Southeast Asian Journal of Economics Vol.14(1), April 2026: 123-164
Received: June 7, 2024
Revision: January 31, 2025
Accepted: March 19, 2025

Inequitable Pay and Work Performance: Evidence from Lab Experiments in Thailand

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Abstract

While inequitable pay can hurt morale among disadvantaged workers, it is not clear whether it affects work performance. This paper examines how inequitable compensation affects work performance using lab experiments among university students aged mostly between 18 and 22. Results show that compensation disadvantage improves performance but lowers satisfaction when unequal treatment is arbitrary. The lower satisfaction seems to result from the perception of unfairness, and that perception became clearer after subjects experienced unfair treatment. Disadvantaged subjects seem to try to increase their effort to match the outcome of advantaged peers. When unequal treatment is a result of competition, the performance of disadvantaged subjects is not higher than that of the control group. As such, unequal treatment is undesirable from the perspective of worker satisfaction, but is desirable when considering performance. This evidence supports anti-discrimination policies, as firms have an incentive to improve performance under discriminatory practices that undermine social justice and worker well-being.

Keywords: compensation, unequal pay, real effort experiment, work performance, experiments, wage discrimination.

1. Introduction

Scholars and practitioners have long recognized the role of compensation as a motivator for employees in organizations (Werner & Ward, 2004), with different schemes being appropriate for different conditions (Lazear, 1991). A key consideration in organizational wage practices is the perception of equity and fairness in pay structures (Rees, 1993). Compensation systems perceived as inequitable can undermine motivational potential, leading to dissatisfaction and disengagement among employees. Discrimination, in particular, directly challenges notions of fairness, fostering a sense of injustice that can negatively impact both individual performance and organizational outcomes. Understanding how inequitable pay affects worker behavior, beyond its psychological effects, is essential to fully grasping its impact.

Pay disadvantages may reduce workers' performance by diminishing engagement, motivation, and effort. Discriminated workers may withdraw from actively contributing if they perceive their efforts are not fairly rewarded. Alternatively, they might withhold effort as a form of retaliation, signaling their dissatisfaction and indirectly penalizing the employer. However, it is also possible that discriminatory practices do not necessarily reduce workers' effort and performance. When faced with unequal pay for equal work, discriminated workers may exert additional effort to prove their worth and close the gap between themselves and their advantaged counterparts. This response could lead to higher productivity or even skill development as a survival mechanism within an unfair system. Nonetheless, such efforts may result in emotional and psychological strain, ultimately undermining long-term well-being.

This paper investigates the effect of compensation disadvantages on work performance through laboratory experiments, comparing performance under equal and unequal piece-rate compensation schemes. It contributes to the existing understanding of wage discrimination by examining its impact beyond the

psychological effects on those who are disadvantaged. The primary experimental manipulation involves offering a higher pay per unit of work to a select few in the treatment group, while maintaining wage equality in the control group. Piece-rate compensation is used to facilitate interpretation. The findings indicate that disadvantage in piece-rate pay leads to improved performance but lower satisfaction among participants, supporting the hypothesis that discriminated workers increase their effort and performance as a response mechanism to perceived unfair treatment.

The research question has significant implications for business practices and the labor market. If discrimination lowers productivity by reducing morale or creating a sense of unfair treatment among workers, the market mechanism would systematically penalize discriminatory firms. However, if unfair treatment does not discourage workers to the extent that it reduces productivity, discriminatory firms may not face market penalties. This issue is particularly concerning in labor markets where employers hold a strong bargaining position, such as in cases of labor oversupply, and employees have limited outside options. In such markets, workers may be forced to accept discriminatory or otherwise unfair practices.

Previous research has linked simple wage comparisons to worker satisfaction (Brown, 2001), indicating that workers tend to be more satisfied with a given wage level if it compares favorably to their reference points. Other studies have explored the relationship between wage inequities and factors such as worker productivity and work quality (Adams & Jacobsen, 1964; Breza et al., 2018), as well as quit rates (Dube et al., 2019). When discrimination is recognized and causes resentment, workers may respond by protesting or terminating their employment. However, in labor markets with limited alternatives, such as those characterized by an oversupply of labor, quitting may not be a viable option. In such circumstances, and given workers' inherent drive to achieve a more favorable wage position, it may be rational to exert even greater effort in response to discrimination.

Inequitable compensation, particularly wage discrimination, can have significant ramifications for worker morale, influencing attitudes and engagement, both of which are critical to performance (Breza et al., 2018). When workers perceive their compensation as unfair, their intrinsic motivation may decline, resulting in reduced commitment and lower productivity. This demoralization can manifest in various ways, such as decreased effort, withdrawal from collaborative activities, or even intentional underperformance. The psychological burden of inequitable compensation, driven by feelings of undervaluation and injustice, is likely to diminish a worker's willingness to exert effort, directly affecting overall efficiency and output. These effects highlight the broader implications of pay inequality on performance, emphasizing its importance for both individuals and organizations.

Both wage transparency and equity continue to garner attention from practitioners and academics (Greiner et al., 2011; Mas, 2017). If inequitable compensation negatively impacts performance, it could have significant implications for companies that inadvertently or deliberately implement unequal pay structures. Conversely, if workers strategically adjust their behavior in response to wage discrimination by increasing effort to counterbalance the inequality, inequitable compensation may not necessarily suppress performance but could affect individuals in more nuanced ways. Understanding these dynamics is crucial for developing compensation policies that foster both fairness and productivity in the workplace.

Despite extensive research on compensation structures and employee motivation (Akerlof & Yellen, 1990a; Rees, 1993), a gap remains in the literature linking inequitable compensation to individual performance outcomes. This gap is particularly notable given that performance is a critical concern for both workers and employers. Understanding how compensation inequality influences performance is essential for both economic theory and managerial practice. Investigating this direct

link can provide deeper insights into whether wage inequities primarily affect the psychological state of workers or lead to measurable differences in output. This research aims to provide empirical evidence on the impact of inequitable compensation on work performance. By directly linking wage discrimination to performance outcomes, the findings could inform organizational and public policies while contributing to broader debates on wage equity. Additionally, the results may enhance economic models of labor market behavior, offering new perspectives on how compensation dynamics influence worker productivity and firm performance.

The experimental method provides greater confidence in identifying the causal mechanism underlying the relationship between compensation structures and performance. By utilizing controlled settings, laboratory experiments can isolate the effects of compensation while minimizing confounding factors that are challenging to control in real-world observational studies. This approach addresses the common limitation of scarce secondary data on individual performance and compensation equity, allowing researchers to manipulate key variables and directly observe their impact on participants' behavior. Furthermore, lab experiments facilitate precise measurement of performance, which is often difficult to capture accurately in field settings.

Lab experiments have important limitations. The artificial setting may not fully capture the complexity of real-world work environments, and the use of college students as subjects in this study raises concerns about the generalizability of the findings to the broader workforce. College students may not face the same pressures, incentives, or responsibilities as working professionals, which could influence their responses to inequitable compensation. However, college students represent the future workforce, and their behavioral responses in controlled experiments can still provide valuable insights. As they transition into the labor market, understanding their behavior can offer useful foresight into the dynamics of the future workforce.

The next section reviews the relevant literature, followed by a description of the experiment and an interpretation of the results. A theoretical discussion is then presented to clarify key concepts and facilitate a clearer understanding of the findings. This is followed by a detailed presentation and discussion of the experimental results. The paper concludes with final remarks, an acknowledgment of the study's limitations, and suggestions for future research directions.

