has to submit four effort choices, depending on the wage level, and whether the principal decided to disclose it. We design this condition to understand to which extent a positive value of transparency in the *Informative Transparency* condition is driven by the provision of uncertainty-resolving information. Note that, for both conditions, standard economic theory predicts that, in equilibrium, the agent will always choose zero effort since effort is costly. Anticipating this, the principal will never

[5] Throughout our experiment, it was common knowledge that agents could never lose money from their effort choice under non-transparency. If an agent had entered an effort level greater than 80 under non-transparency and ended up with the low wage, his implemented effort level was automatically reduced to 80. We let the computer accept each effort level entry between 0 and 160 in the decision-making stage of agents under non-transparency to prevent agents from finding out about their wage level by entering different transfer levels.

disclose the observed wage level considering it is costly to do so.[6]

2.2 Experimental procedure

The experiment was run in March 2016 in the experimental laboratory of a large University in Switzerland.[7] In total, we conducted six sessions, of which we randomly allocated three to the *Informative Transparency* condition, and three to the *Uninformative Transparency* condition. In each session, subjects played at least nine iterations of the game as described in Section 2.1. To best preserve the nature of one-shot interactions and still allowing subjects to gain experience, we implemented a perfect stranger matching following the "no-contagion" protocol by Kamecke (1997). This procedure guaranteed that each of the $N/2$ agents interacted with any of the $N/2$ principals at most once.[8]

In total, we had 122 participants, which we randomly assigned to one of the two conditions. Each subject participated only once in the experiment. Upon arrival, subjects were randomly allocated to the roles of principals and agents. Throughout the instructions that subjects received we used neutral wording and referred to principals as "player B" and agents as "player A" (see Section E in the Web-Appendix for the instructions). Before the start of the experiment, subjects had to answer practice questions to make sure that they understood the experiment, and an experimenter read a summary of the instructions to the subjects to create common knowledge. After the experiment, we ran a short questionnaire to obtain subjects' sociodemographic information and motivation for their choices. On average, each session lasted about 80 minutes and earnings for subjects were around

[6]Our experimental design can also be interpreted as an extended dictator game with a positive efficiency parameter and a recipient's endowment. Similar games have previously been used to model manager-worker relationships, e.g., Falk & Kosfeld (2006).

[7]The experiment was computerised using z-Tree (Fischbacher 2007) and was organized and recruited for with the software hroot (Bock et al. 2014). Subjects were undergraduate and graduate students, excluding majors related to economics or psychology (see Table A.1 in the Web-Appendix for summary statistics by condition).

[8]For all sessions, our goal was to have at least 20 subjects to allow for ten iterations of the one-shot game. In one session, however, only 18 subjects showed up and thus played only nine iterations.

Table 1: Overview of experimental conditions

condition	number of sessions	number of subjects[1]	average earnings (CHF)[2]
Informative Transparency	3	60	36.63
Uninformative Transparency	3	62	36.15
N	6	122	36.39

[1] Half were in the role of a principal and half in the role of an agent.
[2] Earnings include a show-up fee of CHF 22.50.

36 CHF (= 37 USD at the time of the experiment). Table 1 provides detailed information about the number of sessions and subjects, as well as average earnings per condition.[9]

As explained in the previous section, we use the strategy method to elicit choices for both players.[10] Using the strategy method allows us to observe the disclosure strategy of the principal and the effort strategy of the agent. For each agent, we can thus elicit effort choices for the same wage with and without disclosure, and calculate a separate value of transparency for the low and for the high wage. In addition, we elicited beliefs for both players after they had made their decisions. Specifically, each agent had to answer if he believed that his principal would inform him about the low wage, about the high wage, and, for each wage level, how many of 100 principals would have informed their agent. Similarly, each principal had to answer how much effort she expected from her agent for each of the possible outcomes. To avoid any income effects we did not incentivize belief elicitation.

[9]Previously to our main experiment, we conducted a number of sessions with one-shot interactions. Because this experiment did not allow us to study the role of experience with the communication setting (which is a central characteristics of transparency in real-world organizations), we now refer to this earlier experiment as the secondary experiment. At the time of the main experiment, we decided to keep all decision-relevant parameters identical to allow comparisons across both experiments. However, to compensate participants for the longer session duration in the main experiment, we had to increase the show-up fee by CHF 12.50. We provide information on the secondary experiment in Section C in the Web-Appendix.

