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ABSTRACT

We examine the interaction effect between the agents' perceptions of fairness and the power distance of inter-agent and how it affects agents' misreporting and whistleblowing behaviors in peer-reporting settings through pre-registered experiments using oTree. Participants were agents under mutual monitoring contracts (N=150), and a 2×2 between-participant design manipulated agents' perceptions regarding fairness (high or low perceptions) and power distance (with or without). We found that fairness perception and power distance affected participants' misreporting behavior, although the interaction effect was not statistically significant. As a mechanism-level analysis of misreporting behavior, wages' negative effect on participants' misreporting behavior was mediated by an increase in their perceptions of fairness and loyalty. Moreover, when power distance exists under mutual monitoring, junior managers' role increases misreporting by mediating a decrease in loyalty to executives and senior managers. This contributes to the literature on corporate misreporting, whistleblowing, and collusion.

Keywords: mutual monitoring; perceived fairness; power distance; misreporting; experiment

I. INTRODUCTION

Accounting fraud has become increasingly complex in recent years, and governance mechanisms to prevent fraud have become increasingly important. Whistleblowing is one of the most important corporate governance mechanisms that allows employees to monitor their colleagues, superiors, or subordinates by increasing transparency about actions that could be detrimental to firm value (Bowen, Call, and Rajgopal 2010; Dyck, Morse, and Zingales 2010; Wilde 2017; Call et al. 2018; Heese and Pérez-Cavazos 2021). For example, regulatory agencies in the United States rely on whistleblowers to detect corporate fraud (Coates 2007; Ball 2009; Heese, Krishnan and Ramasubramanian 2021). However, employees who observe wrongdoing do not always share information because of the costs associated with whistleblowing (Near and Miceli 1995; Gao and Brink 2017; Culiberg and Mihelič 2017; Guthrie and Taylor, 2017; Hayes et al. 2021; Latan et al. 2017; Latan et al. 2021). Furthermore, corporate fraud has become more complex in recent years, with an increasing number of frauds being committed not by single individuals, but in collusion (Evans III et al. 2016; Maas and Yin 2022). Power distance within an organization is also thought to influence fraud and whistleblowing (Taylor and Curtis 2013; Geng 2021; Geng and Fleming 2021). Therefore, it is necessary to clarify the mechanism of when and how employees blow the whistle in such complex business environments.

Prior research has shown that even in environments where collusion is possible, perceptions of fairness may affect how honestly agents report. For example, Zhang (2008) shows that under a peer reporting system with a high reward for whistleblowing, the agents' perception of the fairness of the principal positively affects their reporting honesty and negatively affects their explicit attempts at collusion (Zhang 2008). As for the power distance within organizations, for example, Taylor and Curtis (2013) and Gao, Greenberg, and Wong-On-Wing (2015)

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experimentally demonstrated that whistleblowing intentions are lower when the wrongdoer is in a powerful organizational position. However, these studies focused on the relationship between wrongdoers and non-wrongdoers (whistleblower). Therefore, it is still an open question as to how the perceptions of fairness affect fraud and whistleblowing in environments where collusion is possible when there is a power distance among players.

This study examines how the interaction effect between the agents' perceptions regarding the fairness of the principal and the power distance of inter-agents affect agents' misreporting and whistleblowing behaviors in a peer reporting setting. To examine this effect, we adopted an experimental approach. Compared to empirical analyses conducted in the field, experimental research offers tighter controls on agents' perceptions of fairness and power distance. By carefully selecting the relevant parameters, we can directly compare the actual behavior under certain settings. Specifically, we conducted pre-registered experiments using oTree (Chen, Schonger and Wickens 2016), in which participants played the role of agents under mutual monitoring contracts and were asked to perform reporting and whistleblowing behaviors (N = 150). We employed a 2 × 2 between-participant design to manipulate agents' perceptions regarding the fairness of the principal (high or low perceptions) and power distance (with or without).

Our experimental results showed the following three findings. First, fairness perception and power distance affected participants' misreporting behavior, although the interaction effect between them did not reach statistical significance. Second, as a mechanism-level analysis of misreporting behavior, the negative effect of wages on participants' misreporting behavior was mediated by an increase in their perceptions of fairness and loyalty. Third, in situations where power distance exists under mutual monitoring, the role of a junior manager increases misreporting by mediating a decrease in loyalty to executives and senior managers.

This study makes three main contributions to the literature. First, it contributes to the literature on corporate misreporting and whistleblowing. Previous studies have discussed the perceptions of fairness and power distance separately. By contrast, we show that perceptions of fairness influence misreporting and whistleblowing behavior in the presence of power distance. In particular, we find that even among the same colleagues, different informal positions lead to different fraudulent behaviors. Thus, this study provides a new perspective that has not been found in previous studies.

The second contribution is to the literature on behavioral research on collusion. Prior research on whistleblowing experimentally demonstrates that whistleblowing intentions are lower when the wrongdoer is in a powerful organizational position (Taylor and Curtis 2013; Gao et al. 2015). However, few studies have tested its effects, particularly in mutual monitoring settings. Therefore, our study examines the impact of power distance among agents on honest reporting and whistleblowing behavior under mutual monitoring and reveals that power distance and fairness do not lead to collusion.

The third is its contribution to practice and institutional design. Institutionally, for example, the effectiveness of monetary rewards for whistleblowing has been discussed in the United States. In addition to these debates, this study highlights the importance of incentive design that considers the influence of informal positions within an organization.

II. SETTING AND HYPOTHESES

The Game Setting

This study can be positioned as an extension of the multi-agent model developed by Ma (1988) and the experimental study by Zhang (2008), which expanded on the former. Ma's

(1988) model was used in a moral hazard situation. This model has been theoretically extended and can be applied to the case of information asymmetry in this study. Zhang's (2008) experiment focused on information asymmetries between principals and agents during budgeting. This is an experiment in mutual monitoring contracts with a model of a principal and multiple agents. Towry (2003) focused on the agent's effort level, whereas Zhang (2008) focused on the agent's behavior of honestly reporting private information.

The game setup in this study was as follows: a multiagent setting with one principal and two agents. The agents were working on one project and knew the actual sales of both projects. In other words, the agents knew their own actual sales and could fully observe the actual sales of their counterparts. The principal asked each agent to report their sales.

However, only the agents knew their actual sales and could fully observe that of other agents. Thus, agents would expropriate any surplus from the project. To solve these problems, the principal introduced a peer-reporting system into a multi-agent setup. The principal attempts to exploit the agents' knowledge of each other to elicit truthful reports. The principal also asked each agent to report their sales and earnings and used the responses of other agents as a policing tool. One agent's reward was determined by verifying that of the other agents.

