Development of fairness views when facing unequal opportunities

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Meritocracy judges individual on choices and not on circumstances. However, only part of the meritocrats account for how circumstances affect choices. I explore how this develops as children enter into adolesence. I report from an experiment in which school students decide how to distribute money between workers that completed tasks under unequal opportunities. Younger children are more likely to base their decisions on what actually happened, while older ones value more what would have happened under equal opportunities. I show that cognitive development explains those differences. I show that neither incentivized reflection nor information provision affects decisions. These findings shed light on behavioral underpinnings for fairness view development.

JEL-Classification: D91, D63, D83, D84.

Keywords: fairness, children, cognitive development, inequality of opportunities.

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1 Introduction

Fairness plays a crucial role in shaping individuals' acceptance of inequality. The prevailing view in modern societies is meritocratic (Alesina and Angeletos, 2005; Almås et al., 2020; Cappelen et al., 2007; Stantcheva, 2021), by which inequalities arising from personal effort choices are fair, while those resulting from lucky circumstances are perceived as unjust (Cappelen et al., 2020; Konow, 2000).[1] However, personal effort is rarely detached from circumstances (Altmejd et al., 2021; Bursztyn et al., 2017; Falk et al., 2020; Glover et al., 2017; Parsons et al., 2011). Recent studies have shown that people acknowledge the influence of unequal opportunities on effort exertion, but only part of them want to correct the resulting inequality (Andre, 2022; Bhattacharya and Mollerstrom, 2022; Cappelen et al., 2023; Preuss et al., 2022).

In this paper, I study how this [view] develops as children grow old. I report results from an experiment in which school students decide how to distribute money between workers that completed tasks under unequal opportunities. The data recollection consist of two phases. In the first phase, workers in a lab complete effort tasks for different piece-rate payments per task: low and high. I ask workers to commit a number of tasks for each piece-rate. In average, workers commit twice as many tasks for the high piece-rate than for the low piece-rate. A lottery then determines each worker's piece-rate payment and workers follow through their commitments. After all work is done, I form pairs consisting of one unlucky worker (assigned to the low piece-rate) and one lucky worker (assigned to the high piece-rate). In the second phase, I elicit fairness preferences from the school students using a spectator game (Cappelen et al., 2007, 2013). Spectators both state and reveal their preferences. I ask them to declare which criteria should be used to distribute the total earnings within worker pairs. Stated preferences allow me to identify spectator's fairness views and explore differences across groups. Spectators also make distribution decisions. I employ a contingent response method. Spectators face many scenarios showing qualitatively different effort choices. Their decisions are probabilistically incentivized, as one decision can be implemented on a real pair from the first phase. [IMPROVE THIS LINE] These revealed preferences provide validity to spectator's stated preferences.

Children in my sample adhere to diverse fairness views: 13% declare as egalitarians (who want to equalize income regardless of effort exerted), 11% as libertarians (who want to maintain the existing distribution), and the remaining 76% as meritocrats. Among the latter, two thirds value

[1] This ideal is closely intertwined with the notion of equality of opportunity, which often contrasts with reality. Individual's income, educational attainment, and overall life outcomes tend to be closely tied to their family background (Akee et al., 2019; Becker et al., 2018; Chetty et al., 2014; Chetty and Hendren, 2018; Corak, 2013).

more the efforts actually exerted, and the other third value the efforts that would have been exerted under equal circumstances. In line with recent literature, I label the first group as factual meritocrats and the second group as counterfactual meritocrats (Andre, 2022; Cappelen et al., 2023). To explore fairness development, I leverage age and cognitive ability variations. The sampling plan was pre-registered. Participats comprise students in 5th to 9th grade from a private full-day school, with ages ranging from 10 to 15 years old. These children share much similar schooling experiences and socio-economic background. Most entered the school at kindergarden, have received all their formal education there, live in the surrounding neighborhoods, and have low material deprivations. These features provide a clean group to explore how fairness preferences evolve with age and cognitive development, as there is limited cofounding impact of upbringing experiences.

I find that the share of meritocrats increases with age. Meritocrats climb from 71% among younger students (attending 5th to 7th grade) to 84% among older students in my sample (8th and 9th grade). The rise is entirely explained by counterfactual meritocrats, who expand by 16.6 percentage points (with p-value=.013). The increase almost doubles the share among young children. As a counterpart, the share of egalitarians decreases by a similar magnitude, while the share of libertarians remains stable. These results are in line with previous findings that suggest that children move towards more complex fairness views as they are more cognitively mature (Almås et al., 2010). Egalitarianism prescribes an invariant decision rules: dividing equally. Implementing libertarianism, although changing in each case, simply implies maintaining the *status quo*. Meritocracy is slightly more complex, as it requires to assess efforts case by case. And counterfactual meritocracy is even more complex, as individuals need first to infer what would have happened under equal opportunities.[2]

To provide a behavioral underpinning for this result, I explore the role of cognitive development in explaining the differences. After the spectator games, I apply a Raven's Standard Progressive Matrices (SPM) test (Raven, 1936, 2000). This test comprises 12 questions and is a commonly used assessment for measuring cognitive ability for children in this age range. I split the sample into two groups by the median. Though older students score higher in the test scores, there are children of all ages in both groups. I find that among the high cognitive ability group, there is a larger share of counterfactual meritocrats (12.2 percentage point, p-value=.064) and lower share of egalitarians (-9.9 percentage point, p-value=.028). These trends mimic the ones when

[2] I explore implementation errors in my sample and find that they vary by fairness views. Spectators adhering to fairness views that require simpler decision rules are less likely to make implementation errors. Egalitarians are the most accurate, closely followed by libertarians. Meritocrats are the least accurate, with counterfactual meritocrats the most. See Appendix XXXX for more details.

comparing age groups. [PUT INTO RELEVANCE RESULTS]

I exploit the contingent response method to explore whether stated preferences are in line with actual decisions. I analyze decisions for four scenarios with different choice differences between the unlucky and lucky worker. In all scenarios, the lucky worker is initially assigned higher earnings and performs at least as much tasks as the unlucky worker. I show that spectators that declare as egalitarians assign the unlucky worker the largest share, almost by equality. Libertarians assign the lowest share, closest to the unequal *status quo*. Meritocrats are in between: they partially correct the unequal earnings, but do not fully equalize. Among them, counterfactual meritocrats assign a higher share to the unlucky worker. This difference is in line with expected, as this view prescribes accounting for the increased effort under equal opportunities of the unlucky workers. The contrast is not observed in scenarios with large differences in effort choices, but is salient when the unlucky worker would have performed equal or more tasks than the lucky worker. I further show that spectators justify their decisions as prescribed by their stated preferences. I ask participants to report the reasons behind their decisions. Explanations differ in key aspects. Egalitarians talk more about team work, justice, and equality. Libertarians strongly emphasize earnings. Meritocrats mention tasks and efforts. Counterfactual meritocrats are more likely to mention the unlucky worker and to use conditional verb forms.

[BRING INTO TOPIC WHY HIGH COGNITION BEHAVE LIKE THIS] [BRING INTO TOPIC BELIEFS] I then explore how cognitive development accounts for these differences. I analyze how fairness views' implementation errors vary with cognitive ability. I also compare assess belief formation and belief accuracy across groups.

This tolerance can be attributed, in part, to the limited availability of information about the effort that would have been exerted under different circumstances. Individuals can only observe the actual choices, while speculating about comparable counterfactual scenarios with equal opportunities. If those inferences are absent or imprecise, moral decisions can be based on innacurate inputs. I run an experiment to test this channel.I incentivized one subset of spectators to engage in counterfactual thinking about effort choices under equal opportunities before making redistribution decisions. For another subset, I directly provided that information. I find that neither incentivized reflection nor information provision affects decisions.

Related literature. My work builds and contribute to the vast literature of fairness and inequality acceptance (e.g., Almås et al., 2020; Cappelen et al., 2007, 2013; Konow, 2000;

Stantcheva, 2021). These studies show that a significant share of people are sensitive to the source of inequalities. I focus on a recent extended categorization of fairness views that distinguishes within meritocrats and complement this literature by testing behavioral underpinnings for its existence. Considering counterfactual choices implies belief formation, which makes for a more complex decision strategy. My main finding shows that the prevalence of that strategy increases alongside with cognitive development.

Two strands of this literature are closest to my study. One of them finds that people partly account for unequal opportunities on moral decisions (Andre, 2022; Bhattacharya and Mollerstrom, 2022; Cappelen et al., 2023; Preuss et al., 2022). Proposed explanations include uncertainty aversion, recognizing circumstances dependent effort as morally relevant, and belief biases.

[TALK ABOUT INDIVIDUAL IDENTIFICATION BY STATED PREFERENCE] My work differs in its focus on how limited information and belief biases explain these incomplete pass-through. First, I measure if people interiorize the effect of limited information on their decisions by measuring their willigness to acquire complete information. Second, I assess how failures to engage in counterfactual thinking explain previous findings. Moreover, the residual difference between decisions under limited and complete information provides a proxy for the impact of uncertainty aversion on moral decisions. The other strand analyzes the development of social preferences in children (Almås et al., 2010; Fehr et al., 2008, 2013; Martinsson et al., 2011; Sutter et al., 2018). One important message from these studies is that individuals develop their fairness views throughout childhood. I extend this literature by exploring the prevalence of two additional types of meritocratic view that differ in cognitive requirements. I test if cognitive development enables the implementation of these more complex moral strategies.

My work also relates to the recent literature on inference errors in economics (Ba et al., 2023; Enke and Graeber, 2021; Fan et al., 2023; Graeber, 2023; He, 2023).

The project integrates two main topics in behavioral economics: bounded rationality and social preferences. I explore how belief bias caused by these errors impact inequality acceptance, the individual aknowledgement of these errors and responses to them. A better comprehension of the relative importance of belief bias heterogeneity in the prevalence of fairness views will help understanding existing disagreements about inequality.

The remainder of the paper is structured as follows. Section 2 describes the experiment design and implementation. Section 3 presents the theoretical framework guiding our analysis and the hypothesis to be tested. Section 4 defines the variables we will use and the analysis plan to test the hypothesis. Section 5 concludes.

2 Experimental design and implementation

The experiment is designed to investigate fairness views on the distribution of income between individuals that face unequal opportunities, belief formation concerning non-observed equal-opportunity scenarios, willingness to inform about such situations, and effectiveness of counterfactual thinking in shaping allocation decisions.

The experiment consists of two phases.[3] In the Workers phase, workers perform simple real-effort tasks and accumulate earnings. In the Spectator phase, spectators state their preferred distribution criteria and make decisions that can affect the income of paired workers. The analysis focuses mainly on the spectators. The workers are recruited to create realistic economic conditions.

2.1 Workers phase

I hire workers on *Prolific* to perform a simple real-effort task, based on letter-to-number encryption (Benndorf et al., 2019).[4] Participants are paid a 2.00 British Pounds ($\sim$ 2.50 USD) base payment and can earn additional money for each succesfully completed encryption.[5]

Workers encrypt '*words*' formed by letters, based on an encryption table. They can only proceed to the next '*word*' if the encryption is done correctly. There is no limited time or opportunities to answer. Before they start working, I inform participants about two possible piece-rate for each encryption succesfully completed: low piece-rate (π^L) of 0.05 British Pounds ($\sim$ 0.06 USD), or high piece-rate (π^H) of 0.50 British Pounds ($\sim$ 0.60 USD). I ask participants to commit a number of tasks for each piece-rate. I inform participants their final payoff can be influenced by a third-party. To avoid effort decisions to be distorted in anticipation, I restrict information about when, how, why, and who is involved in the income allocation. The resulting piece-rate is randomly assigned, and participants follow-up on their commitment. Appendix B summarizes the main instrutions for the workers, and the full version is available online (XXX).

[3] For summaries of the main instrutions for each phase, see Appendix A and B respectively. Full instructions are available online (XXX).

[4] This word encryption task has many advantages that make it suitable for our experiment: (i) it is a simple and easy to explain task, (ii) it needs not any preexisting knowledge, (iii) it mostly eliminates the scope for guessing, and (iv) it minimizes learning after repetition.

[5] *Prolific* works with British Pounds. Participants with sufficient experience in the platform are used to it. Still, I display an approximation for United States Dollars (USD) for the sake of clarity.