[10]The findings from Brandts & Charness (2011) suggest that treatment effects that are identified with the strategy method will also be identified using the direct response method. However, using the strategy method has the advantage that we can analyze decisions within subjects.

3 Results

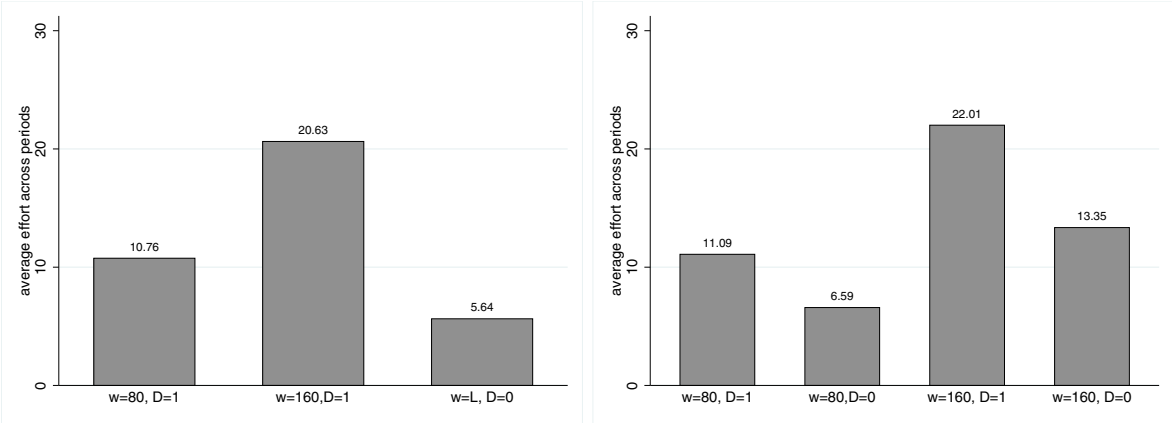
We divide the discussion of our experimental results into three parts. In the first part, we focus on agents' effort choices in response to the level of transparency that the principal implements. In the second part, we discuss the value of transparency, and shed light on its motivating mechanism for organizational performance. In the third part, we focus on principals' decision to disclose information, and the factors that influence this decision.

3.1 Agents' Effort Choices

The left graph in Figure 1 shows agents' average effort choices across periods in response to the level of transparency that the principal implemented for the *Informative Transparency* condition. It can be seen that informational transparency has a causal effect on effort for both wage levels: average effort increases from 5.64 under non-transparency to 10.76 and 20.63 in response to disclosure of the low and high wage, respectively. A two-sided Wilcoxon matched-pairs signed-rank test shows that effort under non-transparency is indeed significantly different from effort under informative transparency for each of the two wage levels (low wage vs. non-transparency: $z = 4.16, p < 0.001$; high wage vs. non-transparency: $z = 4.64, p < 0.001$).

Next, we look at the results from the *Uninformative Transparency* control condition, in which disclosure by the principal does not provide news to the agent. The right graph in Figure 1 shows agents' average effort choices across periods in response to information disclosure in this condition, and reveals that agents' effort choices are consistently higher after information disclosure than after non-disclosure. Specifically, average effort increases from 6.59 to 11.09 and from 13.35 to 22.01 in response to disclosure of the low and high wage, respectively (two-sided Wilcoxon matched-pairs signed-rank test: low wage vs. non-transparency: $z = 4.55, p < 0.001$; high wage vs. non-transparency: $z = 4.62, p < 0.001$).

Figure 1: Average effort choices across periods in the *Informative Transparency* and *Uninformative Transparency* condition



Notes: Displayed are the means of agents' average effort choices across periods for different wages and transparency levels in the *Informative Transparency* (left) and *Uninformative Transparency* (right) condition.