The game timeline in the model consisted of two stages. In the first stage, each agent decided whether to report honestly or dishonestly their sales to the principal. In the second stage, the principal was told whether the other agents were honest or dishonest in their reporting. In other words, this is a decision to report or not. In this game, each agent's gain is determined by two factors: (1) how agents report about themselves and (2) how they report about other agents. Thus, the situation is such that one agent's gain depends on the other agent's decision-making.

Solving this game with backward induction yields only the subgame perfect equilibrium in which each agent reports honestly in both the first and second stages. Thus, the model results in the conclusion that multi-agent mutual monitoring works, and there is no need for whistleblowing. The structure and equilibrium of this game are similar to those in Zhang (2008). Note that in Zhang (2008), the game was cost-reporting, but in this study, the game was changed to a sales-reporting one. Thus,

Personal Utility = reservation utility payment + padding of sales + Bonus for truthful accusation (whistleblowing) (if any) – Fine for overstating (if any) – Penalty for false accusation (if any).

Related Literature and Hypotheses

This study examines how two factors–the agents' perceptions regarding the fairness of the principal and the power distance of the inter-agent–affect agents' behaviors under a peer reporting system. As described in the previous subsection, analytical models show that when agents can observe each other's actions and local signals, a peer reporting system with a verification mechanism using one agent's information to verify that of the other and a reward for truthful whistleblowing can induce agents to report honestly, thereby helping the principal achieve the first-best outcome. However, behavioral research suggests that agents' perception regarding the fairness of the principal may affect how honest agents report (Zhang 2008; Guo, Libby and Liu 2017; Guo et al., 2020). Zhang (2008) shows that under a peer reporting system with a high reward for whistleblowing, the agents' perception of the fairness of the principal positively affects the agents' reporting honesty and negatively affects their explicit attempts at collusion. Guo et al. (2020) examined the joint effect of vertical pay dispersion and peer

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observability on subordinates' misreporting choices, showing that high vertical pay dispersion motivates subordinates to misreport costs to a greater extent than low vertical pay dispersion due to unfairness perceptions. Consequently, in this study, we focus on agents' perceptions of principals' fairness.

As the second factor, we also focus on the power distance of inter-agents, because many fraudulent activities have been conducted within conspiracies (Free and Murphy 2015; ACFE 2022) and power distance among wrongdoers is one of the factors that cause collusive fraud (Albrecht et al. 2015). According to recent reports, the Association of Certified Fraud Examiners (ACFE) estimates that approximately 58 percent of fraud cases involve collusion schemes (ACFE 2022). The report also shows that the median loss of collusive fraud is 254 percent higher than the median loss of fraud committed by a single person (ACFE 2022, 56). Thus, it is important to understand how collusive fraud can be prevented.

In previous studies, collusion behavior between two agents has also been observed. For example, Zhang (2008) shows that, in situations where there is communication between agents before reporting, there is more collusion agreement at lower wages than at higher wages. In addition, Evans III et al. (2016) show that transparency regarding employee behavior causes fraudsters to develop reciprocal relationships and thereby adhere to collusive agreements. Such collusive behavior by employees increases misreporting.

In addition to these previous studies, we focused on the power distance between agents. This is because power recruits co-conspirators (Albrecht, Albrecht, and Albrecht 2004; Albrecht et al., 2015). These studies depend on the social power framework by French, Raven, and Cartwright (1959). This framework provides the most insight into the recruitment process as it is the only framework that suggests how power is derived between two individuals. As shown

in Figure 1, the person in Position A (Conspirator) influences the person in Position B (Potential Co-conspirator) using one or more of the five types of power (Albrecht et al. 2015, 808). As power is expected to lead to collusion based on this theory, it is also important to examine how power distance affects agents' behavior under mutual monitoring.

Furthermore, prior research on whistleblowing experimentally demonstrates that whistleblowing intentions are lower when the wrongdoer is in a powerful organizational position (e.g., Taylor and Curtis 2013; Gao et al. 2015). However, these studies focused on the relationship between wrongdoers and non-wrongdoers (whistleblower). However, no previous studies have focused on the whistleblowing behavior under power distance in collusion. Therefore, this study examines the impact of power distance among agents on honest reporting and whistleblowing behavior under mutual monitoring.

As noted above, Zhang (2008) shows that higher wages lead to more honest reporting and whistleblowing behavior toward principals. This is because of the influence of the concept of reciprocal fairness developed in the gift exchange literature (Akerlof 1982; Akerlof 1984). In other words, higher wages may increase agents' perceptions of the principal's fairness and encourage their reciprocal behavior.

Prior research indicates that whistleblowing intentions are lower when the wrongdoer is more powerful or when there is a closer social relationship with the wrongdoer (Curtis, Conover, and Chui 2012; Taylor and Curtis 2013; Gao et al. 2015; Boo, Ng, and Shankar 2016). For example, internal whistleblowing intentions are lower when the wrongdoer is powerful, such as when the wrongdoer is in a higher organizational position (Gao et al. 2015) and when there is a greater power distance between the whistleblower and wrongdoer (Curtis et al. 2012; Taylor and Curtis 2013). Boo et al. (2016) similarly found that closeness to the wrongdoer affects

auditors' internal whistleblowing intentions. In such an environment, where whistleblowing is likely to be suppressed, each agent may increase misreporting in anticipation. Thus, while agents are likely to behave reciprocally (i.e., report honestly) to the principal when offered higher wages, this may be less effective when there is a power relationship between agents. Therefore, we expect an interaction effect between wage and power, leading to this following hypothesis:

> ***H1: There is an interaction effect between wages and power distance on agents' reporting and whistleblowing behaviors in a mutual monitoring setting.***

Next, we set up the hypotheses with mediating variables that extend Zhang (2008). Although Zhang (2008) noted that agents' perception of fairness to principals is an important factor in eliciting honest reporting behavior, this mechanism has not been tested using data analysis. Therefore, we developed a hypothesis that perceives fairness to principals as a mediating variable. In addition, we focus on the agents' perceptions of loyalty to the principal. Empirical literature shows that the relationship between employee loyalty and wages has some negative results (Cohen et al. 2009; Masakure 2016) and some positive results (Judge, Livingston, and Hurst 2012; Nyborg and Zhang 2013; Linz, 2013). Thus, there is mixed evidence, and most of them only analyze correlations. An exception is Masakure (2016), who approaches causality using empirical data but has not been tested in a controlled environment. Our study focuses on how high wages affect employee loyalty in a controlled environment. According to the basic idea of the "labor market as partial gift exchange," the loyalty of workers is exchanged for high wages, and this loyalty can be translated via effective management into high productivity (Akerlof 1984). Relying on this theory, we can also expect employees to act reciprocally toward managers (e.g., increased honest reporting) by increasing loyalty. Based on the above, we propose the following hypothesis:

H2: Wage decreases agents' misreporting through perceptions of fairness and loyalty to principals.