2. Literature Review

When individuals seek to maximize only their own utility, unfair compensation has no impact on effort and performance, as comparisons with others are considered irrelevant. In this case, effort is influenced solely by the absolute level of compensation, provided it affects the marginal utility of effort. However, research suggests that individuals experience a loss in utility when they are paid less than their peers. Card et al. (2012) found that U.S. employees earning below the median wage among similar workers report lower job satisfaction compared to those earning above the median. Additionally, anecdotal evidence suggests that such effects influence wage structures within organizations (Rees, 1993).

Compensation perceived as unfair can also negatively impact work performance. In a seminal paper, Akerlof and Yellen (1990) introduce and provide empirical support for the "fair wage-effort" hypothesis, which posits that effort levels are influenced by workers' perceptions of wage fairness (Akerlof & Yellen, 1990). Laboratory experiments have shown that "employers" often offer wages above market-clearing levels to elicit higher effort, while "employees" reciprocate by exerting greater effort (Fehr et al., 1993). Additionally, lower-paid workers tend to shirk more when pay information is transparent (Greiner et al., 2011). Furthermore, principal-agent experiments indicate that the share of labor surplus is positively correlated with contract acceptance (Anderhub et al., 2002), implying that a smaller share of surplus may reduce the attractiveness of the contract and

potentially lower effort levels. The same study also finds that subjects exert effort beyond optimal levels when engaged in contracts perceived as better-than-fair (Anderhub et al., 2002).

In addition to fairness in employer-employee profit sharing, evidence suggests that unequal pay among workers can significantly impact work outcomes. A field experiment found that cutting wages in half negatively affected performance to a greater extent when the wage cut did not apply to other workers (Cohn et al., 2014).

An individual's rank within the pay distribution has also been shown to have a substantial effect on work performance (Clark et al., 2010) and to negatively impact job satisfaction (Brown et al., 2008). Laboratory experiments further indicate that awareness of a more favorable pay scheme for others leads to reductions in labor supply (Bracha et al., 2015) and decreased work effort (Burchett & Willoughby, 2004). Moreover, compensation disadvantages can trigger a "discouragement effect" (Ku & Salmon, 2012), causing disadvantaged workers to reduce their effort levels.

An unequal pay environment can also lead to increased worker effort and productivity. While some evidence suggests that wage discrimination does not necessarily enhance effort (Gächter & Thöni, 2010), it may, in some cases, motivate workers to exert more effort. Workers might adjust their reference points and expectations upward in response to pay disparities. Empirical evidence from the Thai academic context supports the influence of peer comparisons, though nuances exist that warrant further investigation (Sampattavanija & Sujarittanonta, 2016). Experimental research by Abeler et al. (2011) shows that when individuals have higher earnings expectations, they tend to work longer and earn more. Additionally, resentment stemming from perceived injustice may not always be strong enough to impact performance, and over time, individuals may come to accept their current status. Charness and Kuhn (2007) find no negative effects of coworkers' wages on

individual effort in laboratory experiments. Furthermore, research by Liu-Kiel et al. (2013) indicates that unequal pay can initially boost effort and performance, although this effect tends to diminish over time. The competitive aspect of unequal pay may also drive greater effort, as Gneezy and Rustichini (2004) find that competition enhances performance, with a stronger effect observed among boys compared to girls.

Wage inequality may elicit varying levels of effort and satisfaction depending on how it is perceived. A "fair" or "justified" inequality may be deemed acceptable and have no adverse effects. Research suggests that the negative impact of pay disadvantages stems more from the perceived intentions behind the inequality rather than the inequality itself (Gächter & Thöni, 2010). Bolton and Werner (2016) find that disadvantageous wage positions do not negatively affect effort when individuals perceive them as justified. Additionally, workers at different career stages may respond differently to wage discrimination, and the nature of the task itself may influence their reactions.

The broader impact of unfair compensation on other important job outcomes warrants further investigation. Pay inequality can be examined through the lens of organizational justice, particularly equity and procedural justice (Werner & Ward, 2004). Studies have found that pay inequity (Bing & Burroughs, 2001) and perceived underpayment (Werner & Mero, 1999) are negatively associated with performance. Furthermore, perceptions of injustice have been shown to affect job satisfaction (Fields et al., 2000; O'Neill & Mone, 1998), organizational commitment, intentions to stay (Fields et al., 2000; Sweeney & McFarlin, 1997), as well as innovative work behavior (Janssen, 2000). While these factors are closely linked to work performance, they fall beyond the scope of the present study.

Studying this phenomenon using observational data or field experiments is prohibitively costly. Investigating the relationship econometrically would require comprehensive records of work performance and pay levels across a diverse range

of pay schemes, which are often unavailable or difficult to obtain. Alternatively, conducting controlled experiments in actual work environments presents significant logistical and financial challenges. Breza et al. (2018) addressed this issue by exploring the effects of pay inequality on productivity in a real-world setting. Their study compared situations where pay inequality resulted from actual productivity differences versus cases where productivity was difficult to observe. The findings suggest that in the latter scenario, workers perceive compensation as unfair and respond by reducing their effort, ultimately leading to lower productivity.

A key challenge in studying compensation equity using data is determining whether pay structures are truly equitable. One possible approach is to supplement quantitative data with employee surveys that capture perceptions of equity. Firm-level data serves as a valuable resource for examining the relationship between firm characteristics and worker outcomes and has been utilized in previous research. For example, Iranzo et al. (2008) used a dataset of Italian manufacturing firms matched with individual worker records to analyze the impact of within-firm skill dispersion on firm productivity. Similarly, Brown et al. (2008) leveraged firm-level data to investigate the effect of wage rank on worker satisfaction. Such data could provide valuable insights for future studies exploring the interplay between worker productivity and firm characteristics.

Previous studies have used experiments to examine the determinants of individual effort. Charness et al. (2018) compared the "stated-effort" and "real-effort" approaches used in prior research. The stated-effort approach minimizes confusion in respondents' calculation of costs and benefits; however, the responses may not accurately reflect real-world behavior. In contrast, the real-effort approach more closely mirrors actual work scenarios, but the unknown cost of effort limits its applicability for testing certain theoretical predictions (Charness et al., 2018). For the present study, the real-effort approach appears more suitable, as the primary focus is on actual work output. While laboratory experiments help address data

limitations, their restricted scope may limit the generalizability of the findings to the broader population.

3. Theoretical Discussion

The effect of discrimination on work performance is an empirical question, and a model is useful for interpreting empirical findings. We focus on effort as the mediator through which discrimination affects performance. Following Liu-Kiel et al. (2013), the model starts with a workers' utility function *U*, determined by the workers' surplus from providing work effort *e* as

$$U(e) = pv(e) - c(e) \tag{1}$$

The surplus utility is the difference between the payoff from work *pv(e)* where p is the piece rate, v is a production function, and c is the cost function.

We invoke Fehr and Smidt's (1999) inequity aversion equation and write a utility function with a comparison preference as

$$U(e) = pv(e) - c(e) - \alpha\big(S - pv(e)\big) \tag{2}$$

The parameter α denotes the degree to which individuals care about comparison with reference payoff *S*, which is given by

$$S = \tilde{p}v(\tilde{e}) \tag{3}$$

We assume that the relevant comparison is with respect to total payoff, not the net. This seems more plausible since agents typically only observe others' payoff and not their costs. The disadvantaged worker does not observe the reference's effort level $\tilde{e}$ and the piece rate $\tilde{p}$ nor make assumptions on them. Thus, the optimal effort level is given by

$$U'(e^*) = pv'(e^*) - c'(e^*) + \alpha pv'(e^*) = 0 \tag{4}$$

which simplifies to

$$U'(e^*) = (1+\alpha)pv'(e^*) - c'(e^*) = 0 \tag{5}$$

Using the implicit function theorem, this becomes

$$\frac{de^*}{d\alpha} = -\frac{pv'(e^*)}{U''(e^*)} > 0 \tag{6}$$

The comparison preference parameter α increases the optimal level of effort, since it raises the marginal utility of effort.