Comparing effort levels across both conditions, we do not observe that effort levels are consistently higher after disclosure in the *Informative Transparency* condition than in this condition (two-tailed, Wilcoxon rank-sum test: low wage: $z = 0.34$, $p = 0.73$; high wage: $z = 0.52$, $p = 0.60$). Overall, our data from both conditions present clear evidence that the level of transparency has a causal effect on effort choices, making it an effective, non-monetary incentive device. We summarize the previous discussion in our first result:[11]

Result 1 *In both conditions, transparency has a causal effect on effort.*

3.2 The value and motivating mechanism of transparency

To shed light on the value of transparency across time, and on its motivating mechanism, we calculate, for each agent, separately, the value of transparency for the high and for the

[11]While we derived this result from agents' average effort choices across periods, Figure B.1 in the Web-Appendix actually shows that the causal, positive effect of transparency on effort is present in each individual period of both our experimental conditions.

low wage. We then estimate variants of the following linear regression model:

$$\begin{aligned}\text{Value of Transparency}_{i,w} &= \beta_0 + \beta_1 \text{uninformativeTransparency}_i + \beta_2 \text{highWage}_{i,w} \\ &+ \beta_3(\text{highWage}_{i,w} \times \text{uninformativeTransparency}_i) + \epsilon_{i,w}, (1)\end{aligned}$$

where we use the indices i and w to indicate dependence on the individual, and the wage level, respectively. This latter index w is required, because the regression model involves two observations for each agent i, one for the low wage, and one for the high wage. Our choice of indices is thus a direct implication of the strategy method, and the fact that each agent had to make separate effort choices, depending on the principal's disclosure decision and wage level.

In equation (1), *Value of Transparency*$_{i,w}$ is calculated as twice the change in effort from agent i through information disclosure for wage level w, minus the principal's disclosure cost. Accordingly, our analysis focuses on the value of transparency for the principal. In the *Informative Transparency* condition, this value is given by $2 * (e(D = 1)_{i,w} - e(D = 0)_i) - 6$, and in the *Uninformative Transparency* condition, it is given by $2 * (e(D = 1)_{i,w} - e(D = 0)_{i,w}) - 6$. That is, in the *Informative Transparency* condition the value is always measured based on changes in effort relative to effort under uncertainty, and in the *Uninformative Transparency* condition the value is measured based on changes in effort relative to effort under non-disclosure for the same wage. The variable *uninformativeTransparency*$_i$ indicates if agent i is in the *Uninformative Transparency* condition (or not), and *highWage*$_{i,w}$ is an indicator variable that equals 1 for agent i's high wage observation, and 0 for his low wage observation. Finally, *highWage* $\times$ *uninformativeTransparency* is an interaction term of *highWage* and *uninformativeTransparency*. To account for correlation across a subject's choices, we adjust standard errors for clustering

on the subject level.[12]

We estimate variants of equation (1) for three different measurements of the value of transparency: using average effort choices across all periods (Models 1 and 2), using only effort choices in period 1 (Models 3 and 4), and using only effort choices in period 9 (Models 5 and 6). These different measurements allow us to shed light on differences in the value of transparency as participants gain experience with the interaction. Table 2 reports the associated estimation results. In Models 1, 3, and 5, we only include *uninformativeTransparency* as a regressor in the model. Accordingly, the Constant in these models measures the average value of transparency in the *Informative Transparency* condition across the low and high wage. We start our discussion of the estimation results with these three models.

Model 1 in Table 2 shows that there exists a significant value of transparency in the *Informative Transparency* condition: on average, disclosing the low and the high wage increases the principal's payoff by about 14 points. While the value of transparency is about 7 points lower in the *Uninformative Transparency* condition, this difference fails to achieve statistical significance. Model 3 uses effort choices in period 1, and shows that the value of transparency is significantly lower by about 10 points in the *Uninformative Transparency* condition when participants are unexperienced with the communication setting.[13] Model 5, however, shows that there is no longer a significant difference across conditions when using effort choices in period 9. Overall, we find that the value of transparency does not differ across conditions when participants have gained experience with the setting.

In Models 2, 4, and 6, we include all the other regressors from equation (1). Accordingly, the Constant in these models measures the value of transparency when disclosing the low wage in the *Informative Transparency* condition. Model 2 shows that both, the disclosure

[12]Because of the low number of sessions (6) in our study, we do not cluster standard errors on the session level.