After the worker phase is completed, I form worker pairs. Each pair consists of an unlucky worker (randomly assigned to the low piece-rate) and a lucky worker (randomly assigned to the high piece-rate).[6]

2.2 Spectators phase

I invite school students to be spectators, in collaboration with a private full-day school in Montevideo, Uruguay. Students are between 10 and 15 years old. The project was granted ethical approval by the UAB Ethics Committee on Animal and Human Experimentation and the principal board of the school. Parents of involved students received a consent form asking approval for their children participation.[7] All parents gave their consent. Children were also instructed that their participation was voluntary. None refused to participate. Participants are offered prize baskets consisting of school canteen products worth 75 Uruguayan Pesos ($\sim$ 2.00 USD) and can earn additional prizes (worth up to 265 Uruguayan Pesos, $\sim$ 7.00 USD).[8]

This phase consists of two stages: distribution with incentivized belief elicitations, and surveys (see Figure 1). Treatments differ on the first stage (see Section 2.2.1). The second stage is equal to all treatment conditions. I start by laying out the workers phase setting and explaining the decisions that spectators will make. To verify that all spectators understood the setting and instructions, I ask a set of comprehension questions.[9] I only allow participation after all questions are correctly answered and provide explanations if required. Spectators complete the two stages. After the class is finished, I reward spectators. Appendix A summarizes the main instructions for the spectators, and the full version is available online (XXX).

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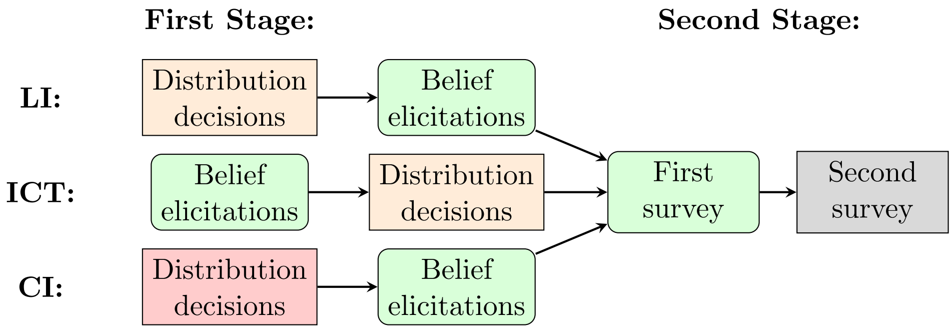
[6] I match workers according to their relative performance within piece-rate. This allows me to compare workers within same effort levels, focusing on the differences stemming from unequal opportunities (Roemer, 1993; Ramos and Van de gaer, 2016). Concretely, this matching assumes that those at the same percentile of the income distribution conditional on their circumstance have exerted the same degree of effort. In my setting, the fundamental assumptions to derive it are met as circumstances are randomly assigned and the worker's payment structure is strictly increasing in exerted effort. For more details, see Fleurbaey (1998).

[7] The letter contained information on the project and the rewards for the children, with an explicit school endorsement. No specific details on the tasks or aim of the research was communicated.

[8] The minimum (maximum) prize is worth more than 2 (8) days of average daily canteen expenditure in our sample. Average daily canteen expenditure within the sample is 32.5 Uruguayan Pesos ($\sim$ 0.87 USD). Additional prizes are bundled together in different types of baskets, with each basket offering escalating rewards. See A for more details in the spectator phase payments.

[9] Afterwards, I ask spectators to report how much they understood the instructions for that stage. None of the participants in my sample reported a lack of understanding of the instructions. Over 80% reported to mostly understand all of the task. I show results are robust to excluding those who failed to understand part of the instructions (see XXX).

Figure 1: Stages of the spectator phase



Notes: This figure depicts the experiment flow for the spectator phase. Each row shows different treatment conditions: Limited Information (`LI`), Incentivized Counterfactual Thinking (`ICT`), and Complete Information (`CI`). Treatment conditions differ in the first stage. Distribution decisions in yellow are with Limited Information. Distribution decision in red are with Complete Information. The boxes filled in green are parts of the experiment in which participants can increase their chances of earning bonus rewards.

2.2.1 Treatments

I randomly assign spectators to different treatments in a 2x2 between-subject setting. Only the first stage of the spectator phase varies across treatments. Each treatment consists of information provision, distribution decision, and incentivized belief elicitation sections. Treatments differ on the information provided before the decisions and in the order in which the incentivized belief elicitation takes place. As the flow order is inconsequential under complete information, I merge the two possible treatments into one. As detailed in Figure 1, my design involves three treatment conditions: Limited Information (`LI`) is my control group; Incentivized Counterfactual Thinking (`ICT`) has incentivized belief elicitations preceding distribution decisions; and Complete Information (`CI`) provides information on worker's performance in an equal-opportunity scenario.

2.2.2 Distribution decisions

Spectators make distribution decisions for 5 scenarios with different worker pairs. Information received is the same for each scenario. I show all spectators the piece-rate, effort choice (i.e., tasks completed), and initial earnings of each worker in the pair. Depending on the treatment, spectators receive additional information. In the `LI` and `ICT` treatment, spectators are only provided with the aforementioned information. In the `CI` treatment, I complement that information by disclosing worker's task commitment for an equal piece-rate.[10]

All information is displayed using simple text, alongside graphical illustrations (see Figure 2).[11]

[10] For each scenario, I randomly choose the low or high piece-rate and show both worker's commitment for it. I maintain the same disclosure piece-rate when eliciting beliefs.

[11] The visual design was created with input from local teachers. The focus was on making the information

For each worker pair, the total amount to redistribute is the sum of both worker's earnings.[12] Spectators decide on the final payoff of the workers by selecting which share of the total earnings each worker deserves. Decisions are made with a slider and aided by a dynamic graph. I employ a contingent response method. Spectators are informed that their decisions can have real consequences. I announce that one of the 5 scenarios involves a real worker pair and that decisions for the real pair can be implemented after a lottery.[13] The last scenario refers to a real worker pair from the workers phase. The preceding scenarios are hypothetical. Spectators do not know which scenario is real and which are hypothetical.[14]

The contingent response method allows me to elicit merit judgements for various effort differences between the unlucky and lucky worker (see Table 1). I restrict the analysis to the hypothetical scenarios for consistent comparissons across spectators. Each spectator sees the same effort differences benchmarked to the real worker pair assigned.[15] Hypothetical scenarios are presented in random order.

After deciding for the 5 scenarios, participants are randomly presented one of their decisions and asked to justify it. Next, they are asked about their preferred distribution criteria for distributing within pairs. I present a close list, with each statement adhering to (i) egalitarism, (ii) libertarianism, (iii) factual meritocracy, and (iv) counterfactual meritocracy. Responses are presented in random order.

Finally, spectators are offered the possibility of gaining additional information to remake decisions. Offered information is on worker's effort commitment under equal piece-rate payment. To access such information, spectators need to complete a counting zeros task (Abeler et al., 2011).[16] Spectators are able to take or not the opportunity. They can also give up the task in any point,

easy to understand and the interface intuitive to use. Teachers were not on the staff of the school where the experiment occurred and they were not informed about the research's objectives.

[12] Spectators decide on a setting where money is shown as equivalent points. Point conversion rate is 0.05 GBP = 1 point. Low piece-rate is valued 1 point and High piece-rate is valued 10 points. I use points for the sole purpose of simplifying numbers for children. I explain that the points will be converted into money at the end of the experiment, but do not disclose the conversion rate.

[13] I randomly select 20 spectator decisions. This implies that 1 in 10 spectators makes a decision with real consequences.

[14] I ask spectators in our sample to guess which scenario is real after they make their decisions. Responses for each scenario are all around the share selected by chance (20%). The share for the correct guess is 12%.

[15] Hypothetical scenarios show effort differences between the lucky and unlucky worker of 0, 5, 10, and 15 tasks. Scenarios are constructed taking as reference point the effort of the unlucky worker in the real scenario. Efforts choices are constructed by adding multiples of 5 to the reference point. For example, if the unlucky worker in the real scenario completed 16 tasks, the hypothetical scenarios will show workers completing figures such as 16, 21, 26, or 31 tasks.

[16] I introduce the task emphasizing that (i) it is designed to be simple yet tedious, (ii) makes no use of creativity, curiosity, or ability, (iii) differs from the one performed by workers, and (iv) will not provide monetary rewards. See Appendix A for the task description.

Table 1: Scenarios description

	Scenario			
	i	ii	iii	iv
Panel A. Effort differences				
Factual	0	5	10	15
Counterfactual	-10	-5	0	5
Panel B. Worker with higher share				
Factual	Equal	Lucky	Lucky	Lucky
Counterfactual	Unlucky	Unlucky	Equal	Lucky

Notes: This table shows characteristics of the hypothetical scenarios used in the specatator phase. Scenarios are presented to each spectator in random order. Numerical labels are only used for reference. The real scenario is always presented after all the hypothetical scenarios. Panel A shows the observed and counterfactual effort difference. Differences are positive when favoring the lucky worker and negative when favoring the unlucky worker. The number of tasks presented to each spectator varies to accomodate with the reference point taken from the real workers. Panel B states the worker that exerts higher effort in the team.

loosing access to the additional information.

2.2.3 Belief elicitations

Spectators elicit their beliefs on workers' task commitment for an equal piece-rate for each of the 5 scenarios.[17] See Figure A.4 for an example of the belief elicitation. Belief elicitation is incentivized. Spectators increase their chances of receiving additional prizes if their guess is approximately correct. Depending on the treatment, spectators answer about their beliefs before or after the distribution decisions. In the `LI` and `CI` treatment, spectators are asked about their beliefs after the distribution decisions. In the `ICT` treatment, I elicit beliefs before the distribution decisions.

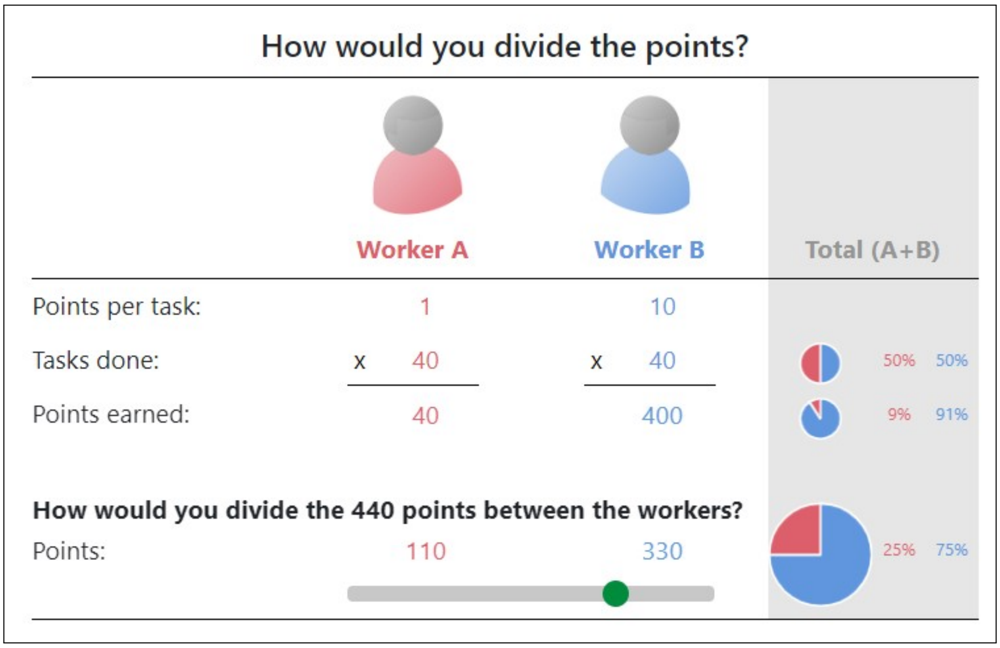
2.2.4 Surveys

The first survey consists of 12 items from Raven's Standard Progressive Matrices (SPM) test (Raven, 1936, 2000). The SPM is a non-verbal assessment used to measure reasoning ability and cognitive development.[18] Each item consists of a 3x3 matrix with a missing cell in the bottom right corner. Participants are asked to select the missing cell out of eight choices provided (see

[17] The equal piece-rate is randomly chosen between the low and high piece-rate for each scenario, and is the same as the one disclosed in the `CI` treatment. I ask spectators to estimate how much the worker not assigned to that piece-rate would have worked for it. Piece-rate, effort choice, and initial earnings for both workers (as previously provided) are shown. I also ask participants their certainty about the estimate for each.

[18] Raven's matrices have been used in various studies analyzing cooperative behavior (e.g., Gill and Prowse, 2016; Proto et al., 2019; Lambrecht et al., 2021).

Figure 2: Distribution decision screen example



Notes: This figures exemplifies the distribution decision screen. The figure shows a pair of workers. Piece-rate payment, tasks completed, and initial earnings for each worker are provided. Shares for tasks and earnings are automatically computed and displayed. Participants can modify the allocation by moving the slider. A dynamic graph updates with the spectator's decision. This figure correspond to the `LI/ICT` treatment conditions. In the `CI` treatment I additionally disclose the task commitment for a same piece-rate payment (randomly selected for each pair). See Figure A.2 for a comparisson between treatment conditions.