The reference payoff S can affect effort only if the comparison preference parameter α is a function of the reference payoff S. This can happen with a concave utility where getting less than others affects agents more than getting more, since agents expect a payoff equal to the reference payoff. In this situation, a higher reference payoff induces more effort through a stronger comparison preference. With this assumption, the effect of reference payoff on optimal effort is

$$\frac{de^*}{dS} = \frac{de^*}{d\alpha} \cdot \frac{d\alpha}{dS} = -\frac{pv'(e^*)}{U''(e^*)} \cdot \frac{d\alpha}{dS} > 0 \tag{7}$$

Thus, the model predicts that a larger reference payoff S increases effort. However, a larger reference payoff that is perceived as discrimination or injustice may reduce effort by discouraging workers. One way to incorporate this possibility is to view the discouragement as an increase in the marginal cost of effort. We can expand equation (4) to include this possibility as

$$U(e) = pv(e) - c(e) - \alpha(S)\big(S - pv(e)\big) - \beta(\tilde{p} - p)c(e) \tag{8}$$

The sense of injustice raises the marginal cost of effort by a factor β of the piece-rate difference $(\tilde{p} - p)$. The first order condition with respect to e is thus

$$U'(e^*) = (1+\alpha)pv'(e^*) - \big(1 + \beta(\tilde{p} - p)\big)c'(e^*) = 0 \tag{9}$$

Given that S is partially and positively determined by the reference piece-rate $\tilde{p}$, the effect of $\tilde{p}$ on optimal effort is

$$\frac{de^*}{d\tilde{p}} = -\frac{pv'(e^*)}{U''(e^*)} \cdot \frac{d\alpha}{dS} \cdot \frac{dS}{d\tilde{p}} - \frac{-\beta c'(e^*)}{U''(e^*)} \gtreqless 0 \tag{10}$$

The first term of the condition is positive, while the second term is negative. The disadvantage of piece-rate thus exerts two effects. First, the disadvantage causes S to be relatively higher for any effort level. Second, the disadvantage has a root cause in an unequal piece rate, or discrimination. We refer to the former as the "peer comparison" effect, and the latter as the "discrimination" effect. The peer comparison effect induces more effort, and the unequal piece-rate effect reduces effort. The net effect is an empirical question whose answer will depend on context and other aspects of the population under study.

4. Methodology

This paper utilizes lab experiments to examine the impact of compensation structures on work performance by comparing performance outcomes under equal and unequal pay conditions. The experiments are conducted with university students, and while there are limitations regarding the generalizability of the findings to the broader working-age population, this demographic is set to enter the labor market, making their behavior relevant. Furthermore, the study offers a fresh cultural perspective, as the sample is drawn from a middle-income Asian country, contributing to the broader understanding of compensation dynamics across different economic and cultural contexts.

The task used in our experiment to evaluate performance does not require technical knowledge or specialized training. Previous studies have employed

cognitive tasks such as solving puzzles, adding numbers, and counting characters, as well as physical tasks like stuffing envelopes or cracking nuts (Charness et al., 2018). In our experiment, participants are provided with a bag containing rigid palm-sized cards numbered 1 to 5. Their task is to arrange the cards in numerical order and secure each completed set with a rubber band to earn compensation. Participants have one minute to complete as many sets as possible in each round, and the experiment consists of ten rounds in total. The primary outcome of interest is the number of units completed per round. While all experiment groups perform the same task, they differ in terms of the compensation structure, as summarized in Table 1 below.

Table 1. Summary of compensation structure by treatment group

Pay details	**Control**	**T1**	**T2**	**T3**
Piece-rate	20 THB/unit	20 THB/unit	20 THB/unit	20 THB/unit
Bonus rounds	None	3 rounds	3 rounds	3 rounds
Bonus recipients	None	Everyone	Chosen randomly	Chosen by competition
Piece-rate in bonus rounds	20*4.5 = 90 THB/unit	20*4.5 = 90 THB/unit	20*4.5 = 90 THB/unit	20*4.5 = 90 THB/unit

All subjects across groups receive a participation fee of 150 THB. In the control group, participants are compensated with an identical piece rate based on the number of completed card stacks, earning 20 THB (approximately 0.60 USD at the time of writing) per stack. The final take-home pay is calculated as the average payout across all rounds.

The experimental groups differ in terms of the presence of "bonus rounds," where scores are magnified, and in the allocation of these bonuses. The score, measured in "points," is defined as the number of completed card stacks. In Treatment 1, participants receive the same piece rate as those in the control group; however, they experience three unannounced bonus rounds in which their scores are multiplied by 4.5 before calculating per-round averages. These bonus rounds occur

in rounds 3, 5, and 7, strategically placed to be evenly distributed throughout the experiment.

The multiplier of 4.5 was chosen to ensure that the bonus pay is clearly distinguishable from regular pay. Participants are not informed in advance about the bonus rounds but are made aware of them immediately at the end of each round. This treatment aims to assess whether the introduction of a bonus that increases the piece rate can enhance performance, as suggested in the theoretical framework.

Treatment 2 is the primary focus of this study. In this treatment, four subjects are arbitrarily selected to receive bonus rounds before the experiment begins. The bonus rounds function in the same manner as in Treatment 1, with scores being multiplied by 4.5. The selection process is conducted by the experiment staff, and while the chosen subjects are announced to the group, the selection process lacks transparency to emphasize its arbitrary nature. The staff simply state that they have selected these individuals, without providing any rationale. Participants are informed of their selection status before the experiment starts. This treatment is designed to simulate "favoritism," where a select few receive higher compensation for identical work, potentially fostering perceptions of unfairness.

In Treatment 3, seven subjects receive three bonus rounds, identical in structure to those in Treatments 1 and 2. However, the selection process is based on merit, where participants compete in an unrelated word-finding task prior to the experiment, and the top four highest scorers are awarded the bonuses. This treatment aims to evaluate the hypothesis that when participants perceive wage disparities as justified, they may be less affected by the inequality (Bolton & Werner, 2016).

There is a possibility that non-bonus recipients in Treatments 2 and 3 may differ due to the different selection processes for bonus recipients. However, while performance in the word-finding task used in Treatment 3 may reflect certain cognitive abilities that overlap with card-stacking, the two tasks require distinct skill sets, such as physical coordination versus observational skills. Furthermore, an

analysis of the word-finding scores reveals a tendency to cluster, suggesting that participants exhibit relatively similar abilities in that task. This clustering reduces the likelihood of significant differences in baseline capabilities among participants, helping to mitigate concerns about selection bias.

4.1 The Experiment Process

The research team announced the experiment through Facebook groups that are widely used by students at the university. Interested students signed up via an attached link, where they indicated their preferred experiment times. However, not all participants were assigned their preferred time slots, as scheduling was determined to ensure a balanced allocation across treatment and control groups. Consequently, some students who could not accommodate their assigned times did not participate in the experiment. The final pool of participants consisted of 24 individuals in the control group, 20 in Treatment 1, and 21 participants each in Treatments 2 and 3.

In the experiment room, subjects are seated at individual tables and provided with a bag containing eight sets of cards, each numbered 1 to 5 and mixed together. They have one minute to arrange as many stacks of five cards in ascending order as possible, following the specified instructions. At the end of each round, their completed work is collected, and scores are recorded.