Finally, we examined how the power distance between agents affects each one's honest reporting behavior[1]. Specifically, we examined the honest reporting behavior of senior or junior agents. According to previous studies, internal whistleblowing intentions are lower when the wrongdoer is in a powerful organizational position (Gao et al. 2015). If a senior agent misreports, the junior agent's whistleblowing intention is expected to decline with the power distance. Therefore, senior agents are in a situation where they are more likely to misreport than junior agents, taking advantage of power relationship. Thus, we propose the following hypothesis:

H3: In situations where power distance exists under mutual monitoring, a senior agent is more likely to misreport than a junior agent is.

III. METHODS

Task

We conducted an experiment based on a principal–agent model in a multi-agent and mutual monitoring setting. In the experiment, participants holding the role of the agent choose their levels of reporting and whether or not to perform whistleblowing behaviors. We manipulated (1) whether perceived fairness was high or low (high or low fixed wages) and (2) with or without the power distance between agents.

Study Design

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[1] As we show in the next section, we represent the power relationship by assigning participants the role of senior or junior manager.

Participants were randomly assigned to one of the following four conditions: (1) perceived high fairness with power distance condition, in which agents' fixed wages are higher with power distance between agents; (2) perceived high fairness without power distance condition, in which agents' fixed wages are higher without power distance; (3) perceived low fairness with power distance condition, in which agents' fixed wages are lower with power distance between agents; and (4) perceived low fairness without power distance condition, in which agents' fixed wages are lower without power distance.

The dependent variables were as follows: (1) whether an agent reports false sales (false reporting = 1, truthful reporting = 0) and (2) the extent to which an agent reports false sales (from 0 to 1,000).

Our final sample size for the collected data was N = 150, and we performed a power analysis beforehand by the R package "pwr" and chose this value. We excluded the data of those who did not finish the experimental task or failed the manipulation check.

Procedure

After approval by the Institutional Review Board (IRB), we pre-registered for the experiment in *AsPredicted* (https://aspredicted.org/, Pre-registered No. 86112). We recruited participants through the Sona system using a standard research participant pool of undergraduate and graduate students at a large private university. In total, 150 participants joined our experiment (high wage-power condition: 42, high wage-no power condition: 34, low wage-power condition: 32, and low wage-no power condition: 42). Participants were 20.87 years old on average (SD = 1.23). The maximum and minimum ages of the participants were 25 and 18 years, respectively, and 57 percent of them were female. The participants were randomly

allocated to each treatment. As we adopted a between-participant design, no participant joined more than one experimental session. Each session lasted approximately 49 minutes on average, and the average payment to participants was USD 22.40, including a fixed show-up fee of USD 17.0.

Each session was conducted online using web conferencing software (Zoom) and oTree (Chen, Schonger, and Wickens 2016). Upon entering the Zoom room, participants changed their names to the experimental IDs. To control participants' communication and ensure anonymity, participants turned off their web cameras and muted their microphones during the experiment. After the participants entered the Zoom room and were ready, the experimenter played the prerecorded instruction video. The participants also received a set of written instructions from the experimenter in the instruction video. After completing the instruction, the experimenter sent the oTree link to the participants, who then accessed the oTree and started the task.

The sessions consisted of eight independent rounds. In each round, a participant participated in the task described 3-1. The cash payment to participants consisted of a fixed show-up fee of USD 17 and a variable pay that depended on the points earned in the experiment. One of the eight rounds was randomly selected by roulette and the points earned in that round were converted to USD. See Supplementary File S1 for the instructions.

IV. RESULTS

Summary Statistics

Table 1 presents the descriptive statistics about misreporting (the extent to which an agent reports false sales) for each experimental condition[2].

Hypothesis Testing

Result of the ANOVA (Test of H1)

First, regarding H1, we conducted an analysis of variance (ANOVA) using pooled data, in which the dependent variables are the extent to which an agent reports false sales, and the independent variables are treatment dummy variables. Table 2 shows the results of the ANOVA.

Table 2 shows that the wage effect reached statistical significance at the 5 percent level [$F(1) = 5.499$, $p = 0.019$], and the power effect also reached statistical significance at the 10 percent level [$F(1) = 2.930$, $p = 0.087$], although the interaction effect between wage and power effect did not reach statistical significance [$F(1) = 0.061$, $p = 0.804$].

As a complementary analysis to H1, we tested whether wage fairness and power distance among agents are associated with reporting behavior. Logistic regression analysis revealed that reporting behavior was more likely when there was a power distance between agents, but this did not differ depending on whether wages are fair.

Mediation Analyses about Wage (Test of H2)

In this section, we report mechanism-level analyses to better understand misreporting behavior. H2 predicts that wages decrease agents' misreporting through perceptions of fairness and loyalty to principals. Panel A of Figure 2 presents this model. Panel B of Figure 2 reports the

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[2] A linear mixed effects model (LMM) analysis was conducted to verify whether there is a difference in the amount of fraud (misreporting) for each condition. It was found that the LP condition showed higher levels of misreporting than the other conditions.

results of the path analysis. Wage is a dummy variable with a high value of 1 and a low value of 0. Misreporting is the extent to which an agent misreports sales (from 0 to 1,000). We used fairness and loyalty to the principal as mediator variables. These were measured by a post-questionnaire measured using a 7-point Likert scale ranging from 1 = *strongly disagree* to 7 = *strongly agree.*

The model provided a good fit for the data (chi-square = 0.000, SRMR = 0.000, RMSEA = 0.000, Comparative Fit Index = 1). Consistent with our expectations, we find that wages increase Fairness Perception ($p < 0.01$), and fairness perception decreases misreporting ($p < 0.01$). Likewise, we find that wages increase loyalty perception ($p < 0.01$), and loyalty perception decreases misreporting ($p < 0.01$). Finally, the direct effect of wage on misreporting after controlling for fairness perception and loyalty perception was insignificant ($p > 0.10$). This finding suggests that the negative effect of wages on participants' misreporting behavior is mediated by an increase in their perceptions of fairness and loyalty. These findings confirm H2.