[13]This finding is consistent with the results from the secondary experiment, in which participants played the game only once. We decided to move these results for the *Informative Transparency* and *Uninformative Transparency* condition to the Web-Appendix (see Table C.2), because they do not provide qualitatively different insights than the findings for period 1 in our main experiment.

of the high wage, and the low wage have a statistically significant positive effect on the principal's income. For the low wage in the *Informative Transparency* condition, the value of transparency is 4.241 and for the high wage it is 19.748. For the low wage, the value of transparency does not significantly differ in the *Uninformative Transparency* condition, but the significant negative coefficient on *highWage* × *uninformativeTransparency* shows that the value of transparency is lower for the high wage in the *Uninformative Transparency* condition. As we previously did not find a significant difference in effort choices after disclosure across both conditions, this result is driven by the significantly lower benchmark of non-transparency for the high wage in the *Informative Transparency* condition (compare Figure 1).

Results in Model 4 use effort choices in period 1, and show qualitatively the same results as in Model 2. The only notable exception is that the value of transparency for the low wage in the *Informative Transparency* condition is marginally insignificant ($p = 0.137$). However, as participants gain experience with the setting, we no longer observe a significant difference in the value of transparency across both conditions. In fact, when using effort choices for period 9, Model 6 shows that neither the coefficient for *uninformativeTransparency* nor the one for *highWage* × *uninformativeTransparency* is statistically significant.

Overall, we find clear evidence that the value of transparency is significantly positive for the disclosure of each wage level. This observation presents first causal evidence for the prevailing view in the management, psychology, and organization science literature. In contrast to this view, however, we do not find evidence that the value of transparency is primarily driven by the disclosure of uncertainty-reducing information to otherwise uninformed parties. While the value of transparency tends to be significantly lower in the *Uninformative Transparency* condition (which it should be according to the prevailing view) at the beginning of the experiment, the difference across both conditions is no longer statistically significant when participants gain experience with the setting.

Table 2: Value of Transparency in *Uninformative Transparency* vs. *Informative Transparency*

	Average across Periods		Period 1		Period 9	
	OLS	OLS	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)	(5)	(6)
	Value of Transparency	Value of Transparency	Value of Transparency	Value of Transparency	Value of Transparency	Value of Transparency
uninformativeTransparency	-6.954	-1.234	-9.960**	-1.877	-6.594	-2.923
	(4.756)	(2.916)	(4.403)	(3.368)	(5.157)	(2.960)
highWage		19.748***		21.133***		19.600***
		(3.895)		(5.095)		(4.201)
highWage × uninformativeTransparency		-11.438**		-16.166***		-7.342
		(5.023)		(5.570)		(6.113)
Constant (β_0)	14.115***	4.241*	14.767***	4.200	14.400***	4.600*
	(3.681)	(2.187)	(4.403)	(2.789)	(3.952)	(2.321)
F-Statistic	2.14	11.40***	5.12**	8.38***	1.63	10.02***
Pseudo R^2	0.02	0.14	0.05	0.17	0.02	0.13
N	122	122	122	122	122	122
Number of clusters	61	61	61	61	61	61

Robust standard errors in parentheses are corrected for subject clusters.
The Constant in Models 2, 4, and 6 measures the value of transparency for disclosure of the low wage in the *Informative Transparency* condition.
The p-values on the Constant in Models (2), (4), and (6) are 0.057, 0.137, and 0.052, respectively
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

We summarize these observations as follows:[14]

Result 2 *A significant, positive value of transparency exists for both, the low wage, and the high wage. The value of transparency is significantly higher for the high wage than for the low wage.*

Result 3 *As participants gain experience with the communication setting, there exists no difference in the value of transparency across conditions.*

Based on these results, we conclude that there exists a significant value of disclosing bad news and good news to agents, and that the value of transparency in organizations (where both agents and principals are experienced with the setting) is primarily driven by the interpersonal communication involved.[15]