The scores are displayed on a classroom projector for all participants to see, with each subject's identity concealed using aliases. Additionally, the "current payout" is shown, representing the amount each subject would earn if their performance remained consistent for the remaining rounds. The current payouts for all participants in the session are visible, allowing subjects to compare their performance with others while maintaining anonymity. This setup is designed to introduce a social comparison element and enhance engagement with the compensation structure.

At the beginning of the experiment, the staff provide a detailed explanation of the game rules and compensation structure, followed by a mock round to familiarize participants with the process. The mock round involves actual gameplay, including timing, score collection, and the display of "current payout," the amount participants would earn if the round were their final one, along with their average number of completed sets.

Following the mock round, participants complete a questionnaire designed to assess their understanding of the game and their perceptions of various aspects. The questionnaire includes questions about how fair they perceive the game to be, the level of effort they intend to put in versus the effort they actually exert, and their satisfaction with the payout.

For Treatments 2 and 3, the selection and announcement of bonus recipients occur after the mock round and before participants complete the questionnaire. This timing ensures that participants in these treatments are aware of their selection status before responding to questions about their perceptions and expectations.

The game begins after participants complete the initial questionnaire. Each round lasts for one minute, followed by approximately eight minutes to count the completed sets and report the scores. A classroom projector displays all scores, allowing participants to view their performance and compare their results with others anonymously. The experiment consists of 10 rounds in total.

For the treatment groups, the staff announce each bonus round only after it has been completed. This approach ensures that bonus rounds do not create an immediate incentive effect, as participants are unaware of them beforehand. However, since participants know there are only three bonus rounds, they will realize after the third bonus round that no further bonuses will be awarded. This awareness may influence effort and performance in the remaining rounds, with the effect expected to be more pronounced in Treatment 1 and among the few bonus recipients in Treatments 2 and 3.

At the end of the 10 rounds, the final scores and payouts are summarized and displayed. Participants then complete a post-game questionnaire, which includes questions about their perceived effort levels, satisfaction with their earnings, and their assessment of the game's fairness.

5. Results

5.1 Descriptive Statistics and Average Score

Table 2 below presents the summary statistics of participants across the different experimental groups. The study sample consists of 86 Thai university students, primarily aged 19 to 22, with four participants aged 23. Since each participant completed 10 rounds, the total number of observations amounts to 860. Approximately three-quarters of the participants are female, and the majority are in their fourth (senior) year of study. Across all experimental groups, most participants (ranging from 57% to 86%) come from Social Sciences faculties.

Table 2. Descriptive statistics of the subjects pool

Variable	**Control**	**T 1**	**T 2**	**T 3**	**All**
Average Score	4.6	4.7	5.4	4.7	4.8
Age	21.0	20.6	21.1	21.1	20.9
Female (%)	79%	65%	71%	67%	71%
Freshman (1st year, %)	4%	20%	0%	15%	9%
Sophomore (2nd year, %)	17%	25%	24%	25%	22%
Junior (3rd year, %)	25%	20%	43%	15%	26%
Senior (4th year, %)	54%	35%	33%	40%	41%
Social Science (%)	75.0%	70.0%	85.7%	57.1%	72.1%
Number of subjects	24	20	21	21*	86

Note: One subject reported being a 5th year student.

In terms of task performance, participants in Treatment 2 achieved the highest average score, completing an average of 5.4 sets of cards per round. This is notably

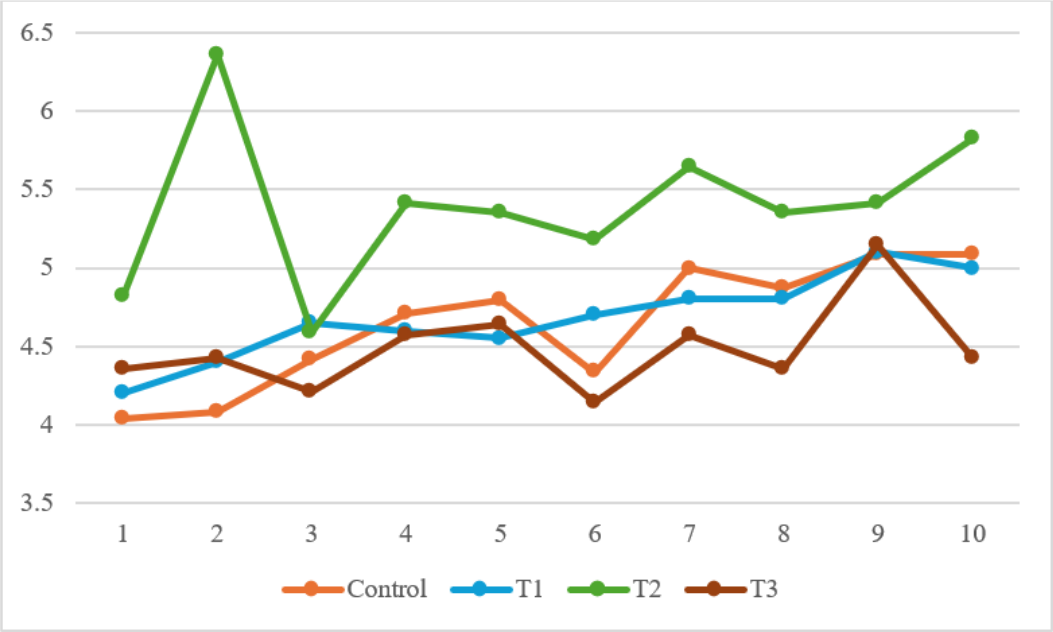
higher than the average scores of participants in other groups, which range between 4.6 and 4.7 sets per round. The majority of participants are sophomores or higher.

Subjects come from a variety of faculties and majors, and these factors will be controlled for in subsequent analyses to account for potential differences in background. To provide further insights into performance variations across groups, Figure 1 presents the plot of average scores across all rounds for each experimental group. For Treatments 2 and 3, the figure includes only those participants who were *not* selected to receive bonus rounds, ensuring a focus on the impact of perceived unfairness.

The plots indicate that participants in Treatment 2, which simulates arbitrary discrimination, achieved higher average scores than all other groups in nearly every round, except for round 3. Interestingly, the trend of dips and spikes in performance is consistent across multiple rounds for all groups, suggesting potential shared influences such as fatigue or learning effects over time.

Notably, in the final round, while most groups exhibited a decline in average scores, possibly due to fatigue or reduced motivation, participants in Treatment 2 displayed a significant spike. This pattern may suggest a “last-ditch effort” by participants in Treatment 2, potentially driven by a desire to compensate for perceived unfair treatment or to demonstrate their capabilities despite the arbitrary bonus allocation.

Figure 1. Average score by round and treatment group



Since participants do not know in advance which rounds will be bonus rounds, the incentive is not expected to influence performance on a round-by-round basis. Instead, its effect should be distributed relatively evenly across all rounds. However, there may be a psychological component at play: The occurrence of a bonus round could create an expectation of future bonuses, subtly influencing effort levels.