Mediation Analyses about Power Distance (Test of H3)

Regarding H3, we predict that a senior agent is more likely to misreport than a junior agent is in situations where power distance exists under mutual monitoring. The likelihood of misreporting was 52/288 (18.1 percent) for seniors and 65/272 (23.9 percent) for juniors, but there was no significant difference (X-squared = 2.5455, df = 1, p-value = 0.1106). Similarly, misreporting was 138.6 for seniors and 178.2 for juniors, but there was no significant difference (t = -1.3489, df = 545.93, p-value = 0.1779, W = 36936, p-value = 0.1001). Thus, H3 is not supported.

Next, we used SEM to analyze whether the roles of seniors and juniors make a difference in the path. Figure 3 shows the results of the path analysis using data from the power–distance condition. Senior is a dummy variable with a senior agent equal to 1 and a junior agent equal to 0. Misreporting is the extent to which an agent misreports sales (from 0 to 1,000). We used two types of loyalty as the mediator variables. One is loyalty to the principal, and the other is loyalty to the partner agent. These were assessed by a post-questionnaire measured using a 7-point Likert scale ranging from 1 = *strongly disagree* to 7 = *strongly agree.*

The model provided a good fit for the data (chi-square = 0.000, SRMR = 0.000, RMSEA = 0.000, Comparative Fit Index = 1). We find that senior increases fairness perception to principal ($p < 0.01$), which in turn decreases misreporting ($p < 0.01$). Likewise, we found that seniors decreased loyalty perception to partners ($p < 0.01$), and loyalty perception to partners increased misreporting ($p < 0.01$). Finally, the direct effect of wage on misreporting after controlling for loyalty perception to principal and partner was insignificant ($p > 0.10$). Therefore, although there was no direct impact of role (senior/junior) on misreporting, the results indicate that there is less misreporting behavior through loyalty for seniors than for juniors.

V. DISCUSSION

In this section, we conduct a complementary analysis focusing on individual attributes to determine who made what kind of decisions. As a complementary analysis to H1, we test whether wage equity and power distance among agents are associated with the amount of misreporting. Multiple regression analysis revealed that in model (1) with a cross-term, the amount of misreporting is higher in situations where there is a power distance between agents, but this does not depend on whether wages are fair. In model (2) without the cross-term, we find

that misreporting is higher in situations where there is a power distance between agents and that wage fairness decreases the amount of misreporting. Thus, the results of the complementary analysis show that age equity and power distance between agents are related to the amount of reported fraud even after controlling for individual attributes.

We examined the determinants of the personal attributes of wrongdoers that affected the amount of misreporting reports. Only those who engaged in misreporting were selected for analysis. Multiple regression analysis revealed that among those who made misreports, those who felt their wages were fair, those who had a high sense of justice, and those who had high loyalty to their bosses had fewer misreports, whereas those who had high loyalty to their partners made more misreports. Those with high loyalty to their partners had a higher amount of misreporting, possibly because they attempted to collude with their partners. Possible measures to prevent false reporting include explaining that employees should feel that their wages are fair, providing employee training that increases their sense of justice, and communicating with them to increase their loyalty to their supervisors.

VI. CONCLUSIONS

This study examines how the interaction effect between the agents' perceptions regarding the fairness of the principal and the power distance of the inter-agent affects agents' misreporting and whistleblowing behaviors in a peer reporting setting. Specifically, we conducted pre-registered experiments using oTree, in which participants played the role of agents under mutual monitoring contracts and were asked to report and perform whistleblowing behaviors (N = 150). We employed a 2 × 2 between-participant design to manipulate the agents'

perceptions regarding the fairness of the principal (high or low perceptions) and power distance (with or without).

Our experimental results showed the following three findings. First, fairness perception and power distance affected participants' misreporting behavior, although the interaction effect between them did not reach statistical significance. Second, as a mechanism-level analysis of misreporting behavior, the negative effect of wages on participants' misreporting behavior was mediated by an increase in their perceptions of fairness and loyalty. Third, in situations where power distance exists under mutual monitoring, the role of a junior manager increases misreporting by mediating a decrease in loyalty to executives and senior managers.

The limitations of this study are as follows. Regarding H3, our study shows that, under conditions of power distance, seniority is associated with less misreporting via loyalty. This suggests that the senior side may have some sense of normality, suggesting that seniority may create some normative consciousness rather than exercising power. Future research is needed to elucidate the positive normative attitudes that reduce fraud.

References

ACFE. 2022. *Occupational Fraud 2022: A Report to the Nations*, Association of Certified Fraud Examiners.

Akerlof, G. A. 1982. Labor contracts as partial gift exchange. *The Quarterly Journal of Economics* 97 (4): 543–569.

———. 1984. Gift exchange and efficiency-wage theory: four views. *The American Economic Review* 74 (2): 79–83.

Albrecht, C., D. Holland, R. Malagueño, S. Dolan, and S. Tzafrir. 2015. The role of power in financial statement fraud schemes. *Journal of Business Ethics* 131 (4): 803–813.

Albrecht, W., C. C. Albrecht, and C. O. Albrecht. 2004. Fraud and corporate executives: Agency, stewardship and broken trust. *Journal of Forensic Accounting* 5: 109–130.

Ball, R. 2009. Market and political/regulatory perspectives on the recent accounting scandals. *Journal of Accounting Research* 47 (2): 277–323.

Boo, E., T. B.-P. Ng, and P. G. Shankar. 2016. Effects of incentive scheme and working relationship on whistle-blowing in an audit setting. *Auditing* 35 (4): 23–38.

Bowen, R. M., A. C. Call, and S. Rajgopal. 2010. Whistle-blowing: target firm characteristics and economic consequences. *The Accounting Review* 85 (4): 1239–1271.

Call, A. C., G. S. Martin, N. Y. Sharp, and J. H. Wilde. 2018. Whistleblowers and outcomes of financial misrepresentation enforcement actions. *Journal of Accounting Research* 56 (1): 123–171.

Chen, D. L., M. Schonger, and C. Wickens. 2016. oTree—an open-source platform for laboratory, online, and field experiments. *Journal of Behavioral & Experimental Finance* 9: 88–97.

Coates, J. C. 2007. The goals and promise of the Sarbanes-Oxley Act. *Journal of Economic Perspectives* 21 (1): 91–116.

Cohen, T. R., B. C. Gunia, S. Y. Kim-Jun, and J. K. Murnighan. 2009. Do groups lie more than individuals? Honesty and deception as a function of strategic self-interest. *Journal of Experimental Social Psychology* 45 (6): 1321–1324.

Culiberg, B. and K. K. Mihelič. 2017. The evolution of whistleblowing studies: A critical review and research agenda. *Journal of Business Ethics* 146 (4): 787–803.