Figure A.5 for an item example). Participants receive the test instructions before it begins.[19] Performance is incentivized. Participants increase their chances of receiving bonus rewards if they answer correctly. The items in the test are presented in increasing difficulty order. Participants are able to navigate back and forth throughout the test to review and modify their answers as needed. The test lasts up to 6 minutes. All unanswered items are considered incorrect.

The second survey is non-incentivized and concernes age, gender, neighborhood of residence, and diverse socio-demographic questions. There is no time limit to respond this survey. After the surveys are completed, participants are thanked and dismissed. Participants pick-up their rewards when leaving the class. Rewards are delivered in sealed bags anonymously, based on computer's number.

2.3 Samples

[19] I require participants to answer a small set of comprehension questions. These refer to time allocation, number of correct options per item and an illustrative item (previously used in the instructions). The test only begins after all comprehension questions are correctly answered.

2.3.1 Worker phase

I recruited 40 participants in *Prolific* on August 2023. Workers completed an average of 15.9 tasks (SD = 14.5) and earned an average of 7.13 British Pounds ($\sim$ 8.55 USD). Half of the workers were randomly assigned to the low piece-rate payment and the other half to the high piece-rate payment. Workers committed significantly more tasks for the high piece-rate (23.1 tasks vs. 11.8 tasks).[20]

I form 20 pairs of workers. Each pair consists of one worker assigned to the low piece-rate payment and one worker assigned to the high piece-rate payment, with workers matched based on their relative performance within piece-rate.

2.3.2 Spectator phase

I recruited 198 participants who attend a private full-day school in Montevideo, Uruguay. The school is located in a high-class neighborhood and the students mostly live in the surroundings. The sampling plan was preregistered. Spectators are between 10 and 15 years old and share a common educational and socio-economic background. Most entered the school for kindergarden between ages 2 and 5, and had received their entire formal education at the school.

Figure 3 compares characteristics of our sample with Montevidean population based on data from the 2022 Uruguayan Continuous Household Survey. Given the observed characteristics, it is reasonable to believe that spectators reside in households on the right part of the income distribution (see Table A.2 for further details). Moreover, the sample is much homogenous in its lack of limitations to provide material conditions for appropiate cognitive development.

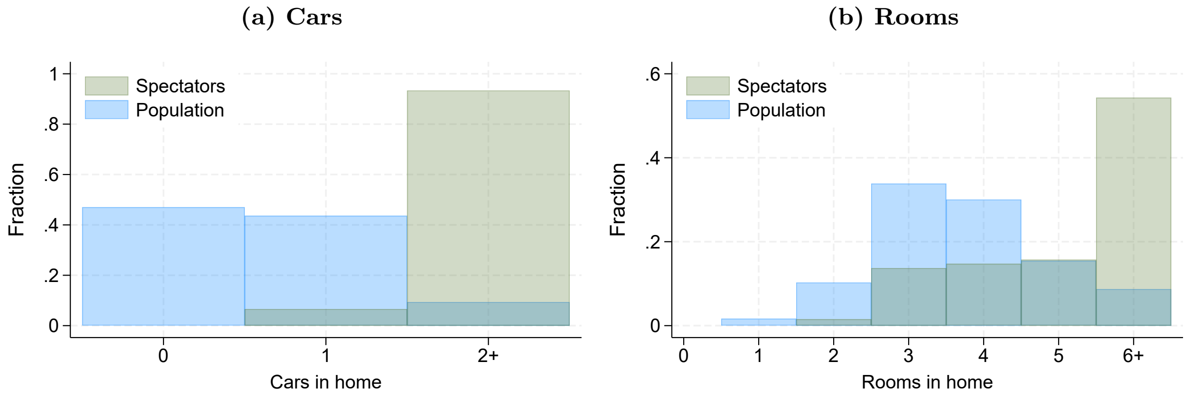
The experiment was conducted throughout four days on September 2023. Sessions took place during regular school hours at the computer lab and lasted 40 minutes. Attendance was high for all groups (see Table A.1). With the experiment ran during regular school hours and all attending students participating, there is no self-selection. The average value of the prize basket reward was 113 Uruguayan Pesos ($\sim$ 3.00 USD).

3 Theoretical framework

I describe a short theoretical framework to illustrate the role of fairness views for distribution decisions in situations with limited information about the effect of circumstances over effort exertion. My framework follows Andre (2022) and Cappelen et al. (2023), which build over the

[20] See Appendix B for detailed results of the worker phase.

Figure 3: Sample and population characteristics



Notes: These figures plot histograms for the spectators and comparable general population (same age bracket and city). Figure (a) shows total number of cars in the household. Figure (b) shows total number of rooms (excluding bathrooms and kitchen) in the household.

distributive choice model introduced by Cappelen et al. (2007).

I first model effort choices by workers under unequal opportunities. Then I model spectators distributive decisions for a pair of workers.

3.1 Workers

Workers decide how much tasks to complete under different piece-rate payments. Total income results from the number of tasks completed and the piece-rate payment. Task completion implies effort, which we assume is increasingly costly for workers.[21] I model workers utility as dependent of total income and effort disutility. The worker i optimization problem is as follows:

$$\max_{p_i} \quad U(y_i, p_i) = y_i - C_i(p_i) \tag{1}$$

$$\text{s.t.} \quad y_i = \pi_i \times p_i \tag{2}$$

where $U_i(\cdot)$ is worker i utility; y_i is income derived from task completion; p_i is total number of tasks completed; π_i is piece-rate payment; and $C_i(p_i)$ is worker's disutility from work.

Workers utility is maximized when the marginal cost of completing an additional task equals the piece-rate payment received for an additional task. With basic assumptions, solutions are interior and workers complete less tasks for the low piece-rate than for the high piece-rate:[22]

[21] I assume all workers have equal disutility from effort for simplicity. As long as spectators don't consider this heterogeneity in their decisions, it has a neutral effect over our main results. I incorporate increasing effort disutility of task completion. This is easily met with increasing difficulty in the tasks.

[22] Piece-rate payment equals income utility as I normalize it to 1. Main results are not affected for considering

$$\pi_i = \frac{\partial C_i}{\partial p_i} \tag{3}$$

$$p_i(\pi^L) < p_i(\pi^H) \tag{4}$$

3.2 Spectators

Spectators redistribute income between two workers for each situation. Worker A is the worker receiving the lower piece-rate payment. Worker B is the worker receiving the higher piece-rate payment. A situation is characterized by the actual tasks completed each worker ($p_A(\pi^L)$,$p_B(\pi^H)$), the counterfactual tasks completed each worker would have complete ($p_A(\pi^H)$,$p_B(\pi^L)$), and the pre-distribution incomes (y_A^{PRE},y_B^{PRE}). The initial setting involves unequal piece-rate payments and pre-distribution incomes. I define worker A as the worker with lower pre-redistribution income.

The decision is on the costless redistribution. With total income and pre-redistribution incomes fixed, the redistributive transfer decision determines post-redistribution incomes. The spectator problem can be solved focusing in only one worker.[23] I assume spectator s utility depends on fairness concerns about worker A's income, as follows:

$$\max_{r_s} \quad U_s = -(y_A^{POST} - m_A)^2 \tag{5}$$

$$\text{s.t.} \quad y_A^{POST} = y_A^{PRE} + r_s \tag{6}$$

$$y_B^{POST} = y_B^{PRE} - r_s \tag{7}$$

$$y_A^{PRE} + y_B^{PRE} = y_A^{POST} + y_B^{POST} \tag{8}$$

where $U_s(\cdot)$ is spectator s utility; m_i is what the spectator considers to be the fair income for worker i; y_i^{POST} is post-redistribution income for worker i; y_i^{PRE} is pre-redistribution

each worker to have particular income utility. Incorporating concave income utility yields similar results as using convex cost function. I further assume that workers find: (i) optimal to complete at least one task when piece-rate is high ($\pi^H - C'(\underline{p}) > 0$), and (ii) sub-optimal to complete the maximum allow number of tasks when piece-rate is low ($\pi^L - C'(\overline{p}) < 0$). I test these assumptions in my sample and find they are met. Results are shown in B.

[23] Given only two workers, the redistributive transfer equals half the difference between the income difference in pre-redistribution and post-redistribution ($r = \dfrac{(y_B^{PRE} - y_A^{PRE}) - (y_B^{POST} - y_A^{POST})}{2}$). For instance, (i) closing post-redistribution income difference is achieved with a redistributive transfer of half the income difference in pre-redistribution; while (ii) making no redistributive transfers makes post-distribution income difference equal to that of pre-redistribution.

income for worker i; and r_s is spectator s decision for the redistributive transfers, such that $(y_A^{POST}, y_B^{POST}) = (y_A^{PRE} + r, y_A^{PRE} - r)$ and $r \in \{0, \ldots, y_B^{PRE}\}$. I define X as total income, which is fixed and equal to the sum of pre- and post-redistribution incomes.

With no stakes in play and no costs nor relevant restrictions in redistribution, the spectators maximize their problem by implementing what they consider to be the fair income for each worker.

$$y_i^{POST} = m_i \tag{9}$$

3.2.1 Fairness views

I consider spectators endorse one of the three most salient fairness views: libertarianism, egalitarianism, and meritocratic fairness views (Cappelen et al., 2007). Decisions following each view are as follows:

Libertarians: Each worker should get according to their earnings: $m_i = y_i^{PRE}$.
Egalitarians: Both workers should get the same: $m_i = X/2$.
Meritocrats: Each worker should get according to their choices: $m_i = p_i$.

Redistributive transfers for libertarians and egalitarians are independent of unequal opportunities, but not for meritocrats. The existence of unequal opportunities makes the assessment of each worker's choices more complex. Part of the meritocrats will consider the impact of unequal opportunities on observed choices should be aknowledged. This is the same as making comparissons in a counterfactual scenario with equal opportunities (such as $p_A(\pi^H)$ and $p_B(\pi^H)$). I label those spectators as counterfactual meritocrats. Other meritocrats will only consider the actual choices by each worker, even if they originated in unequal circumstances. I label them as factual meritocrats. Decisions for each group are as follows:

Factual Meritocrats: Each worker should get according to their factual choice: $m_i = p_i(\pi_i)$.
Counterfactual Meritocrats: Each worker should get according to their counterfactual choice in an equal-opportunity scenario: $m_i = p_i(\pi_i)$, with π_i equal $\forall\, i$.

4 Results

4.1 Stated preferences

I start by analyzing spectator's stated preferences. Table 2 shows the main results. Although there are diverse fairness views in my sample, meritocracy is by far the most common. Around three quarters of the spectators (75.7%) adhere to meritocracy. The remaining spectators are split between egalitarianism (13.1%) and libertarianism (11.1%). Meritocrats can be classified into two groups: factual meritocrats and counterfactual meritocrats. Factual meritocrats value the efforts actually exerted. They represent 51.0% of the sample. Counterfactual meritocrats place a higher value on the efforts that would have been exerted under equal circumstances. They account for 24.7% of the sample.

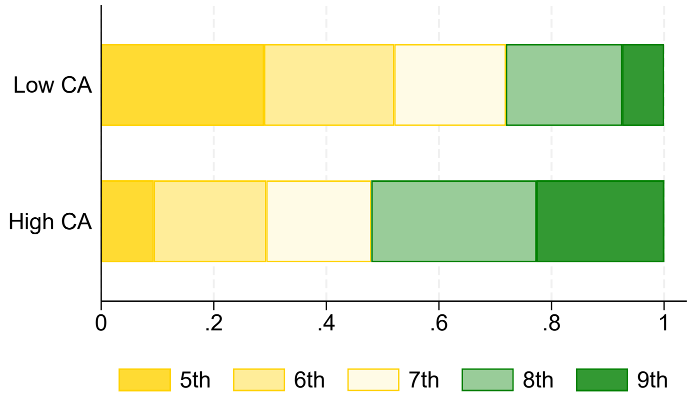
Table 2: Stated fairness preferences

		Age			Cognitive Ability		
	Total	5th/7th	8th/9th	Diff.	Low	High	Diff.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Egalitarians	.131	.177	.054	-.123***	.165	.067	-.099**
				(.043)			(.045)
Libertarians	.111	.113	.108	-.005	.124	.093	-.031
				(.046)			(.045)
Fact. Merit.	.510	.524	.486	-.038	.512	.520	.008
				(.074)			(.074)
Counter. Merit.	.247	.185	.351	.166**	.198	.320	.122*
				(.066)			(.065)

Notes: This table reports stated preferences shares. Columns (1) show refers to the whole sample. Columns (2) to (4) distinguishes by age group. Groups are formed based on current school grade. The first group comprises students from 5th to 7th grade. Ages in those grades range from 10 to 13 years old. The second group comprises students from 8th to 9th grade. Ages in those grades range from 13 to 15 years old. Columns (2) and (3) report the share of each fairness view in each group. Columns (4) reports the difference between the two groups. Columns (5) to (7) distinguishes by cognitive ability. Groups are formed based on the median of the cognitive ability measurement. The first group (low) has scores below the median. The second group (high) has scores above the median. Columns (5) and (6) report the share of each fairness view in each group. Columns (7) reports the difference between the two groups. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

I find that fairness preferences vary across age. I split the sample into two groups. The first group comprises the younger children, who attend from 5th to 7th grade. These children are between 10 and 13 years old. The second group comprises the older children, who attend from 8th to 9th grade and are aged between 13 and 15 years old. Egalitarians are much less common among older children. Their share drops almost by 70%. Libertarians remain relatively stable across age groups. The share of factual meritocrats shows no statistically significant change. The only fairness view that increases with age is counterfactual meritocracy. The prevalence of counterfactual meritocrats almost doubles in size (it expands by 16.6 percentage points, 90% above the younger group). Results are both observed for boys and girls (see Appendix XXX for details).