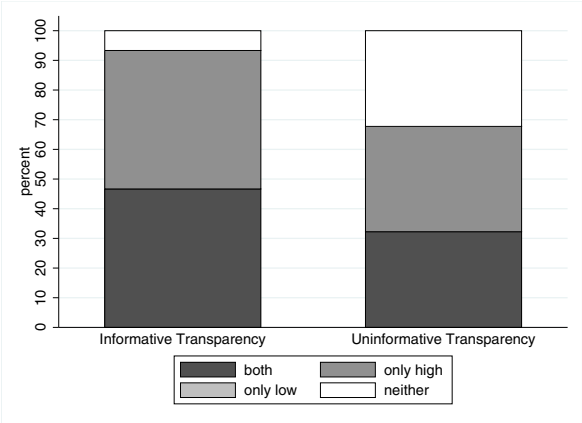
3.3 Principals' Disclosure Behavior

In our discussion of the principal's disclosure behavior, we focus again on three different measurements: the median disclosure decision for each wage across periods, the disclosure decisions in period 1, and the disclosure decisions in period 9. Figure 2 displays the share of disclosing principals in the *Informative Transparency* and *Uninformative Transparency* conditions for the median disclosure decision, and shows three different disclosure strategies that principals choose: disclosure of only the high wage, of both wage levels, and of neither.

[14] Additional support for our results comes from estimation results for the variants of equation (1) in each of the remaining periods (displayed in Tables A.2 and A.3 in the Web-Appendix). In the simple regression specification with *uninformativeTransparency* as the only regressor, the associated coefficient is insignificant in periods 3 to 9. For the full specification, the coefficient on *highWage* × *uninformative-Transparency* is insignificant in periods 8 and 9, and the Constant is statistically significant on the 10% level in all but one period (period 4).

[15] Looking at the differences in the average values of transparency between sessions, we find that the disclosure of good and bad news is consistently rewarded in all our sessions for the *Informative Transparency* condition (both in our main experiment, and in the secondary, one-shot experiment). That is, all these sessions show a positive value of transparency for both wage levels. For the *Uninformative Transparency* condition, the results are more mixed across sessions, such that the positive values of transparency are more pronounced in some sessions than in others.

Figure 2: Principals' disclosure decisions: median decision for each wage across all periods



Notes: The figures show the share of disclosing principals across wage levels in the *Informative Transparency* and *Uninformative Transparency* conditions.

Figure 2 shows that 47 percent of principals in the *Informative Transparency* condition disclose both wages. Another 47 percent disclose only the high wage, while the remaining 7 percent of principals choose not to disclose any wage level. This high degree of heterogeneity among principals shows that there exists considerable disagreement on the value of transparency. In view of our previous results on the value of transparency for the high *and* the low wage, Figure 2 thus reveals that 54 of the principals in our main condition disclose wage levels too restrictively, thereby reducing their profits. In the *Uninformative Transparency* condition, we find that principals' behavior is very similar as in our main condition where disclosure creates informative transparency. For example, 32 percent of principals still disclose both wages, while another 35 percent disclose only the high wage. Based on a Kolmogorov-Smirnov test we cannot reject the equality of both distributions (p=0.77).

Looking at the other two measurements, we find a very similar pattern. In Period 1, we find that 57 percent of principals in the *Informative Transparency* condition disclose both wages, and that another 33 percent disclose only the high wage. 10 percent of principals do not disclose any of the two wages. In the *Uninformative Transparency* condition, the shares

of principals who disclose both wages, only the high wage, and neither are 32, 48 and 19 percent, respectively. In period 9, 20 percent of principals in the *Informative Transparency* condition, and 50 percent in the *Uninformative Transparency* condition do not disclose anything. That is, experience with the situation makes principals less likely to disclose either wage.[16] We summarize the previous discussion in our fourth result.