Curtis, M. B., T. L. Conover, and L. C. Chui. 2012. A cross-cultural study of the influence of country of origin, justice, power distance, and gender on ethical decision making. *Journal of International Accounting Research* 11 (1): 5–34.

Dyck, A., A. Morse, and L. Zingales. 2010. Who blows the whistle on corporate fraud? *The Journal of Finance* 65 (6): 2213–2253.

Evans III, J. H., D. V. Moser, A. H. Newman, and B. R. Stikeleather. 2016. Honor among thieves: open internal reporting and managerial collusion. *Contemporary Accounting Research* 33 (4): 1375–1402.

Free, C. and P. R. Murphy. 2015. The ties that bind: the decision to co-offend in fraud. *Contemporary Accounting Research* 32 (1): 18–54.

French, J. R., B. Raven, and D. Cartwright. 1959. The bases of social power. *Classics of Organization Theory* 7: 311–320.

Gao, J., R. Greenberg, and B. Wong-On-Wing. 2015. Whistleblowing intentions of lower-level employees: the effect of reporting channel, bystanders, and wrongdoer power status. *Journal of Business Ethics* 126 (1): 85–99.

Gao, L. and A. G. Brink. 2017. Whistleblowing studies in accounting research: a review of experimental studies on the determinants of whistleblowing. *Journal of Accounting Literature* 38 (1): 1–13.

Geng, X. 2021. The effects of perceived leader emotional intelligence and group prototypicality on subordinate whistleblowing intentions. *Journal of Forensic Accounting Research* 6(1): 87-110.

Geng, X., and A. S. Fleming 2021. Should I Blow the Whistle on My Boss? An Investigation of the Effects of Emotional Intelligence and Consequence Framing on the Subordinates' Whistleblowing Intentions. *Journal of Forensic Accounting Research* 6(1): 291-312.

Guo, L., T. Libby, and X. K. Liu. 2017. The effects of vertical pay dispersion: experimental evidence in a budget setting. *Contemporary Accounting Research* 34 (1): 555–576.

Guo, L., T. Libby, Liu, Y. Tian. 2020. Vertical Pay Dispersion, Peer Observability, and Misreporting in a Participative Budgeting Setting. *Contemporary Accounting Research* 37 (1): 575–602.

Guthrie, C. P., and E. Z. Taylor, 2017. Whistleblowing on fraud for pay: Can I trust you?. *Journal of Forensic Accounting Research* 2(1): A1-A19.

Hayes, M. J., D. J. Lowe, K. Pany, and J. Zhang. 2021. The Availability of Reporting Channels, Tone at the Top, and Whistleblowing Intentions. *Journal of Forensic Accounting Research* 6(1): 111-126.

Heese, J., R. Krishnan, and H. Ramasubramanian. 2021. The Department of Justice as a gatekeeper in Whistleblower-initiated corporate fraud enforcement: drivers and consequences. *Journal of Accounting & Economics* 71 (1): 101357.

Heese, J. and G. Pérez-Cavazos. 2021. The effect of retaliation costs on employee

    whistleblowing. *Journal of Accounting & Economics* 71 (2–3): 101385.

Judge, T. A., B. A. Livingston, and C. Hurst. 2012. Do nice guys—and gals—really finish last?

    The joint effects of sex and agreeableness on income. *Journal of Personality & Social*

    Psychology 102 (2): 390–407.

Latan, H., C. J. Chiappetta Jabbour, and A. B. Lopes de Sousa Jabbour. 2019. 'Whistleblowing

    triangle': Framework and empirical evidence. *Journal of Business Ethics* 160(1): 189-

    204.

Latan, H., C. J. Chiappetta Jabbour, and A. B. Lopes de Sousa Jabbour. 2021. To blow or not to

    blow the whistle: The role of rationalization in the perceived seriousness of threats and

    wrongdoing. *Journal of Business Ethics* 169(3): 517-535.

Linz, S., L. Good, M. Busch 2013. Does worker loyalty pay? Evidence from transition

    economies. *Evidence-Based HRM: A Global Forum for Empirical Scholarship* 1 (1): 16–

    40.

Ma, C. 1988. Unique implementation of incentive contracts with many agents. *The Review of*

    Economic Studies 55 (4): 555.

Maas, V. S. and H. Yin. 2022. Finding partners in crime? How transparency about managers'

    behavior affects employee collusion. *Accounting, Organizations & Society* 96: 101293.

Masakure, O. 2016. The effect of employee loyalty on wages. *Journal of Economic Psychology*

    56: 274–298.

Near, J. P. and M. P. Miceli. 1995. Effective whistle-blowing. *The Academy of Management*

    Review 20 (3): 679–708.

Nyborg, K. and T. Zhang. 2013. Is corporate social responsibility associated with lower wages? *Environmental & Resource Economics* 55 (1): 107–117.

Taylor, E. Z. and M. B. Curtis. 2013. Whistleblowing in audit firms: organizational response and power distance. *Behavioral Research in Accounting* 25 (2): 21–43.

Towry, K. L. 2003. Control in a teamwork environment—the impact of social ties on the effectiveness of mutual monitoring contracts. *The Accounting Review* 78 (4): 1069–1095.

Wilde, J. H. 2017. The deterrent effect of employee whistleblowing on firms' financial misreporting and tax aggressiveness. *The Accounting Review* 92 (5): 247–280.

Zhang, Y. 2008. The effects of perceived fairness and communication on honesty and collusion in a multi-agent setting. *The Accounting Review* 83 (4): 1125–1146.