Figure 4: Cognitive ability distribution by grade



Notes: This figure plots the distribution of participants in each cognitive ability group. Cognitive ability groups are split by the median score in the Raven's Progressive Matrices test (8 out of 12). Students grade is distinguished between 5th to 9th grade. Grades colores in yellow comprise the younger age group. Grades colored in green comprise the older age group.

I leverage cognitive ability measurements to explore the role of cognitive development in explaining the increase in counterfactual meritocracy. I split the sample by the median test score (8 out of 12) into two groups. There are children of all ages in both groups, but older ones are more likely to be in the group with higher cognitive ability (see Figure 4). Fairness views prevalence by cognitive ability mimics what observed by age groups. Egalitarians drop among children with higher cognitive ability, while counterfactual meritocrats increase. Figure 5 compares distinctions by age and cognitive ability.

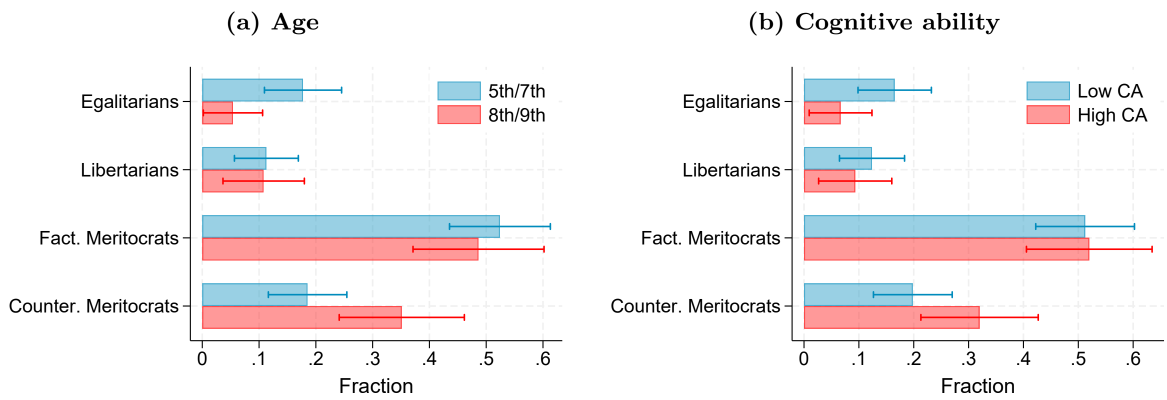
[EXPLAIN]

Robustness checks. Following, I test the robustness of the results to different analysis decisions.

Participant comprehension. One plausible explanation of the difference in stated preferences is that older children have a better understanding of the instructions. I take several steps to ensure all participants understand the experiment instructions.[24] I also ask participants about their degree of understanding of the instructions, after the spectator game. None of the participants report not understanding the instructions. I replicate the main results excluding participants

[24] The design of the instructions was made in collaboration with local teachers, with an emphasis on age-appropiateness. Key aspects included visual aids, simple language and number, and calculation assistance. Lab assistants were briefed on the experiment instructions and available throughout all sessions to answer questions.

Figure 5: Stated preferences for distributing between workers



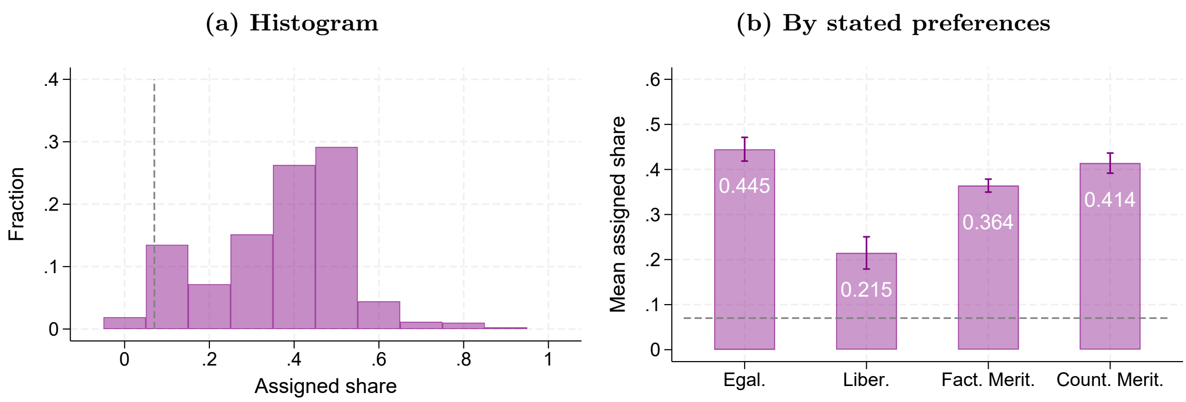
Notes: These figures plot preferred criteria for distributing between workers, as declared by spectators. Figure (a) distinguishes between younger and older children. Differences in proportions are statistically significant at the 5% level using Fisher's exact test (p-value = .012), Pearson's chi-squared test (p-value = .010), and Likelihood-ratio chi-squared test (p-value = .010). Figure (b) distinguishes between children scoring above and below the median in the cognitive ability measurement. Differences in proportions are statistically significant at the 10% level using Fisher's exact test (p-value = .079), Pearson's chi-squared test (p-value = .068), and Likelihood-ratio chi-squared test (p-value = .081).

who failed to understand part of the instructions (see XXX). Results are robust to this exclusion.

Age cutoff. I split groups by age, using the 8th grade as the cutoff for older students. I test the robustness of the results to using the 7th grade as the cutoff. Figure XXX shows the results are robust to this change.

4.2 Revealed preferences

Figure 6: Share assigned to unlucky worker



Notes: This figure plots the shares assigned to the unlucky workers. The mean initial share is plotted as a dashed line in gray.

Table 3: Distribution decisions, by stated preferences

		Higher share		
	Share to unlucky	Lucky	None	Unlucky
	(1)	(2)	(3)	(4)
Egalitarian	.081***	-.384***	.307***	.077*
	(.021)	(.075)	(.072)	(.044)
Libertarian	-.149***	.125***	-.082***	-.043
	(.029)	(.036)	(.024)	(.029)
Counter. Merit.	.050**	-0.123***	.016	.107***
	(.020)	(.043)	(.028)	(.039)
Mean dep. var.	.370	.740	.152	.109
Observations	792	792	792	792
R^2	.147	.106	.093	.029

Notes: This table reports the coefficients of dummies on preferred distribution criteria on implemented decisions. The independent variables are valued 1 for each declared preferred distribution criteria, and 0 otherwise. Lucky worker refers to the worker paid the high piece-rate. Unlucky worker refers to the worker paid the low piece-rate. Column (1) uses as dependent variable the assignment to the unlucky worker as a share of total assignments. Columns (2) to (4) uses shares of dummies for decisions assigning more to the lucky worker, to nonem and to the unlucky worker, respectively. Each column reports estimates from a linear model. Standard errors clusterized at individual level are reported in parentheses for the first column. Robust standard errors are reported in parentheses for the remaining columns. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5 Conclusion

Individuals want fairness to be implemented. With limited information to assess situations, beliefs become a key input for decisions. In this project we will measure the prevalence of individuals relying on counterfactual beliefs for moral decisions and explore how inference errors impact them. We will quantify the bias in counterfactual beliefs and explore whether cognitive development moderates these biases. We will then test if individuals internalize this and are willing to acquire additional information to make more accurate decisions. Our main results will focus on the impact of counterfactual thinking on moral decisions. We will measure the gap between decisions with complete and limited information on counterfactual choices and will test if incentivized counterfactual thinking helps narrow this gap.

Evidence on the impact of imprecise beliefs will help understanding disagreements about inequality. Differences in belief formation could influence individual moral decisions, potentially leading to biased collective decisions. Unlike disagreements stemming from variations in fairness views, disagreements arising from inference errors can be addressed through policy interventions. The findings from the incentivized counterfactual thinking treatment will provide valuable guidance for possible informational campaigns aimed at aligning individuals' decisions with their individual fairness ideals.

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A Spectator phase

A.1 Procedures

The spectator phase consists of two stages: distribution decisions with incentivized belief elicitations, and surveys. Participants are randomly assigned to different treatment conditions in a 2x2 between-subject setting. Treatments differ on the first stage and are equal in the second stage. Figure 1 in the main text details the spectator phase flow.

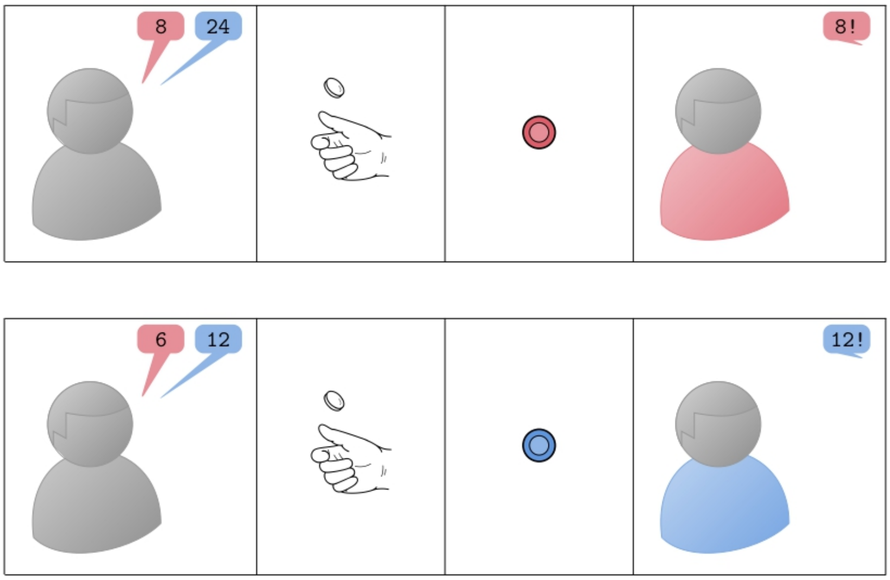
First stage. I start by laying out the workers phase setting. I explain that real people were hired to work in a number of effort tasks, that commitments were made for a low and high piece-rate value, that the piece-rate value was randomly assigned, and that workers had to follow-up their commitment. Throughout the spectator phase I use visual aid, created with a focus on making the information easy to understand. The piece-rate assignment is explained through fliping a red and blue coin. Those workers who get the red side of the coin are assigned the low piece-rate, while those who get the blue side are assigned the high piece-rate. The low piece-rate worker is labelled as 'Worker A' and is colored in red. The high piece-rate worker is labelled as 'Worker B' and is colored in blue. I explain that workers earn points, which can be later traded for money. The point-to-money conversion rate is 0.05 GBP = 1 points, implying that the low piece-rate is 1 point and the high piece-rate is 10 points. Participants are not aware of the conversion rate.

Then, I explain the pair formation, noting that each pair comprises one red worker (receiving the low piece-rate) and one blue worker (receiving the high piece-rate). I inform participants that they will decide how to distribute points within pairs, emphasizing that there is no correct or incorrect answer. I explain participants that they will be presented 5 pairs, one of which is real and that their decisions could be implemented in real life. I announce that 1 in 10 spectators will make a decision with real consequences. Spectators are aware that workers expect a third-party may influence their payment, but cannot know their identity.