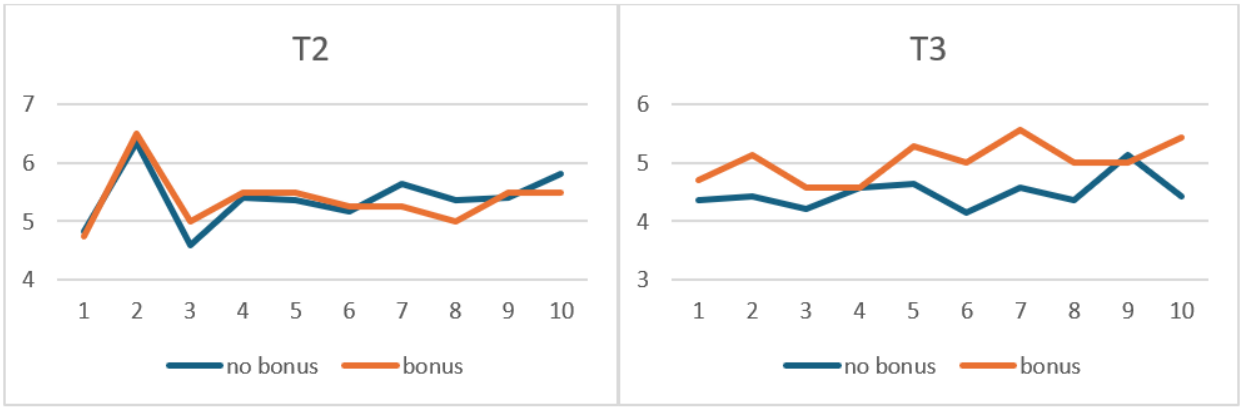
After the first bonus round (round 3), participants in Treatments 2 and 3 exhibited a surge in performance, while those in Treatment 1 experienced a slight decline. Interestingly, this trend reversed in subsequent bonus rounds (rounds 5 and 7), where Treatment 2 and 3 participants showed a decline in effort, possibly reflecting a psychological response to the pay disparity. The initial spike in Treatments 2 and 3 may indicate heightened awareness of the wage gap between bonus and non-bonus recipients, prompting an increase in effort as participants strive to prove their worth. However, the subsequent dips could suggest a sense of discouragement or resignation after repeatedly observing the significant pay difference.

In contrast, subjects in Treatment 1 demonstrated a steady improvement across all rounds, suggesting that the knowledge of group-wide bonuses might foster sustained motivation without the same level of perceived unfairness experienced in Treatments 2 and 3.

It is also crucial to analyze how the bonuses impact subjects differently based on whether they received them or not. The differential responses between bonus recipients and non-recipients can provide valuable insights into the psychological and behavioral effects of perceived inequity in compensation structures. Figure 2 illustrates the variation in scores between bonus recipients and non-recipients in Treatments 2 and 3. While the differences are not always pronounced, a discernible pattern emerges.

In Treatment 2, where bonus recipients were randomly selected, non-bonus recipients tended to perform better in the later rounds, with a notable spike in the final round. This pattern suggests that non-recipients may be increasing their effort over time, possibly as a response to perceived unfairness and a desire to improve their relative standing. The observed last-round surge could indicate a final push to prove their capabilities or to close the perceived gap with the bonus recipients.

Figure 2. Average scores by round and bonus recipients



Conversely, in Treatment 3, where bonuses were awarded based on demonstrated skill in a prior task, non-bonus recipients exhibited a decline in performance during the last round. This drop-off may suggest that these participants,

having already recognized the skill-based rationale behind the bonus allocation, gradually accepted their lower standing and saw little incentive to exert additional effort. The absence of a final surge in Treatment 3, unlike in Treatment 2, implies that when pay inequality is perceived as justified, individuals may be less inclined to respond competitively.

5.2 Task Performance

Our primary measure of performance is the number of correctly arranged card sets completed in each round, with a higher count interpreted as an indicator of greater effort. To examine differences in this effort measure across experimental groups,
we estimate the following linear regression model:

$$score_{ir} = \beta_0 + \delta_1 treat\_1_i + \delta_2 treat\_2_i + \delta_3 treat\_3_i + X\gamma + u_{ir} \qquad (11)$$

The outcome variable *score* is the number of sets of cards arranged and tied correctly by person *i* in round *r*, and *treat_1*, *treat_2*, and *treat_3* are binary variables indicating treatment groups 1, 2, and 3, respectively. The control group is the reference. Among the control variables are age, an indicator for female, an indicator for Social Sciences Faculty (Soc. Sci.), and an indicator for late rounds (lateround, rounds 6 and above). To account for within-subject correlation across rounds, standard errors are clustered at the individual participant level.

Table 3 presents the regression results. For all models, bonus recipients in Treatments 2 and 3 are excluded from the estimation to isolate the effect of perceived inequity among non-recipients. In the baseline regression without control variables (Model 1), participants in Treatment 2 scored approximately 0.752 points higher than those in the control group, while scores in Treatments 1 and 3 showed no significant difference from the control group.

Table 3. Regression results for *score*

	(1)	(2)	(3)	(4)	(5)

T1	0.038	0.048	0.036	0.036	0.07
	[0.195]	[0.204]	[0.203]	[0.203]	[0.211]
T2	0.752***	0.729***	0.743***	0.743***	0.888***
	[0.236]	[0.231]	[0.229]	[0.230]	[0.244]
T3	-0.156	-0.2	-0.196	-0.196	-0.005
	[0.275]	[0.279]	[0.270]	[0.270]	[0.258]
Age		0.06	0.06	0.06	0.06
		[0.055]	[0.057]	[0.057]	[0.057]
Female		-0.085	-0.094	-0.094	-0.094
		[0.176]	[0.171]	[0.171]	[0.172]
Soc. Sci			-0.204	-0.204	-0.204
			[0.178]	[0.178]	[0.178]
lateround				0.312***	0.467***
				[0.077]	[0.157]
T1 x late					-0.067
					[0.191]
T2 x late					-0.29
					[0.256]
T3 x late					-0.381**
					[0.177]
Constant	4.642***	3.459***	3.614***	3.458***	3.381***
	[0.163]	[1.187]	[1.169]	[1.170]	[1.168]
Observations	750	750	750	750	750
Adjusted R^2	0.074	0.080	0.084	0.100	0.101

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; All models exclude bonus recipients. Standard errors in parentheses, clustered by individual subject. All models control for "round" fixed effects.

As anticipated, personal characteristics, such as age, gender, and faculty, do not significantly influence card-stacking performance. The coefficients for these variables are statistically insignificant, and their inclusion in the model does not substantially alter the main results (Models 2 and 3). In Model 3, when controlling for the Social Sciences faculty indicator (Soc. Sci.), the positive effect of Treatment 2 is slightly amplified, suggesting a potential faculty-related difference in effort levels.

Model 4 introduces an additional control variable for late rounds (rounds 6 and above) to account for potential learning effects over time. The coefficient for the late-round indicator is positive and statistically significant at 0.312, indicating that participants tend to achieve higher scores in later rounds, likely due to improved familiarity with the task. However, the estimated treatment effects remain largely consistent across models, reinforcing the robustness of the results.

Overall, these findings suggest that the arbitrary discrimination in Treatment 2 motivates participants to exert more effort compared to the equal-pay control group, while the structured discrimination in Treatment 3 does not appear to have a significant effect.

The effects of treatment manipulations may become more pronounced as participants observe several rounds of results and "learn" from their experiences, potentially leading to varying late-round effects across treatment groups. To investigate this possibility, interaction terms between the treatment groups and the late-round indicator were included in the regression model. Model 5 presents the results of this analysis. Incorporating these interaction terms does not substantially alter the main findings, though the estimated effect of Treatment 2 increases slightly to 0.888 points, reinforcing the earlier conclusion that arbitrary discrimination may encourage greater effort among non-bonus recipients in this group.

While the late-round indicator generally leads to improved performance across all experiment groups, its effect is significantly smaller among non-bonus participants in Treatment 3, as indicated by the interaction term coefficient of -0.381, which is statistically significant at the 5% level. This finding suggests that non-bonus participants in Treatment 3 may gradually reduce their effort, likely as they reconcile with their lower status and perceive their performance potential as predetermined.