Figure 1. Dyad reciprocal model
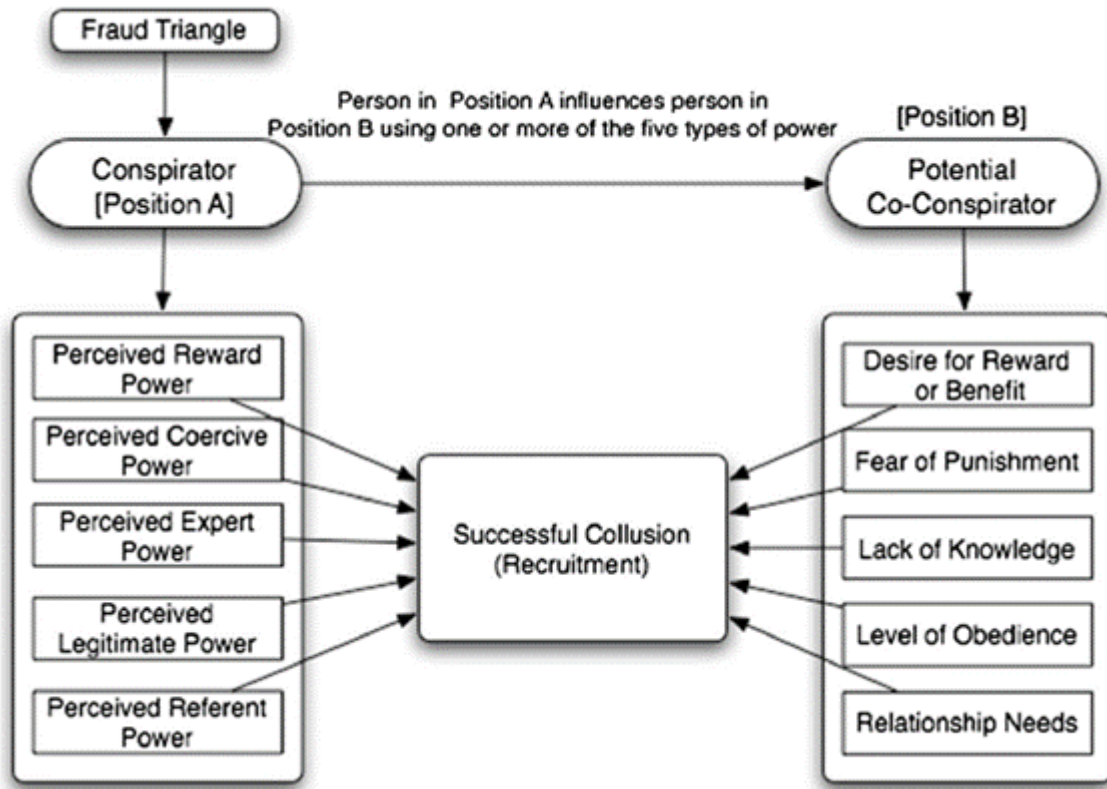
Note: Cited by Albrecht et al. (2015) Fig. 1

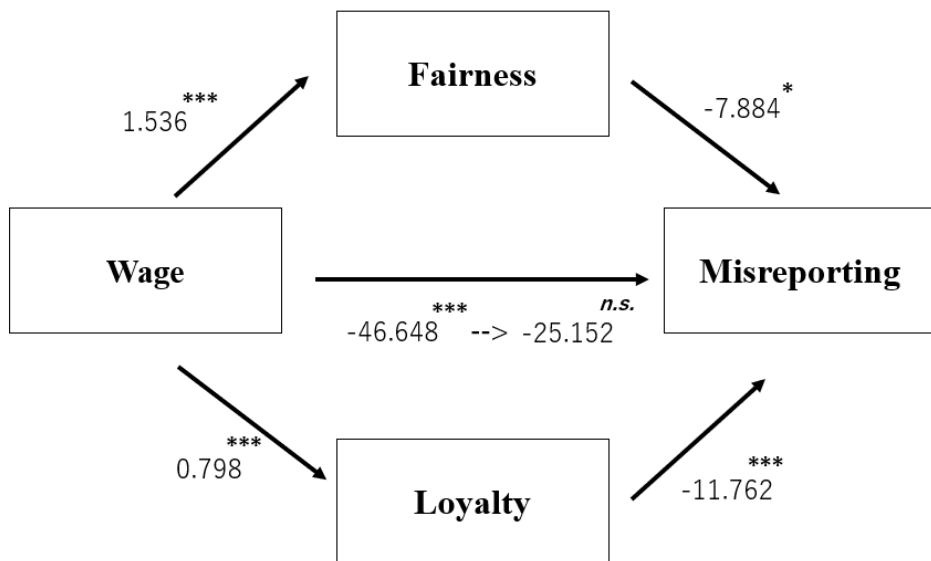Figure 2. Path Analysis of Two Variables

Panel A: Theoretical Model
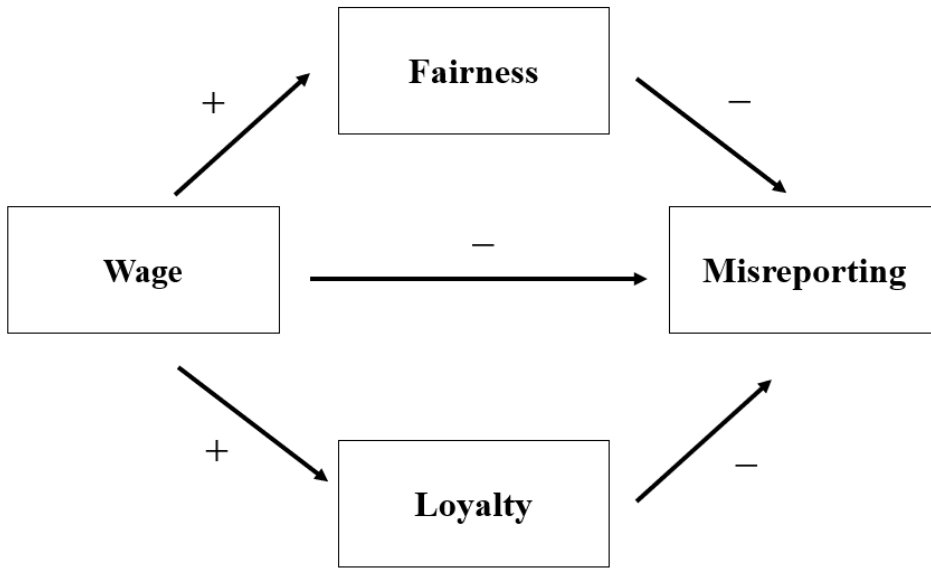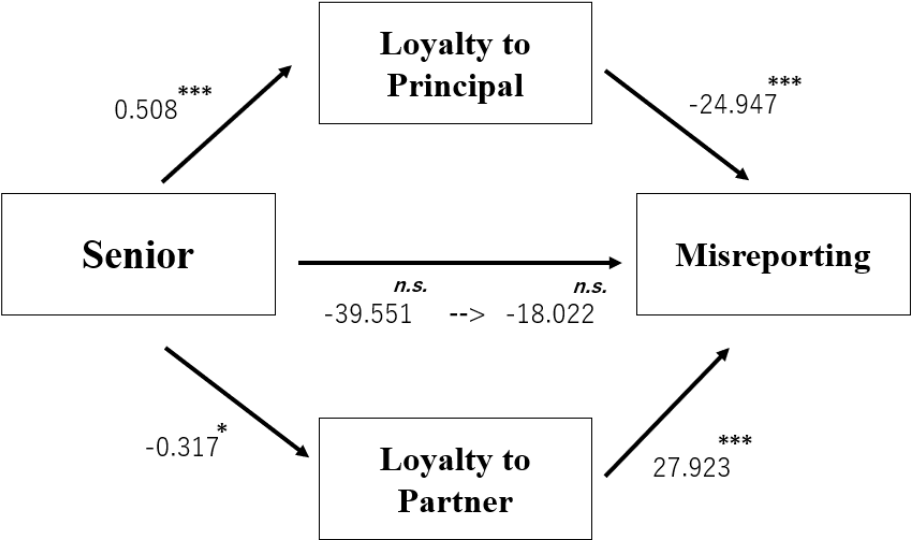

Panel B: Test of the Theoretical Model

Note: ***/**/* indicates significance at the 0.01, 0.05, and 0.10 levels, respectively.