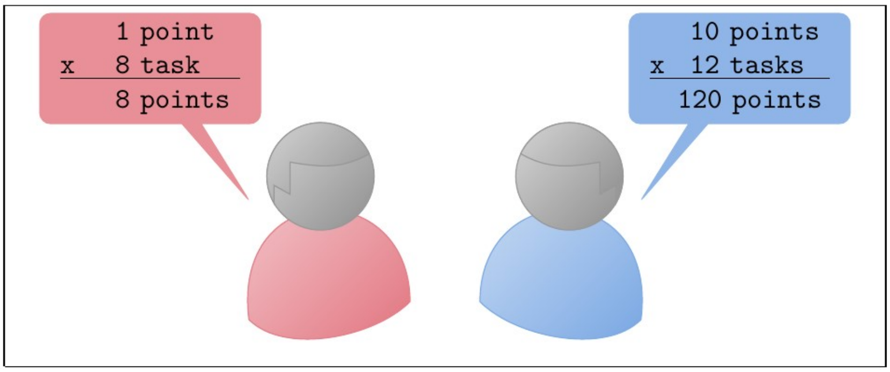
Before starting with the distributions and belief elicitations I run a comprehension test. There is no limited time or opportunities to answer. Participants are allowed to ask questions to the assisting teachers in the room. Teachers were explained the setting in the weekly coordination meeting, but are unaware of the experiment's research questions. Participants can only start with the distributions and belief elicitations after all questions in the comprehension test are correctly answered. Depending on the treatment, participants are first presented with the distribution

Figure A.1: Figures used to explain the worker phase

(a) Piece-rate assignment



(b) Pair formation



Notes: These figures were shown to explain the worker phase. Figures (a) show the task commitment and random piece-rate assignment. I use colors to differentiate commitments and assignments to different piece-rates. Red is used for the low piece-rate and blue for the high piece-rate. I use a coin flip to explain the random assignment. Figure (b) shows team formation.

decisions or with belief elicitations.

For treatment conditions `LI` and `CI`, participants are first presented with the distribution decisions. Participants decide on the point distribution within pairs in 5 scenarios. After the 5 scenarios, participants respond a post-decision survey. Followingly, spectators are offered the possibility of gaining additional information to remake decisions. Finally, participants are presented with the belief elicitations.

For treatment condition `ICT`, participants are presented first with the belief elicitations. Participants guess one worker's task commitment for the non-assigned piece-rate in one scenario. Then, participants are presented with the distribution decision for the same scenario. The distribution decision is made as in treatment conditions `LI` and `CI`. For each scenario participants complete the belief elicitation and the distribution decision. After the 5 scenarios, participants respond a post-decision survey. Finally, spectators are offered the possibility of gaining additional information to remake decisions.

Distribution decisions. See Figure A.2 for a screenshot of the distribution decision. Participants decide on the point distribution within pairs for 5 scenarios. Decisions are made with a slider and aided by a dynamic graph plotting the share assigned to each worker. There is no time limit, but a pop-up window appears 1 minute after the scenario is presented.

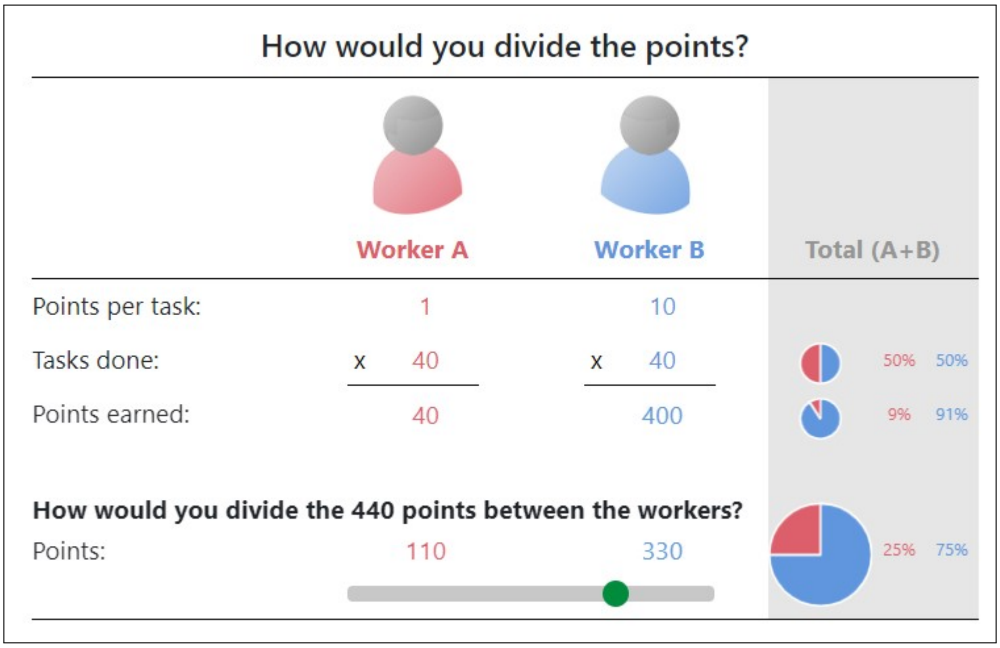
Post-decision survey. After deciding for the 5 scenarios, participants are randomly presented one decision and asked to justify it. There is a minimum character limit of 100 characters. In the next screen, participants answer a non-incentivized survey. I ask which is their preferred distribution criteria for distributing within pairs. I present a close list, with each statement adhering to (i) egalitarism, (ii) libertarianism, (iii) factual meritocracy, and (iv) counterfactual meritocracy. Responses are presented in random order. I also ask about the worker they would prefer to be, the identity of the real team, and the degree of understanding of the task.

Gaining additional information. After the post-decision survey, spectators are offered the possibility of gaining additional information to remake decisions. Offered information is on worker's effort commitment under equal opportunities. To access such information, spectators need to complete a counting zeros task (Abeler et al., 2011). Spectators are able to take or not the opportunity.

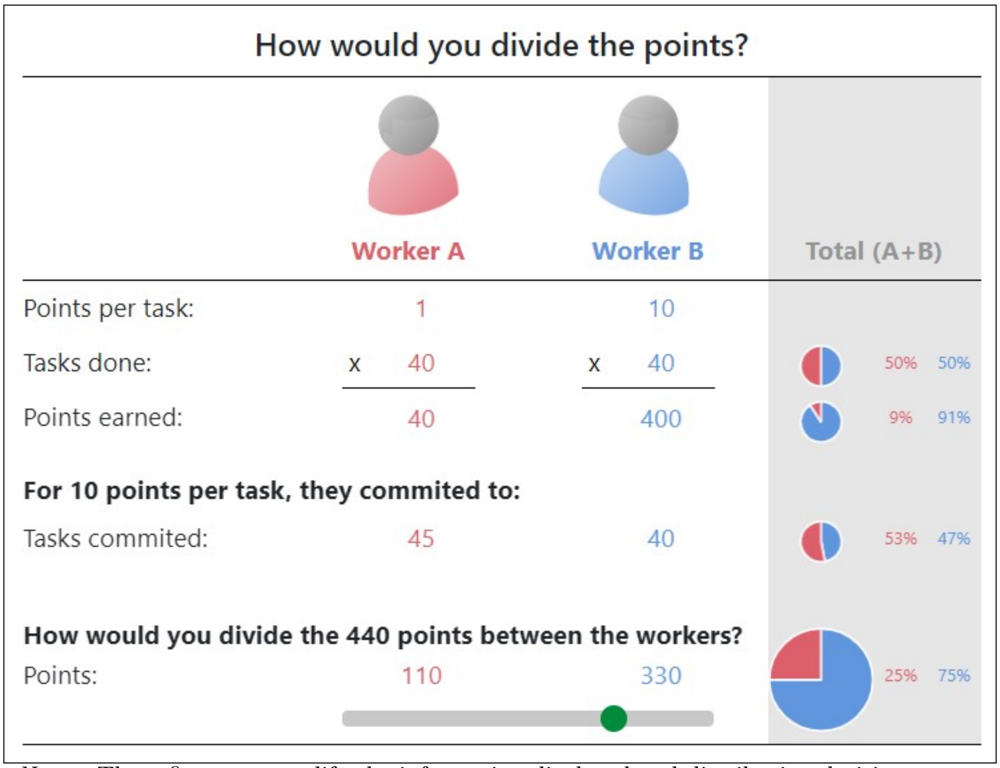
The task consists on counting zeros in a matrix. I present a square matrix composed of 1s and 0s (see Figure A.3). The task is to enter the total number of 0s in the matrix. There is no limited time or opportunities to answer. I ask participants to complete one matrix to acquire information. Participants are able to withdraw from the task at any time, loosing access to the additional information.

Figure A.2: Distribution decision screen, by treatment conditions

(a) `LI/ICT` treatments

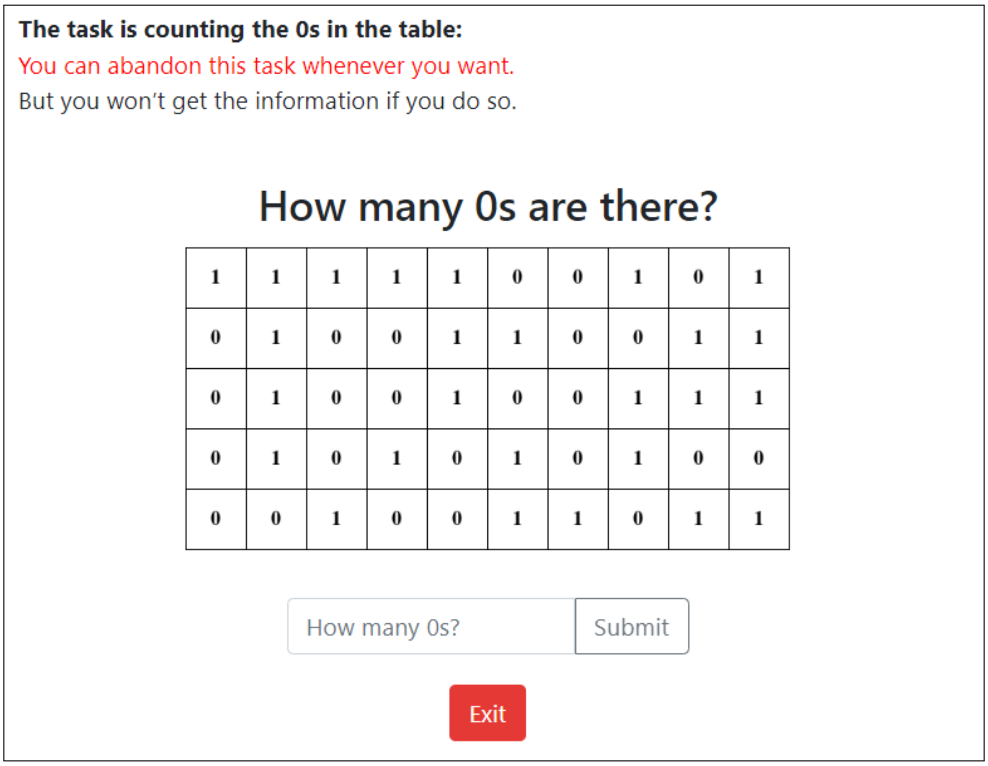


(b) `CI` treatment



Notes: These figures exemplify the information displayed and distribution decision screen. Each figure shows a pair of workers. In the `LI/ICT` treatments I provide information about piece-rate payment, tasks completed, and initial earnings for each worker. In the `CI` treatment I additionally disclose the task commitment for a same piece-rate payment (randomly selected for each pair). I also display shares for tasks and earnings (automatically computed). Participants can modify the allocation by moving the slider. A dynamic graph updates with the spectator's decision.

Figure A.3: Counting zeros task example



Notes: This screenshot exemplifies the counting zeros task. The table displayed shows a random sequence of 1s and 0s. The participant is shown the table and asked how many 0s are there in the table. The correct answer for this table is 24.

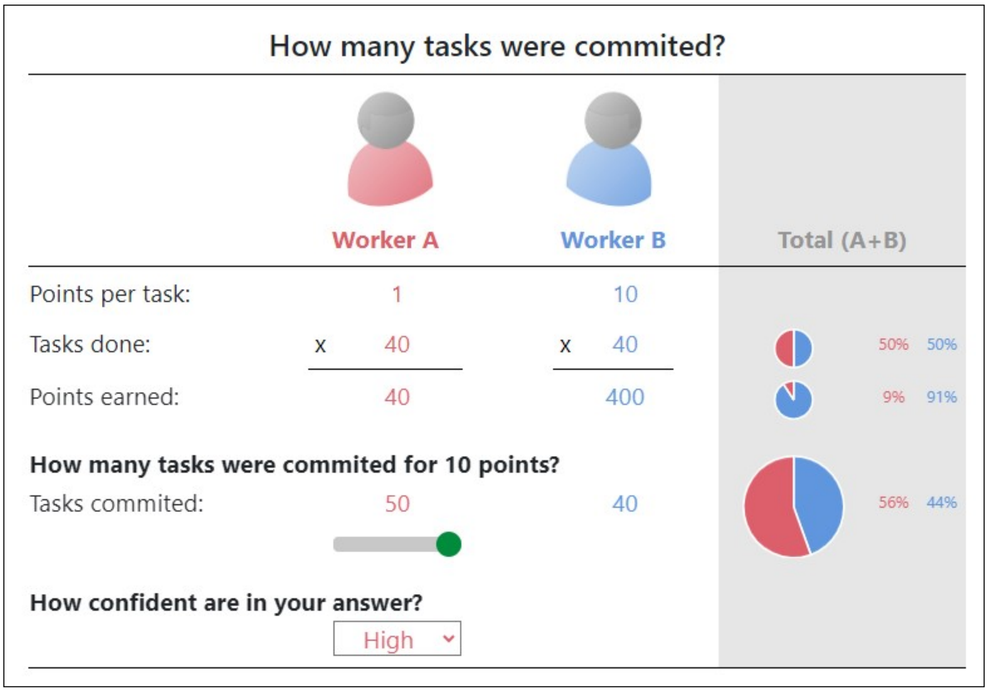
Participants who succesfully complete the task are presented with the information and asked to remake their decision for the scenario they guessed as the real one. The remake decision is made at the end of the first stage. Except for the provided information, the decision is made equally to previous decisions.