Result 4 *A large share of principals misperceive the value of transparency in both conditions, and fail to disclose both wages. Disclosure becomes less common when participants gain experience.*

To understand the reason for this observed lack of transparency, we studied principals' beliefs about the value of transparency in both conditions. Our goal was to see if these beliefs were consistent with the observed value of transparency in the previous subsection. To this end, we estimated a regression model inspired by Bellemare et al. (2010), in which we regressed a principal's disclosure decision on her expected value of transparency.[17]

For all three measurements (i.e., median disclosure decision, and disclosure decisions in period 1 and period 9), our results showed that the expected value of transparency was predictive for principals' decisions to disclosure. To determine if principals' beliefs were indeed similar across conditions, we re-estimated equation (1) for principals' expected value of transparency. Comparing the associated results (displayed in Table B.1 in the Web-Appendix) to our results for the agents in Table 2, we found that principals had qualitatively correct beliefs about agents' behavior in period 1, and about their average behavior across periods. Perhaps surprisingly, however, we also found that gaining experience led to greater misperception of the value of transparency among principals. In particular, principals in period 9 underestimated the value of transparency when disclosing the low wage in the *Informative Transparency* condition, and when disclosing the high

[16]Kolmogorov-Smirnov tests for period 1 and 9 both yield a p-value of 1.00, and thus cannot reject the equality of distributions across experimental conditions.

[17]See section B.2 in the Web-Appendix for the exact model specification and estimation results.

wage in the *Uninformative Transparency* condition. Additional analyses on the period level (displayed in Tables B.2 and B.3 in the Web-Appendix) showed that, in the clear majority of periods, principals misperceived the value of disclosing the low wage in the *Informative Transparency* condition.[18] We summarize the previous discussion in our last result.

Result 5 *Principals' disclosure behavior is driven by their expectations about the value of transparency. As they gain experience, principals increasingly misperceive the value of transparency (particularly for the low wage).*

Why does experience not lead to better disclosure decisions of principals? We believe that the answer lies in a lack of feedback to principals paired with overly optimistic beliefs at the beginning of the experiment[19]: At the end of each period, the principal only learns the agent's effort choice that corresponds to her (non-)disclosure decision. What she does not observe, much like principals in the real-world, are the agent's effort choices for the states that she did not implement. A principal who is disappointed by the low effort choice of the agent after information disclosure may thus (wrongly) conclude that transparency has no value, and decide to save the cost of communication in the future.[20]

4 Conclusion

In this study we report the findings from a controlled laboratory experiment on the value of transparency in organizations. Our focus lies on the motivating effect of information disclosure as one of the three key aspects of transparency (Schnackenberg & Tomlinson

[18] Additional support for this conclusion comes from the results in the secondary, one-shot experiment. As shown in Table C.3 in the Web-Appendix, principals in this experiment underestimated the value of transparency for the low wage in this condition right from the start.

[19] Tables B.2 and B.3 in the Web-Appendix show that principals' beliefs about the value of transparency are substantially revised downwards across periods, because estimated coefficients on the value of transparency decrease across periods.

[20] We leave the important question about the effect of different feedback mechanisms on principals' disclosure decisions across multiple periods for future research.

2014), while keeping the other two aspects of information accuracy and clarity fixed. Our main result is that disclosure of good and bad information improves performance, and that transparency does not have to involve news to be motivating.

In spite of the substantial value of transparency that we observe in our experiment, we acknowledge that there may also be situations, in which transparency backfires. In a marketing context, for example, Mohan et al. (2015) find that cost transparency increases customers willingness to buy from a retailer as long as the disclosed information does not reveal the violation of fairness norms. In their study, willingness to buy from a retailer decreased when the disclosed information revealed the retailer's margin to considerably exceed the industry average (a likely signal for company greed and price unfairness). As the principal in our experiment did not have any control over the disclosed wage level for the agent, fairness considerations with regards to the message content (i.e., the allocated wage level of the agent) did not arise.

Relevant to practitioners, we replicate the well-established, real-world phenomenon of non-transparency in organizations (WSJ 2012, CNN-Money 2013, BusinessWeek 2000), and shed light on its origin. Specifically, we show that many individuals systematically misperceive the value of transparency, and that this misperception is amplified when subjects gain experience with the interactive situation. These results are of concern for decision-makers in real-world organizations, where the costs of non-transparency can be substantially higher than in our simplified two-player interaction: while not a possibility for subjects in our experiment, it is not uncommon for uninformed employees to eventually even leave the firm for the better. Or, as one Business Week article (BusinessWeek 2000) put it succinctly: "Keep Employees in the Dark, and They'll Go Where It's Light." At the same time, our results provide hope for practitioners, because they may find the disclosure of information that has already started to spread within the organization to be equally effective.

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