Figure 3. Path Analysis for the Power Distance Condition

Note: N = 560. *, **, *** Indicate partial regression coefficient is significant at the 0.1, 0.05 and 0.01 levels, respectively (two-tailed).

Table 1. Descriptive Statistics: Misreporting—Mean, (Standard Error), and [Median]

Wage	Power distance		Total
	Power	Non-Power	
High	138.16	102.29	122.79
	(334.92)	(291.31)	(317.19)
	[0.00]	[0.00]	[0.00]
	n = 320	n = 240	n = 560
Low	184.04	158.99	170.21
	(359.55)	(342.49)	(350.12)
	[0.00]	[0.00]	[0.00]
	n = 240	n = 296	n = 536
Total	157.82	133.60	
	(346.12)	(321.53)	
	[0.00]	[0.00]	
	n = 560	n = 536	

Note: Table 1 presents the Mean, (Standard Error), and [Median] for the agent reports false sales in each condition.

Table 2. ANOVA Model of Misreporting

	S.S.	df	M.S.	F-Statics	p-Value
Wage	604649	1	604649	5.499	0.0192**
Power	322195	1	322195	2.930	0.0872*
Wage×Power	6746	1	6746	0.061	0.8044
Residuals	121840519	1108	109964		

Note: **/* indicates significance at the 0.05, and 0.10 levels, respectively. Dependent variable is Misreporting.

Table 3. Additional Analysis to H1

	Dependent variable:	
	Misreporting	
	(1)	(2)
Wage	-46.097	-41.964*
	(-106.884, 14.690)	(-84.304, 0.377)
Power	62.316**	66.083***
	(6.038, 118.595)	(26.237, 105.928)
Fairness	-3.597	-3.792
	(-13.807, 6.613)	(-13.788, 6.204)
Justice	-22.365***	-22.197***
	(-33.416, -11.315)	(-33.101, -11.294)
Senior Loyalty	-6.541	-6.628
	(-18.982, 5.900)	(-19.029, 5.773)
Partner Loyalty	27.281***	27.249***
	(15.869, 38.693)	(15.847, 38.651)
Risk	-36.710***	-36.799***
	(-47.282, -26.137)	(-47.324, -26.273)
Dark Triad	1.037	1.068
	(-28.644, 30.719)	(-28.598, 30.735)
Gender	24.484	23.744
	(-14.605, 63.574)	(-14.541, 62.030)
Age	16.119**	16.126**
	(0.444, 31.795)	(0.458, 31.795)
Wage×Power	7.507	
	(-71.677, 86.691)	
Constant	31.933	31.384
	(-313.816, 377.682)	(-314.163, 376.931)
Observations	1,096	1,096
R^2	0.11	0.11
Adjusted R^2	0.101	0.102
Residual Std. Error	317.092 (df = 1084)	316.951 (df = 1085)
F Statistic	12.156*** (df = 11; 1084)	13.380*** (df = 10; 1085)

Note: ***/**/* indicates significance at the 0.01, 0.05, and 0.10 levels, respectively. ( ) shows the confidence interval . Table 3 presents our additional analysis of H1. The independent variable Fairness asked how fair the agents felt they were on a 1 to 7-point Likert scale. The independent variable Justice asked how much the agents felt a sense of justice on a Likert scale of 1 to 7. The

independent variable Senior Loyalty asked how loyal the agent felt to the principal on a Likert scale of 1 to 7. The independent variable Partner Loyalty asked how loyal agents felt to their partners on a Likert scale of 1 to 7. The independent variable Risk asked about the extent to which agents felt that they were at risk of being found to have lied later when making sales reporting decisions, on a Likert scale of 1 to 7. The independent variable "Dark Triad" is the result of the Dark Triad Personality Test.

Table 4. Determinant Analysis of the Impact of Personal Attributes of Liars on Misreporting

	Dependent variable:
	Misreporting
Wage	66.497
	(-95.040, 228.035)
Power	12.964
	(-133.376, 159.304)
Fairness	-24.417**
	(-48.311, -0.522)
Justice	-28.722*
	(-58.009, 0.564)
Senior Loyalty	-44.942***
	(-74.948, -14.935)
Partner Loyalty	24.361**
	(0.383, 48.338)
Risk	5.868
	(-20.669, 32.405)
Dark Triad	-2.529
	(-75.498, 70.440)
Gender	19.817
	(-63.037, 102.671)
Age	2.964
	(-34.978, 40.906)
Wage $\times$ Power	87.397
	(-126.497, 301.290)
Constant	853.341**
	(19.507, 1,687.175)
Observations	214
R^2	0.157
Adjusted R^2	0.111
Residual Std. Error	330.519 (df = 202)
F Statistic	3.423*** (df = 11; 202)

Residual Std. Error	317.092 (df = 1084)	316.951 (df = 1085)
F Statistic	12.156*** (df = 11; 1084)	13.380*** (df = 10; 1085)

Note: ***/**/* indicates significance at the 0.01, 0.05, and 0.10 levels, respectively. ( ) shows the confidence interval . Table 4 presents determinant analysis of the impact of personal attributes of liars on misreporting. The independent variable Fairness asked how fair the agents felt they were on a 1 to 7-point Likert scale. The independent variable Justice asked how much the agents