Belief elicitation. See Figure A.4 for a screenshot of the belief elicitation. Participants guess one worker's task commitment for the non-assigned piece-rate. The worker is randomly selected in each scenario. Guesses are made with a slider and aided by a dynamic graph. There is no time limit, but a pop-up window appears 1 minute after the scenario is presented.

Second stage. I run two surveys: one is incentivized and the other one is non-incentivized.

Incentivized survey. I include 12 items from Raven's Standard Progressive Matrices (SPM) test (Raven, 1936, 2000). Figure A.5 exemplifies it. Each item is a 3x3 matrix with a missing cell in the bottom right corner. Participants are asked to select the missing cell out of eight choices provided. Participants receive the test instructions before it begins. I require participants to answer a small set of comprehension questions. These refer to time allocation, number of correct

Figure A.4: Belief elicitation screen example



Notes: This screenshot exemplifies the information displayed and belief elicitation screen. The figure shows a pair of workers. In all treatment conditions I provide information about piece-rate payment, tasks completed, and initial earnings for each worker. I also display shares for tasks and earnings (automatically computed). Participants are randomly shown task commitments for one piece-rate value and asked to guess for the worker assigned the other piece-rate. Participants can modify the guess by moving the slider. A dynamic graph updates with the spectator's decision.

options per item and an illustrative item (previously used in the instructions). The test only begins after all comprehension questions are correctly answered.

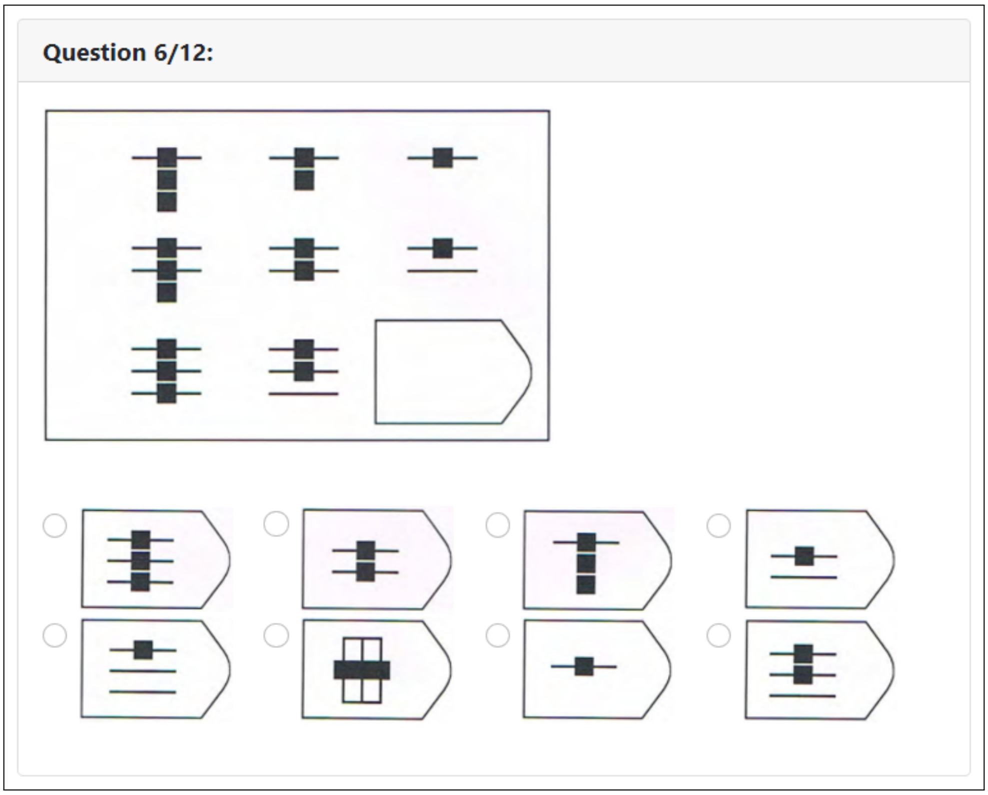
The test is presented in increasing difficulty order. Participants are able to navigate back and forth throughout the test to review and modify their answers. The test lasts up to 6 minutes. All unanswered items are considered incorrect. I incentivize performance by rewarding if correct four randomly picked items.

Non-incentivized survey. I ask participant a small set of questions. These questions concern age, gender, educational background, neighborhood of residence, household size and assets, and canteen consumption. There is no time limit to respond this survey.

After the surveys are completed, participants are thanked and dismissed.

Reward details. At the beggining of the experiment I inform participants that they will all receive rewards. I present three prize baskets, which are on display to see. Each prize basket has escalating prizes and are detailed. I explain that the basket each will obtain depends on

Figure A.5: Raven's Standard Progressive Matrices test example



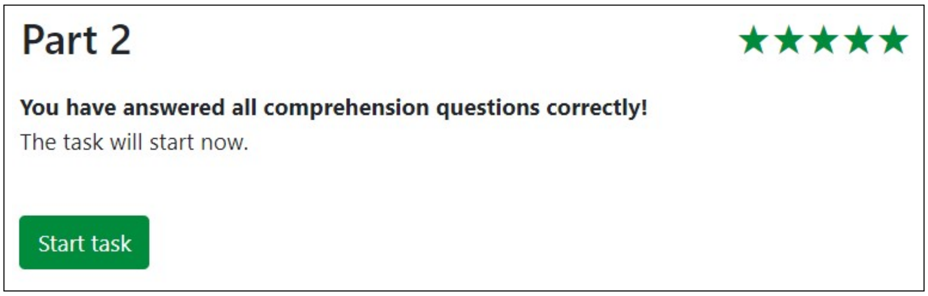
Notes: This screenshot exemplifies Raven's Standard Progressive Matrices (SPM) test. The upper image shows a 3x3 matrix with a missing cell. The task is to guess the image that corresponds to the missing cell. Only one out of the eight possible choices depicted below the matrix is correct. This is item number 6 of the SPM test. The correct answer is choice 5.

how much '*stars*' each accumulates throughout the session.

Participats accumulate '*stars*' in several screens of the experiment. The distribution decisions and non-incentivized survey yield a fix number of '*stars*' for completion. The belief elicitation and the incentivized survey yield '*stars*' depending on response accuracy. The instructions preceding each part of the experiment clearly state how '*stars*' are awarded. The total number of '*stars*' is displayed on the top right corner in each screen of the experiment.

At the end of the experiment, participants are informed how many '*stars*' they earned and which prize basket they obtain. Rewards are delivered in sealed bags anonymously, based on computer's number.

Figure A.6: Screenshots displaying accumulated stars



Notes: This screenshot exemplifies how stars are shown in each screen. Stars are colored in green and always displayed in the top right corner. After a star is earned, a screen pops-up displaying the number of stars earned during 5 seconds.

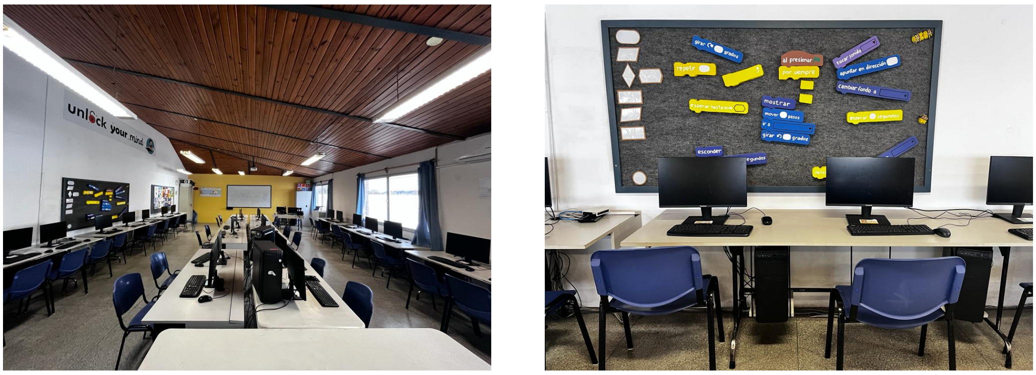
A.2 Implementation

I recruited 198 students from a private school in Montevideo on September 2023. Participation was available for all students from 5th grade to 9th grade.

The data recollection was run across four weekdays, in the school's computer lab during regular computing hours. The logistics were arranged in coordination with the school's principal board and the computing team coordination. I use the infrastructure of the school's computer lab, comprising 30 computers. With every class having under 28 students enrolled, I had no problem fitting all participants in the lab.

Figure A.7: Computer lab used

(a) Room **(b) Computer setup**



Notes: These figures show the school's computer lab, where all sessions took place. Figure (a) shows the room from the entrance. Figure (b) shows the computer setups.

I requested approval by the parents of involved students. The school delivered a consent form containing information on the project, with an explicit endorsement. No specific details on the tasks or aim of the research was communicated. Children were also instructed that their participation was voluntary.

I offered participants prize baskets containing canteen products. All participants received a reward worth 75 UYP ($\sim$ 2.00 USD) for participation and could earn products worth up to 265 UYP ($\sim$ 7.00 USD). I set the expected time to complete the study to 30 minutes, below the average computing class duration. The study was fully conducted in Spanish.

A.3 Results

The study was completed in 10 sessions throughout four days. Each session consisted of an entire group. Each grade consists of two groups. Sessions were run during computing class and lasted its whole duration.

All parents and students agreed to participate in the study. Attendance to the school was almost complete (see Table A.1). All attending students during computing class participated in the activity. Average value of the prize basket reward was 113 Uruguayan Pesos ($\sim$ 3.00 USD).

Table A.1: School attendance

Grade	Group	Absent (1)	Attendance (2)
5th	East	4	.826
5th	West	2	.920
6th	North	3	.875
6th	South	2	.920
7th	North	2	.905
7th	South	4	.826
8th	North	0	1.000
8th	South	2	.920
9th	North	0	1.000
9th	South	1	.929
5th-9th	**All**	**20**	**.908**

Notes: This table reports school attendance the day each group participated in the study. There are two groups per grade, labelled by the cardinal direction of the classroom. Column (1) reports number of absentees in each group. Column (2) reports the attendance rate for each group.

Table A.2 compares characteristics of our sample with Montevidean population based on data from the 2022 Uruguayan Household Survey. In short, spectators come from households with higher income per capita than the population. The sample is part of a reduced group of households with low material limitations.

Table A.2: Sample characteristics

	Spectators (1)	Population (2)	Difference (3)
Panel A. Individuals			
Male	.563	.515	.048
			(.037)
All education in school	.753	-	-
New to school	.056	-	-
Daily canteen expenditure	.87	-	-
Panel B. Households			
Cars: 2+	.929	.092	.837***
			(.019)
Rooms: 5+	.697	.233	.464***
			(.034)
Income per capita: 1000+	.970	.270	.700***
			(.016)
Under the poverty line	.000	.195	-.194***
			(.009)

Notes: This table reports statistics for the spectator sample and the population. The population sample covers all inidividuals in the same age bracket living in the same city. Panel A refers to individual characteristics. Panel B refers to household characteristics. Rows 5 to 7 show household shares. Row 5 refers to total number of cars in the individual's home. Row 6 refers to total number of rooms (excluding bathrooms and kitchen) in the individual's home. Row 7 and 8 include non-parametrics estimates for the spectator sample based in data from the 2022 Uruguayan Household Survey. All income are expressed in 2023 United States Dollars (USD). Columns (1) and (2) show mean shares. Column (3) shows differences between spectators and general population. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

B Worker phase

B.1 Procedures

The worker phase consists of the commitment and completion of letter-to-number encryption tasks. Figure B.1 exemplifies one task. Participants are explained how the encryption works and are asked to complete 3 encryptions, as trial. Afterwards, participants are asked to commit to a number of encryptions for each of two piece-rate payments: low (0.05 British Pounds, $\sim$ 0.06 USD), or high (0.50 British Pounds, $\sim$ 0.60 USD). Each participant is randomly assigned to one of the two piece-rate payments and has to follow-up on their commitment for that piece-rate.