The increase in performance among discriminated subjects in Treatment 2 suggests that these individuals may be attempting to compensate for perceived inequity or avoiding being left behind in terms of payoff or recognition. The selective

nature of the bonus may have reframed the task, not merely as an individual challenge, but as one involving social competition, thereby enhancing motivation among those who were not rewarded.

However, it is important to acknowledge that the observed performance boost could also be influenced by unobserved factors beyond the personal characteristics controlled for in the model, such as the overall atmosphere or group dynamics. Notably, improved performance in Treatment 2 is evident from the very first round for both bonus and non-bonus recipients, which suggests the possibility of external influences beyond the experimental design.

Nonetheless, the summary statistics provide further support for the interpretation that perceived inequity drives effort among non-bonus recipients. Specifically, performance improvements are observed across rounds only among non-bonus participants, whereas no such improvements are evident among bonus recipients.

This pattern aligns with the notion that those excluded from the bonus may exert additional effort over time to cope with the perceived unfairness, while bonus recipients maintain a steady level of output.

The presence of bonus rounds for all participants in Treatment 1 does not lead to increased performance. Participants may see the bonus as insignificant or feel they are already giving their best effort. The equal distribution of the bonus could have normalized it as part of their expected compensation rather than as a reward for extra effort, reducing its motivational effect. Additionally, the lack of improvement may suggest that participants are either intrinsically motivated or limited by their abilities, making the bonus less impactful.

In Treatment 3, where bonus recipients were selected based on competition in a separate task, non-bonus recipients did not show any improvement in performance, unlike in the arbitrary bonus treatment. Since the bonus was linked to a competitive process, non-recipients may have viewed the outcome as a fair

reflection of ability differences. As a result, they may have felt less motivated to improve their performance, accepting the payout gap as something beyond their control. This perception likely reduced their drive to challenge or outperform bonus recipients, leading to a more passive approach to the task.

Considering the theoretical discussions, these findings suggest that the peer comparison effect is the primary driver of behavioral responses to unfair compensation. The higher pay received by a select few bonus recipients has a net effect of increasing effort and, consequently, output performance. However, peer comparison operates through multiple stages, and the current results do not clarify which stage(s) play the most significant role. Specifically, the theoretical model hypothesizes that this effect depends on the reference (unequal) income *S*, inequality sensitivity α, and the marginal utility of effort $pv'(e^*)$. The findings indicate that these factors collectively drive participants to exert greater effort due to unfavorable peer comparisons. Further tests with possibly a different experimental design are needed to identify the independent effects of each factor above.

5.3 Fairness Perception and Satisfaction

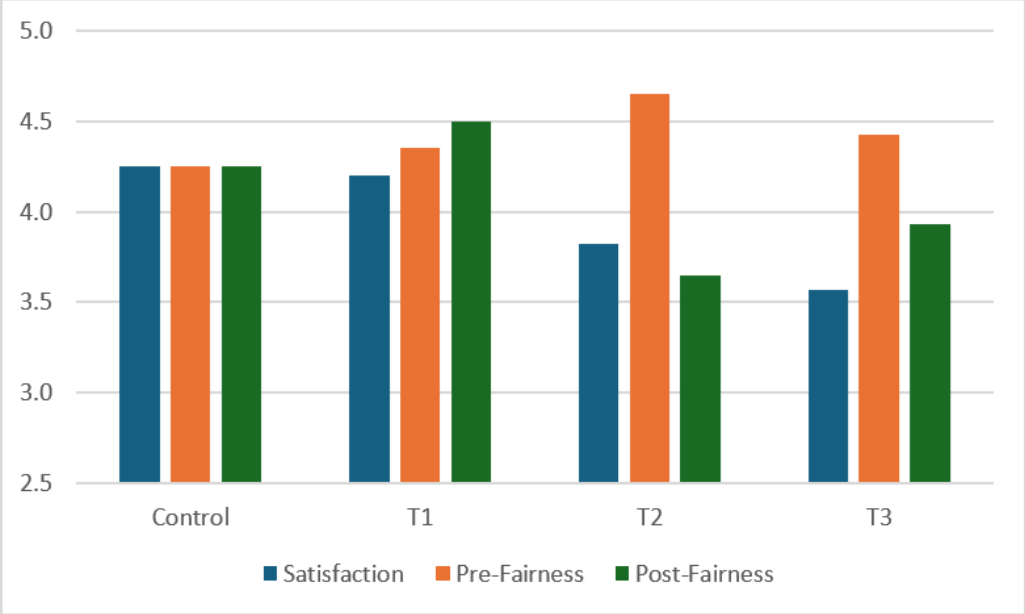
While the results suggest that unequal pay can motivate better performance, such a scheme may not be sustainable if participants are dissatisfied. As discussed in the theoretical framework, unfair compensation negatively impacts work performance, primarily by increasing the perceived cost of effort β due to a distaste for unfairness. Over time, they may reduce their effort, settle into a low-effort, low-reward cycle, or quit altogether. Research indicates that lower job satisfaction, strongly influenced by compensation, is linked to higher quit rates (Shields & Ward, 2001). Underpayment relative to a worker's reference group has also been found to negatively impact satisfaction with pay levels (Brown, 2001).

Satisfaction is likely tied to perceptions of fairness, as unfairness is a key source of dissatisfaction. If this holds, participants in Treatment 2 should perceive the game as less fair compared to those in other groups. To examine these

possibilities, satisfaction levels and fairness perceptions are compared across experimental groups. Satisfaction is measured using participants' self-reported ratings on a scale from 1 to 5 after the experiment. Fairness perception, also rated on a 1 to 5 scale, is assessed both before and after the experiment. This accounts for potential changes in perception as participants gain a better understanding of the game's structure and its implications.

Focusing on non-bonus recipients in Treatments 2 and 3, Figure 3 presents the average satisfaction levels and fairness perceptions recorded before (Pre-Fairness) and after (Post-Fairness) the experiment across different groups. Comparing these measures helps determine whether perceptions of fairness influence overall satisfaction and whether the experience of unequal pay affects participants' views over time.

Figure 3. Satisfaction and fairness perception across experiment groups



Participants in the control group and Treatment 1 reported higher satisfaction levels compared to those in Treatments 2 and 3. Despite receiving bonuses, participants in Treatment 1 reported slightly lower satisfaction than those in the control group, suggesting that the equal distribution of bonuses may have reduced their perceived value. In contrast, non-bonus recipients in Treatments 2 and 3

reported noticeably lower satisfaction levels, with non-bonus participants in Treatment 3 reporting the lowest satisfaction, even though their situation could be considered fair based on merit.

Fairness perception reveals additional insights. Control group participants reported relatively high fairness perception, which remained unchanged after the experiment. In Treatment 1, fairness perception increased after the experiment, resulting in the highest post-experiment fairness rating among all groups. However, participants in Treatments 2 and 3 lowered their fairness perception ratings after experiencing the experiment, with Treatment 2 participants reporting the lowest fairness perception. This suggests that arbitrary pay differences in Treatment 2 were perceived as the most unfair, leading to greater dissatisfaction.

Both satisfaction and fairness perception may be influenced by participants' actual outcomes, not just the differences in the payout mechanism. To account for these factors, regression models are estimated for each variable, controlling for individual characteristics and key game outcomes, including performance and payout.

The relevant outcome variables considered are individual average score (score) and final payout (payout).

For fairness perception, the dependent variable is the change in fairness perception, where a negative value indicates a decrease in perceived fairness after the experiment. The number of observations corresponds to the number of participants, with only non-bonus recipients from Treatments 2 and 3 included in the analysis to isolate the effects of perceived inequity.