felt a sense of justice on a Likert scale of 1 to 7. The independent variable Senior Loyalty asked how loyal the agent felt to the principal on a Likert scale of 1 to 7. The independent variable Partner Loyalty asked how loyal agents felt to their partners on a Likert scale of 1 to 7. The independent variable Risk asked about the extent to which agents felt that they were at risk of being found to have lied later when making sales reporting decisions, on a Likert scale of 1 to 7. The independent variable "Dark Triad" is the result of the Dark Triad Personality Test.
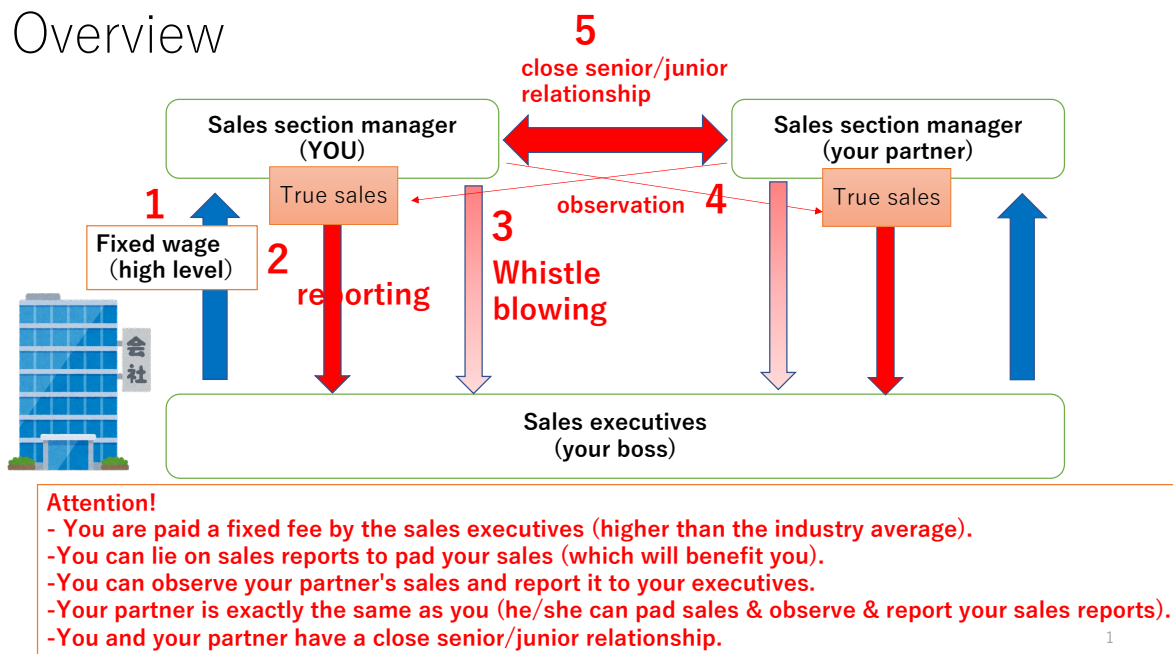
Supplementary file

S1 Instruction
The following are the instructions that were presented to the participants in our experiments. Participants are randomly assigned to only one of the two conditions and read only one scenario. The different parts of each scenario are underlined and italicized according to the conditions of the experiment. Footnotes are also underlined and italicized.

******

Thank you for agreeing to participate in this task. In today's task, you will be playing the role of a managerat a firm. You will read the following scenario.

Figure S1 Overview

Overview

5
close senior/junior relationship

Sales section manager (YOU)

True sales

Sales section manager (your partner)

True sales

1
Fixed wage (high level)

observation **4**

2

3

reporting

Whistle blowing

Sales executives (your boss)

Attention!
- You are paid a fixed fee by the sales executives (higher than the industry average).
-You can lie on sales reports to pad your sales (which will benefit you).
-You can observe your partner's sales and report it to your executives.
-Your partner is exactly the same as you (he/she can pad sales & observe & report your sales reports).
-You and your partner have a close senior/junior relationship.

- Each round in the experiment
A round consists of two stages (**Stage 1: sales reporting/ Stage 2: whistle blowing**), which are repeated for one round of practice and 8 rounds of production. Each round is independent of the other.

- Your role and fixed wages
Your role in the experiment is that of a sales section manager of project A of a company. Your partner is a sales section manager of the other project of the same company. **You and your partner each receive fixed wages of _1,000 lire <high wage condition> / 500 lire <low wage condition>_ for each round from your supervisor, the sales executives**. In this industry, the

average fixed wages for a sales manager are 750 lire. Therefore, you and your partner receive a *high <high wage condition> / low <low wage condition>* level of fixed wages compared to the industry average.

- The relationship between you and your partner
<This information is given only to participants with the power-distance condition.>
Your partner has the same position as you (Sales section manager), but because you joined the company at different times, you are in a senior/junior relationship. Since joining the company, you and your partner have been in a position to teach and be taught various things, both publicly and privately. This hierarchical relationship has been maintained over the years since you joined the firm and will continue. Your partner has an outstanding sales record and the quality of the projects she/he has executed in the past has been highly evaluated by clients. Your position as senior or junior partner is randomly determined at the start of the game and is fixed until the end (same position until the end) (but the partner itself changes each time).

- True sales information for your team
You and your partner get the true sales information for your and your partner's respective teams. **The true sales information for Project A (you) is [1000, 1050, 1100, … , 2950, 3000] lira**. The same applies to the true sales information for the other project (your partner). You and your partner share each other's true information. In other words, you know your partner's team's information. And your partner also knows information about your team. **But your boss, the sales executives, does not know this true sales information.** Your boss knows neither the realized sales nor the prior distribution (which should be between 1000 and 3000).

- Sales Reporting to your supervisor
You and your partner report your team's sales information to your supervisor. You may also report to your supervisor that you have padded your true sales. As long as it is not discovered later, this padding will be added to your profit. Here, the maximum amount of padding is plus 1000 lire. In other words, **the amount to report is an integer between [true sales] and [true sales + 1000].** As mentioned above, your supervisor does not know the true sales information. Also, you and your partner share the amounts reported to your supervisor. In other words, **you know your partner's reported amount and your partner knows your reported amount.**

- Whistleblowing
After the sales report, you may whistle-blow to your supervisor that your partner reported a lie. Your partner's team will then be investigated. If you do in fact lie, your partner's lie will surely be discovered, your partner's sales overage will be canceled, and a fine of 1000 lire will be imposed. At the same time, you will receive a reward of 1000 lire. If your whistleblowing is false, you will be fined 2000 lire. Also, your partner will be judged by the same rules as you. In other words, you may be whistle-blowed, and if so, your team will be investigated.

- Points earned in each round
Your points earned in each round are calculated as follows:

Your Points = Fixed wages 1000 + Sales padding + Reward 1000 (if any)
  - Fines for false reporting (1000) (if any) - Fines for false whistleblowing (2000) (if any)

- Reward Calculation
The additional reward you receive for this experiment is determined by the points you have earned. In other words, the more points you earn in the game, the larger the amount of additional reward you will receive. The points you earn in the experiment will be determined by extracting one round out of the 8 rounds of the main game. This round will be determined by a roulette after the experiment. The conversion rate between points earned in the game and your additional reward: 10 points per round, the additional reward of 6.66 JPN.