Task presentation. I present a '*word*', formed by letters. Every letter has a 3-digit number assigned, displayed in a separate encryption table. Worker's task is to submit the '*code*' assigned to the '*word*'. Workers can only proceed to the next '*word*' if the encryption is done correctly. There is no limited time or opportunities to answer. Once the correct '*code*' is supplied, the workers can proceed to a new '*word*' and encryption table.

Figure B.1: Letter-to-number encryption task example

T	C	R	G	O	K	I	A	P	N	B	V	Z
879	978	054	397	129	170	402	361	328	195	807	785	354

X	W	U	F	S	H	M	E	L	Q	D	J	Y
385	438	218	435	812	157	873	389	573	392	720	214	158

'word': XR

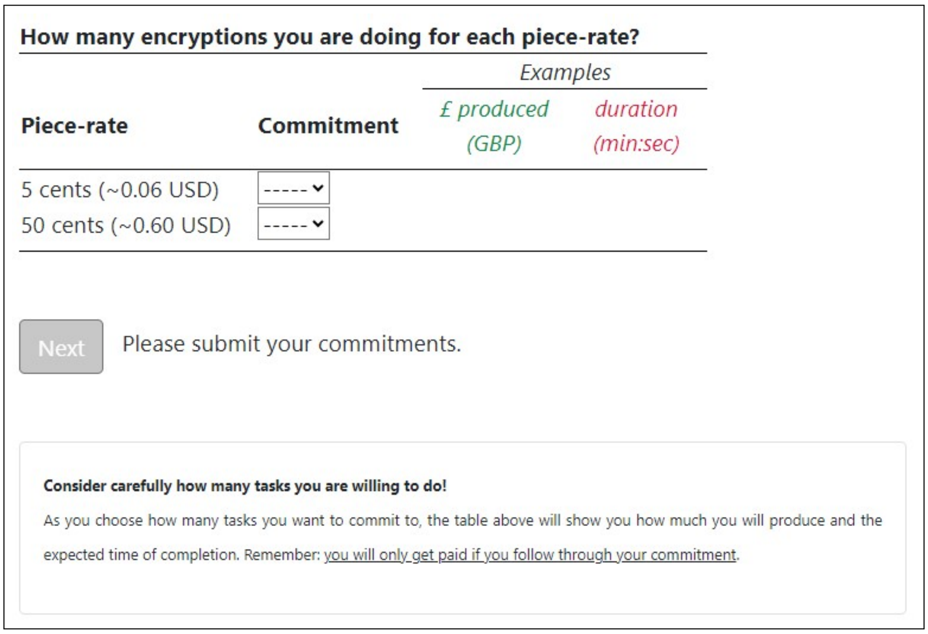
Enter the 'code' | Submit

Notes: This screenshot exemplifies the letter-to-number encryption task. The encryption tables are depicted above. The table displays all letters of the English alphabet in random order. Each letter is allocated a 3-digit number. The assigned '*word*' and a filling blank for the '*code*' are depicted below. The 'code' is formed by all digits, with no space between them. Each round the '*word*' and encryption table are randomly chosen. The encryption table changes both the letter order and the numbers assigned to each letter. In this example, the '*word*' is XR and the '*code*' is 385054.

The encryptions take longer as participants advance. The first 5 encryption '*words*' have 1 letter. Every 5 encryptions one letter is added to the '*word*'. I inform participants about the increasing length of the '*word*' and exemplify it.

Task commitment. I inform participants about two possible piece-rate for each encryption succesfully completed: low piece-rate (0.05 British Pounds, ∼ 0.06 USD), or high piece-rate (0.50 British Pounds, ∼ 0.60 USD). I ask participants to commit to how many tasks they will complete under each piece-rate. The minimum number of tasks is 5, the maximum is 50. I ask participants to carefully consider their commitments, and inform them that they need to follow-up on their commitment to receive the payment.

Figure B.2: Task commitment


How many encryptions you are doing for each piece-rate?

Piece-rate	Commitment	Examples: £ produced (GBP)	Examples: duration (min:sec)
5 cents (~0.06 USD)	-----		
50 cents (~0.60 USD)	-----		

Next Please submit your commitments.

Consider carefully how many tasks you are willing to do!

As you choose how many tasks you want to commit to, the table above will show you how much you will produce and the expected time of completion. Remember: you will only get paid if you follow through your commitment.

Notes: This screenshot shows the explanation and form to commit tasks for each piece-rate payment. The last columns automatically generate estimates of money produced and total duration for the corresponding commitment.

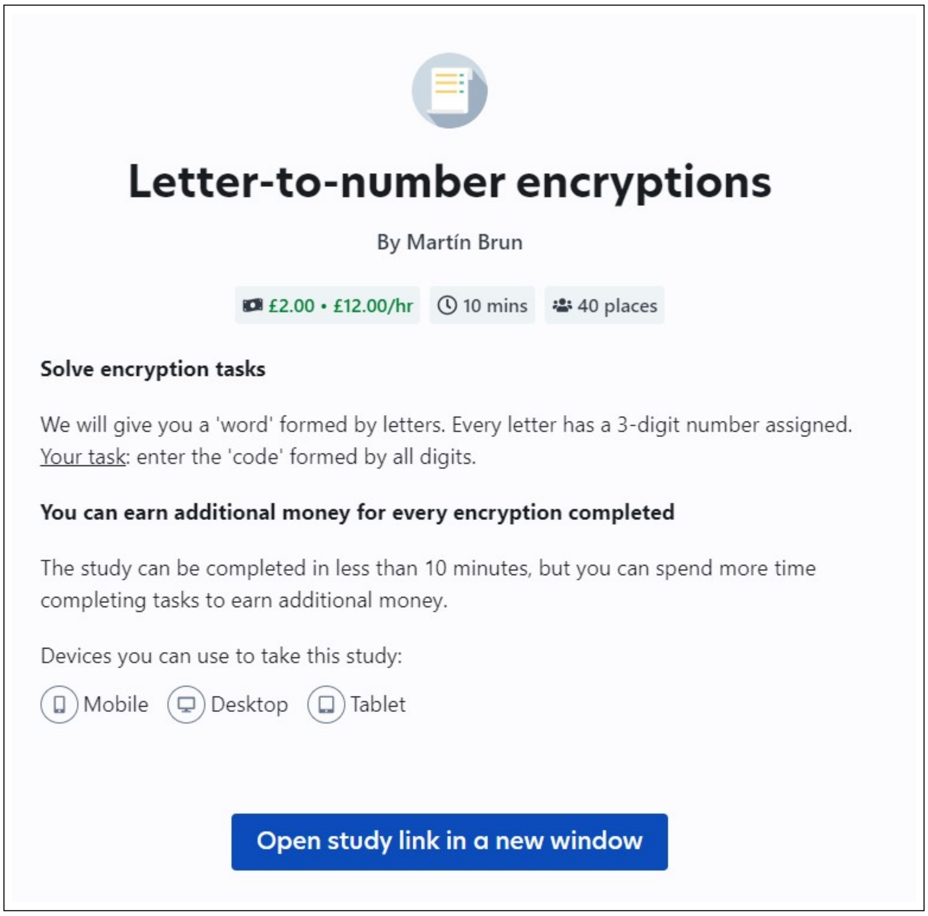
Task completion. The resulting piece-rate is randomly assigned. Participants are required to follow-up on their commitment to obtain the base payment.

Reward details. I inform participants their final payoff can be influenced by a third-party. I restrict information about when, how, why, and who is involved in the income allocation. Workers earn a 2 British Pound (∼2.50 USD) base payment and can earn bonus payment based on their performance.

B.2 Implementation

I recruited 40 participants in *Prolific* on August 2023. Figure B.3 depicts the study description in *Prolific*. I offered a 2 British Pound (∼2.50 USD) base payment for completing the study and the possibility of earning additional money.[25] I set the expected time to complete the study to 10 minutes. Participation was available only to workers residing in the United States.

Figure B.3: Prolific study description



Notes: This screenshot shows the information displayed to participants when entering the study in Prolific. The button at the bottom links to the experiment.

[25] *Prolific* works with British Pounds. Participants with sufficient experience in the platform are used to it. Still, I display an approximation for United States Dollars (USD) for the sake of clarity.

B.3 Results

The study was completed in less than 2 hours.[26] Median time to complete the study was 8 minutes and 32 seconds. Average payment to participants (including bonus payment) was 7.13 British Pounds ($\sim$ 8.55 USD). Total cost was around 285 British Pounds ($\sim$ 340 USD).

Table B.1: Sample characteristics

	Mean (1)	Min (2)	Max (3)
Panel A. Demographic			
Male	.47	.00	1.00
White	.53	.00	1.00
Age	36.89	20	76
Born in U.S.	.75	.00	1.00
Citizen from U.S.	.80	.00	1.00
Panel B. Performance			
Total approvals in Prolific	937	5	3,105
Time to complete task (seconds)	786	220	2,808
Total earnings from task	7.13	2.25	27.00

Notes: This table describes sample characteristics. Column (1) shows means. Column (2) shows minimum values. Column (3) shows maximum values.

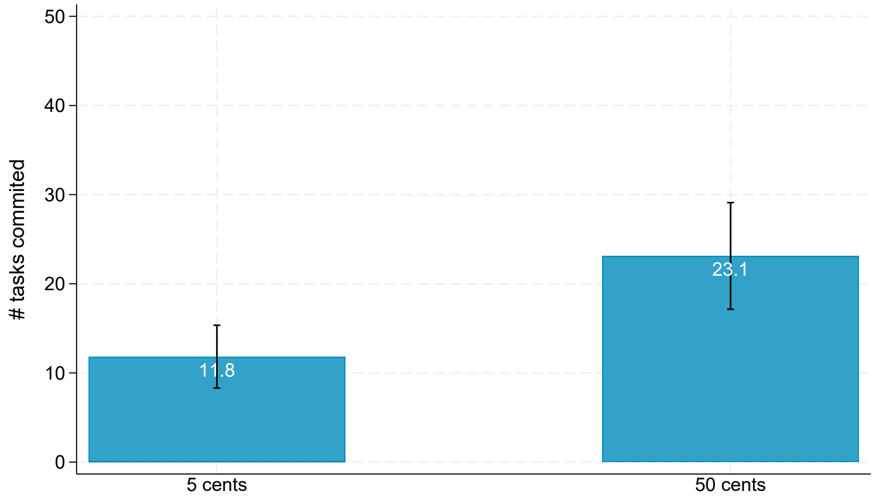
Participants completed an average of 15.9 tasks (SD = 14.5).

Basic assumptions. Figure B.4 shows the mean task commitment for each piece-rate payment. Commitments for all piece-rate payments are statistically different from 5 and from 50 (see columns 2 and 3 in Table B.2 for details). Results are in line with the basic assumptions about worker's behavior.

Implications. To explore commitment differences by piece-rate payments, I rank commitments within each piece-rate payment and compare the number of task commited in each ranking position. Figure B.5 depicts the results. There are workers committing the minimum and maximum number of tasks for all piece-rate payments. In those regions, commitments by piece-rate payments converge to the same number of tasks. For intermediate number of tasks, commitments are larger for the high piece-rate payment.

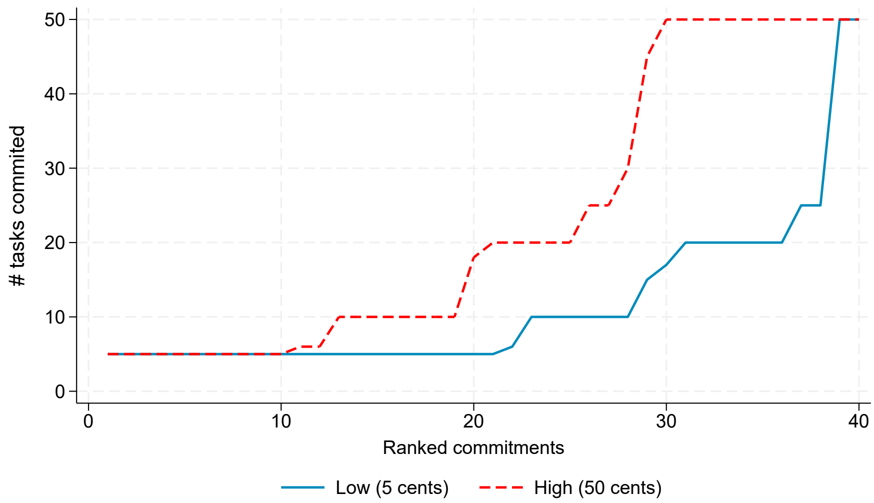
[26] I launched the experiment at 12:00 EDT (09:00 PDT). The last participant completed the study at 13:07 EDT (10:07 PDT). EDT is Eastern Daylight Time (e.g., used in New York City), and PDT is Pacific Daylight Time (e.g., used in Los Angeles).