Table 4 presents the regression results. For each dependent variable, two models are estimated: one without controlling for game outcomes (Model 1) and another that includes performance and payout as control variables (Model 2). Comparing these models allows for an assessment of whether actual outcomes influence satisfaction and fairness perception beyond the treatment effects.

Table 4. Regression results for *satisfaction* and *fairness*

	satisfaction (1)	satisfaction (2)	fairness (1)	fairness (2)
T1	-0.076	2.673*	0.234	-0.957
	[0.299]	[1.476]	[0.319]	[1.649]
T2	-0.404	-0.721**	-1.053***	-0.955**
	[0.310]	[0.323]	[0.330]	[0.361]
T3	-0.676**	-0.596*	-0.536	-0.56
	[0.335]	[0.324]	[0.357]	[0.362]
Score	-	2.386**	-	-0.98
		[1.101]		[1.230]
Payout	-	-0.099*	-	0.043
		[0.052]		[0.058]
Individual characteristics	Yes	Yes	Yes	Yes
Observations	75	75	75	75
Adjusted R^2	0.014	0.088	0.148	0.133

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All models exclude bonus recipients in T2 and T3. Standard errors in parentheses.

Referring first to satisfaction, the results from Model 1 indicate that participants in Treatment 3 reported the lowest average satisfaction, aligning with the trends observed in the previous bar graphs (Figure 3). In the same model, the arbitrary discrimination in Treatment 2 shows a sizeable negative coefficient on satisfaction, though it is not statistically significant.

However, when score is included as a control variable in Model 2, the negative effect of Treatment 2 on satisfaction becomes more pronounced, with a coefficient of -0.721, significant at the 5% level. This suggests that once individual performance is accounted for, participants in Treatment 2 experience the largest decline in satisfaction, likely due to perceived unfairness despite their efforts. The negative effect of Treatment 3 on satisfaction is slightly reduced after controlling for performance, indicating that part of the dissatisfaction may be attributed to lower individual performance rather than the treatment itself.

As expected, a higher score is positively associated with satisfaction, reinforcing the link between effort and perceived rewards. Interestingly, a higher payout shows a slight negative effect on satisfaction. This could suggest that participants who earned more may have done so at a higher personal effort cost, which could diminish their overall satisfaction with the experience.

The results on fairness perception are consistent across models, indicating a negative effect of arbitrary discrimination on changes in fairness perception. When controlling for average score and total payout, the coefficient for Treatment 2 is -0.955 and statistically significant at the 5% level. The magnitude of this effect is slightly smaller compared to the model without controlling for experimental outcomes, suggesting that the perceived unfairness in Treatment 2 is not solely driven by performance or earnings.

Notably, neither average score nor total payout significantly impacts participants' perceptions of fairness, reinforcing the idea that their sense of fairness is primarily shaped by the treatment conditions rather than their actual outcomes. These findings align with the intended treatment design, where the arbitrary discrimination in Treatment 2 was meant to simulate an unfair compensation environment.

Importantly, participants did not initially perceive the setup as unfair. Their sense of injustice appears to have developed only after experiencing the inequitable pay structure firsthand. This finding is concerning, as it suggests that individuals may not be fully aware of unfairness or empathetic toward those facing it until they personally encounter it, highlighting potential challenges in addressing workplace inequities proactively.

6. Discussions and Conclusion

This paper studies the effect of pay discrimination on work performance. The experiment results show that receiving lower piece-rate pay increases effort, as subjects perform better when others receive higher compensation for the same work. However, they report lower satisfaction with their earnings despite higher effort and higher pay. This suggests that wage discrimination may benefit employers by boosting productivity. When higher piece-rate recipients are selected through competition, lower-paid subjects do not show improved performance. Additionally, when all participants receive a higher piece rate, performance remains unchanged, but satisfaction improves.

Arguments for wage fairness often focus on its impact on worker morale. Subjects experiencing wage discrimination report lower satisfaction than those in the control group. This finding aligns with Brown et al. (2008), who show that pay rank strongly correlates with various aspects of job satisfaction, including pay satisfaction. In our study, participants observed others' payoffs, and they could deduce their rankings, such that perceived rank may also contribute to lower satisfaction.

Notably, even in cases where wage discrimination is based on a clear reason, such as competition, satisfaction remains lower. This suggests that workers consider not only the fairness of the process but also the final outcome. Practitioners should be cautious when implementing competition-based incentives, as employees focus on both the reward distribution and the process leading to it.

In light of the theoretical discussions, the results suggest that unequal pay has a stronger effect through peer comparison. The psychological cost of perceived injustice does not seem significant enough to outweigh the influence of comparing oneself to others. Several factors may explain this, though further research is needed. The pay gap may not have been large enough to trigger strong resentment, or the experiment's short duration may have limited its impact. It is also possible that

participants accepted the situation, recognizing that they could only control their own performance and chose to focus on maximizing their outcomes.

In real work settings, perceived injustice could motivate non-recipients to work harder, either to prove their worth to the employer or to compete for future rewards. This motivation may arise from a desire to compensate for the lack of recognition or to stand out from those who were arbitrarily rewarded.

The findings suggest that managers can practice favoritism and reward select workers without negatively impacting performance, provided employees lack outside options. However, this approach may lead to lower satisfaction among non-favored employees. In competitive labor markets, low satisfaction could make it difficult to attract and retain talent. Shields and Ward (2001) found that lower job satisfaction among nurses was associated with higher quit rates, while Dube et al. (2009) observed significant increases in employee turnover when pay raises varied among peers in a low-wage sector at a large U.S. retailer.

However, wage disparities may have little to no effect if employees perceive the differences as justified (Bolton & Werner, 2016), highlighting the importance of perceived fairness in compensation policies.

In many work environments, task performance relies on a combination of effort and skill. In such cases, incentives can enhance performance by encouraging investment in skill development, leading to gradual improvements over time. Rouse (1998), as cited in Gneezy et al. (2011), found that offering incentives helped students achieve better math scores but had no effect on reading and social sciences, suggesting that incentives are most effective when effort plays a key role.

Perceived injustice, however, may negatively impact performance in tasks requiring refined skills if workers are not given the support or motivation to invest in skill development. Without opportunities to enhance their abilities, feelings of unfairness may lead to disengagement, ultimately harming long-term performance.

The short-term nature of the experiment may have mitigated the negative effects of pay disadvantage on performance. In this setting, participants made a one-time decision to commit to the experiment. Once present, spending less than an hour to earn some compensation may have been a more rational choice than leaving and seeking alternative uses of their time. In this context, unfavorable pay may have caused dissatisfaction but not necessarily reduced effort.

In a real work environment, however, the pay disadvantage persists once discovered. The constant reminder of unequal pay could have a stronger and more lasting impact on motivation and performance than what is observed in a short-term experimental setting.

The experiments were conducted with university students, who may not fully represent the broader working-age population. It would be valuable to explore whether these findings hold across different demographic groups or larger samples, which we leave for future research.

Additionally, the underlying decision-making process behind effort levels remains unclear. The most consistent explanation is that participants are strongly influenced by their aversion to falling behind their peers. The results on satisfaction and fairness perception suggest that perceived inequity is a key driver of dissatisfaction among discriminated subjects.

A deeper understanding of the decision-making mechanism could help in applying these findings more effectively, making this an important area for future investigation.

Some policy implications can be drawn regarding fair wage practices. While inequitable compensation may boost performance when perceived as arbitrary, it comes at the cost of lower worker satisfaction. To address this, policies should promote clear, merit-based evaluation systems and ensure that employees understand the criteria for bonuses and promotions. Alternative performance

incentives, such as profit-sharing schemes or recognition programs, can be effective as long as all employees feel they have a fair opportunity to achieve them. Addressing wage fairness through regulations can contribute to a more just labor market, helping to reduce the negative social effects of perceived inequity. Furthermore, enhancing employee well-being through fair compensation practices is likely to have positive long-term effects on firm performance and employee retention.

Further policy implications may be derived regarding fair wage practices. While inequitable compensation can boost performance when the disadvantage is perceived as arbitrary, it undermines worker satisfaction. To address this, policies could include mandating clear, merit-based evaluation systems and ensuring that employees understand the criteria for bonuses and promotions. Other types of performance incentives, such as profit-sharing schemes or recognition, can still be used as long as all workers feel they have a fair chance to achieve them.

Future research should address the generalizability of findings beyond the controlled experimental setting. The current study focuses on university students, a relatively homogenous group, which may limit its applicability to the broader and more diverse workforce in real-world labor markets. Future studies could explore how inequitable compensation affects performance and satisfaction across different demographic groups, such as variations in age, experience, and socio-economic backgrounds.

Industries and job types, such as blue-collar versus white-collar jobs or public versus private sector employment, may also influence the impact of pay disparities. Additionally, examining the factors that shape fairness perceptions and subsequent behavioral responses would provide valuable insights. Assessing the long-term effects of wage inequity, such as job retention, loyalty, and mental well-being, would be another important avenue for research. However, obtaining such data from real organizations may present challenges. Expanding research in these areas would

contribute to a deeper understanding of how wage fairness and incentive structures influence different segments of the labor force, leading to more targeted policy recommendations.

Acknowledgments

I acknowledge the financial support provided by the Faculty of Economics, Khon Kaen University, through its Research Incentive Program, which made this research possible. I extend my sincere thanks to all research assistants for their diligent efforts in conducting the experiments and addressing logistical challenges. I am indebted to Assoc. Prof. Phumsith Mahasuweerachai, Faculty of Economics, Khon Kaen University, for his guidance throughout this research. Furthermore, I want to thank the participants at the JEPA 2023 Conference, Osaka, Japan (November 2023), for their valuable comments and suggestions, which have significantly contributed to this study. Finally, the constructive feedback from the reviewers and the editor has improved this paper tremendously from the first draft to its current form. Any remaining errors or omissions are solely my responsibility.

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Appendix 1. Instructions to participants (translated from Thai by author)

Control:

Welcome and Introduction

"Hello everyone! Thank you for taking the time to participate in our research study. This research is funded by the Economics Department at Khon Kaen University and aims to study people's perceptions of fairness."

"Please note that this is a research experiment and not a product endorsement. There are no specific companies or products associated with this study."

The Game and Rewards

"For today's experiment, we'll be playing a simple paper-sorting game. Your score, and ultimately your earnings, will depend on how many sets of papers you can complete within a given time. We'll play 10 rounds in total."

"Your final earnings will be calculated based on your average score across all 10 rounds. For every point you earn, you'll receive 20 baht. Think of this game as a simulation of a real-world job where your earnings are directly tied to your productivity."

Procedure

1. Practice Round: "First, we'll have a practice round to ensure everyone understands the game."
2. Pre-Experiment Questionnaire: "Before we start the actual experiment, you'll be asked to complete a short questionnaire."
3. Experiment: "We'll play 10 rounds of the game, and your score will be announced after each round."
4. Post-Experiment Questionnaire: "After the 10 rounds, you'll complete another questionnaire."
5. Payment: "You'll be paid based on your final score."

How to Play

– "You'll be given a set of numbered papers and rubber bands."

– "Your task is to group the papers by number and secure them with a rubber band."

– "Each completed set earns you one point."

– "You'll have one minute for each round."

"Your total earnings are based on your average score across all 10 rounds. You'll also receive a base payment of 150 baht."

Treatment 1

Same as instructions in the Control Group, but adding the treatment manipulation of bonus rounds for everyone:

"In addition, I will randomly select certain rounds where you will receive a bonus. This means that no matter how many sets of papers you complete in that particular round, your score for that round will be multiplied by 4.5 times (emphasis)! There will be a total of 3 bonus rounds out of the 10 rounds. I won't tell you which rounds are bonus rounds beforehand. Instead, I'll let you know which round has a bonus once you've finished playing it."

Treatment 2

Same as instructions in the Control Group, but adding the treatment manipulation of bonus rounds for some participants, selected arbitrarily:

"We will randomly select 4 lucky participants who will earn extra rewards. These will be announced before starting the game, but anonymously by using assigned aliases. For these participants, I will randomly select certain rounds where you will receive a bonus. This means that no matter how many sets of papers you complete in that particular round, your score for that round will be multiplied by 4.5 times (emphasis)! The lucky participants will receive 3 random bonus rounds throughout the game. I won't tell you which rounds are bonus rounds beforehand. Instead, I'll let you know which round has a bonus once you've finished playing it. Other participants do not get bonus rounds."

Treatment 3

Same as instructions in Control Group, but adding the treatment manipulation of bonus rounds for some participants, selected through competition in a word-search game:

"Before the 10 rounds of the main game, there will be a preliminary game of finding words (unrelated to the paper-sorting game) to select the top 4 scoring players. These top 4 players will receive special bonuses, earning more money than others for the same number of completed tasks in the main game. The winners will be announced before starting the game, but anonymously by using assigned aliases."

"For these participants, I will randomly select certain rounds where you will receive a bonus. This means that no matter how many sets of papers you complete in that particular round, your

score for that round will be multiplied by 4.5 times (emphasis)! The lucky participants will receive 3 random bonus rounds throughout the game. I won't tell you which rounds are bonus rounds beforehand. Instead, I'll let you know which round has a bonus once you've finished playing it. Other participants do not get bonus rounds. After the preliminary game, the 10-round main game will begin."

Appendix 2. Word Search Game (Instructions translated from Thai by author)

Instructions:

Locate the hidden English animal names in the grid below.

Circle the words you find and write them in the spaces provided (not shown).

Puzzle:

C	D	E	E	D	I	U	M	D	E	E	V	L	O
O	R	M	M	D	U	C	K	C	V	A	I	O	L
O	A	O	W	O	L	F	B	P	A	G	O	V	I
A	M	P	C	G	O	O	S	E	L	L	L	E	V
C	A	A	N	O	Z	E	B	R	E	E	E	S	S
A	F	C	A	T	D	A	A	C	N	L	T	K	H
N	J	E	H	I	O	I	B	R	T	A	T	O	A
T	O	H	G	G	O	N	L	H	I	B	E	A	R
H	I	S	B	E	E	U	P	E	N	O	Y	L	K
A	F	G	L	R	L	T	O	L	E	L	O	A	N
N	Y	S	E	L	E	E	B	L	S	R	U	H	N
B	U	E	L	R	P	A	N	D	A	R	O	S	E
A	O	S	H	M	H	S	K	F	O	L	W	E	R
F	O	O	D	N	A	G	A	M	E	I	D	E	E
O	S	R	K	A	N	G	A	R	O	O	W	O	W
X	F	K	H	K	T	A	N	A	A	N	R	I	D
E	H	I	J	D	C	F	H	T	N	C	O	L	A
E	F	A	C	B	D	A	S	H	E	E	P	B	V

Word List (Solutions):

BEE	DUCK	HAMSTER	PANDA	TOAD
EAGLE	ELEPHANT	JACKAL	RABBIT	TURTLE
KANGAROO	FOX	LEMUR	SNAKE	WHALE
KOALA	GERBIL	MONKEY	SQUIRREL	WOLF
CUCKOO	GOOSE	OSTRICH	TIGER	