Figure B.4: Commitment by piece-rate payment



Notes: This figure plots mean task commitments for each piece-rate payment. 95% confidence interval is plotted as bars.

Figure B.5: Commitment ranking by piece-rate payment



Notes: This figure plots ordered task commitments for each piece-rate payment. Commitments are ranked within piece-rate payment (similar to a percentile). For example, rank 20 is the median task commitment for each piece-rate payment.

Column 4 in Table B.2 shows the differences for task compared to the high piece-rate payment. Commitments increase with the piece-rate payment. Raw differences are statistically significant.

We test the differences between task commitment by piece-rate payments using a regression. Results are shown in Table B.3. We run regressions comparing task commitment between low and high piece-rate payments. Commitments increase with the piece-rate payment. Differences are statistically significant for all specifications.

Table B.2: T-tests on commitments by piece-rate payment

	Mean	vs. 0	vs. 50	vs. High
	(1)	(2)	(3)	(4)
Low	11.8	-	-	-11.3***
		[.000]	[.000]	[.002]
High	23.1	-	-	
		[.000]	[.000]	

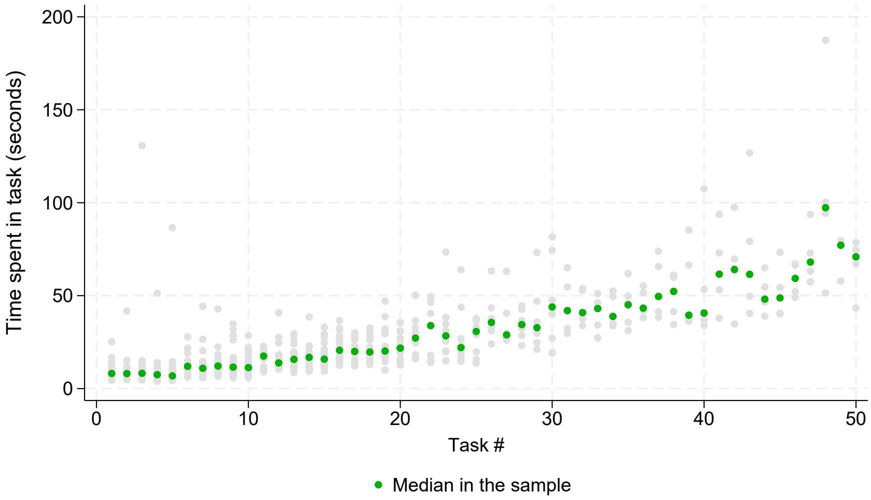
Notes: These tables describe participant's commitments for different piece-rate payments. Column (1) show mean commitment per piece-rate payment. Columns (2) and (3) show p-values on the differences with the minimum commitment (0 encryptions) and the maximum commitment (50 encryptions), respectively. Column (4) show differences with the High piece-rate payment (50 cents). p-values are reported in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.3: Piece-rate payments drawn

	(1)	(2)
High	11.3***	11.3***
	(2.4)	(3.3)
Individual FE	No	Yes
Observations	80	80
R^2	.122	.787

Notes: This table reports the coefficients for high piece-rate payment on task commitment. The dependent variable is the number of tasks committed. The independet variable is a dummy variable for 'high' piece-rate payment. Low piece-rate payment is 5 cents. High piece-rate payment is 50 cents. Each column reports estimates from a linear model. Standard errors clusterized at individual level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure B.6: Time spent per task



Notes: This figure plots time spent (in seconds) per task by all participants. Median time spent is plotted in green. One outlier is excluded from the plot: more than 600 seconds for task #19.

C Old results

Table C.1: Implementation, by preferred criteria

	Equalize	Maintain	As fact.	As counter.	As belief
	(1)	(2)	(3)	(4)	(5)
Egalitarian	.322***	-.061	-.126**	.018	.084
	(.069)	(.039)	(.057)	(.042)	(.064)
Libertarian	-.242***	.336***	-.284***	-.153***	-.183***
	(.041)	(.101)	(.059)	(.045)	(.046)
Counter. Merit.	.025	-.032	-.081	.011	-.012
	(.052)	(.042)	(.058)	(.043)	(.052)
Individual FE	No	No	No	No	No
Observations	792	792	792	792	792
R^2	.088	.106	.034	.013	.024

Notes: This table reports the coefficients of dummies on preferred distribution criteria on different categorical decisions. The independent variables are valued 1 for declared preferred distribution criteria , and 0 otherwise. The dependent variable in column (1) is a dummy valued 1 for observations where the share assigned to the unlucky worker is between 45% and 55% of total income. The dependent variable in columns (2) to (5) are a dummies valued 1 for observations where the absolute difference between the share assigned to the lucky worker and the reference share is below 5%. Sample is restricted to the hypothetical scenarios. Each column reports estimates from a linear model. Standard errors clusterized at individual level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.2: Implementation

(a) Age

	All	Kids	Teens
	(1)	(2)	(3)
Equalize	.343	.353	.328
Maintain	.140	.151	.122
As factual choices	.375	.310	.483
As counterfactual choices	.278	.258	.311
As inferred choices	.250	.238	.270

(b) Cognitive Ability

	All	High	Low
	(1)	(2)	(3)
Equalize	.343	.348	.337
Maintain	.140	.150	.123
As factual choices	.375	.323	.460
As counterfactual choices	.278	.274	.283
As inferred choices	.250	.246	.257

Table C.3: Implementation

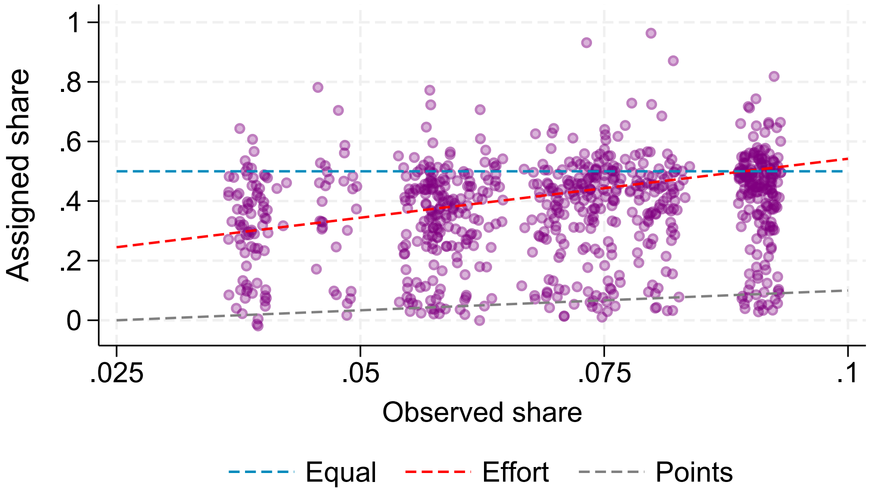
(a) Age

	Equalize	Maintain	As fact.	As counter.	As belief
	(1)	(2)	(3)	(4)	(5)
Teens	-.025	-.030	.173***	.053	.032
	(.043)	(.043)	(.051)	(.035)	(.043)
Individual FE	No	No	No	No	No
Observations	792	792	792	792	792
R^2	.001	.002	.030	.003	.001

(b) Cognitive Ability

	Equalize	Maintain	As fact.	As counter.	As belief
	(1)	(2)	(3)	(4)	(5)
High CA	-.011	-.027	.137***	.009	.011
	(.045)	(.044)	(.051)	(.034)	(.045)
Individual FE	No	No	No	No	No
Observations	792	792	792	792	792
R^2	.000	.001	.019	.000	.000

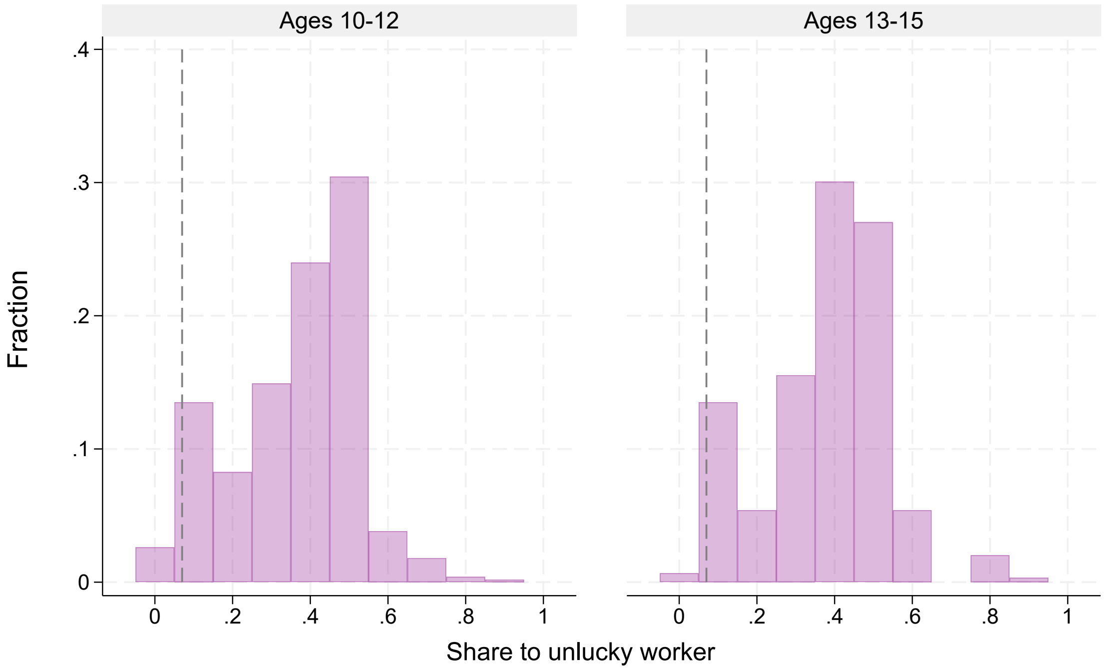
Figure C.1: Share to the unlucky worker



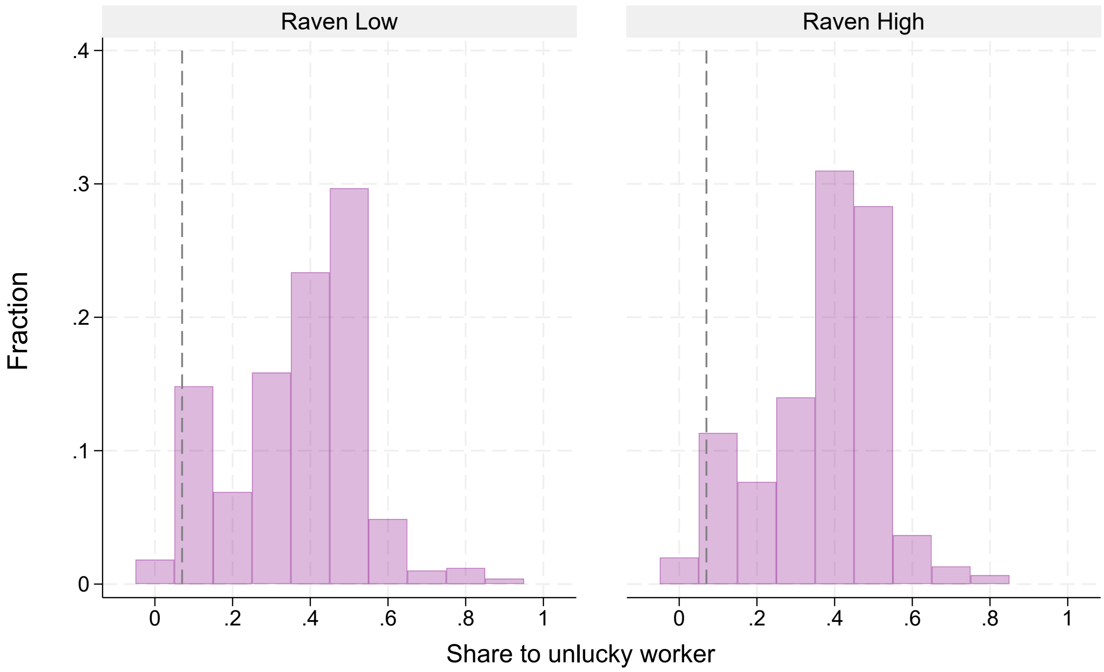
Notes: This figure plots the assigned shares over observed shares to the unlucky worker. Dashed lines plot equal assignment (in blue), assignment relative to observed effort shares (in red), and assignment relative to initial point share (in gray).

Figure C.2: Share assigned to unlucky worker

(a) Age



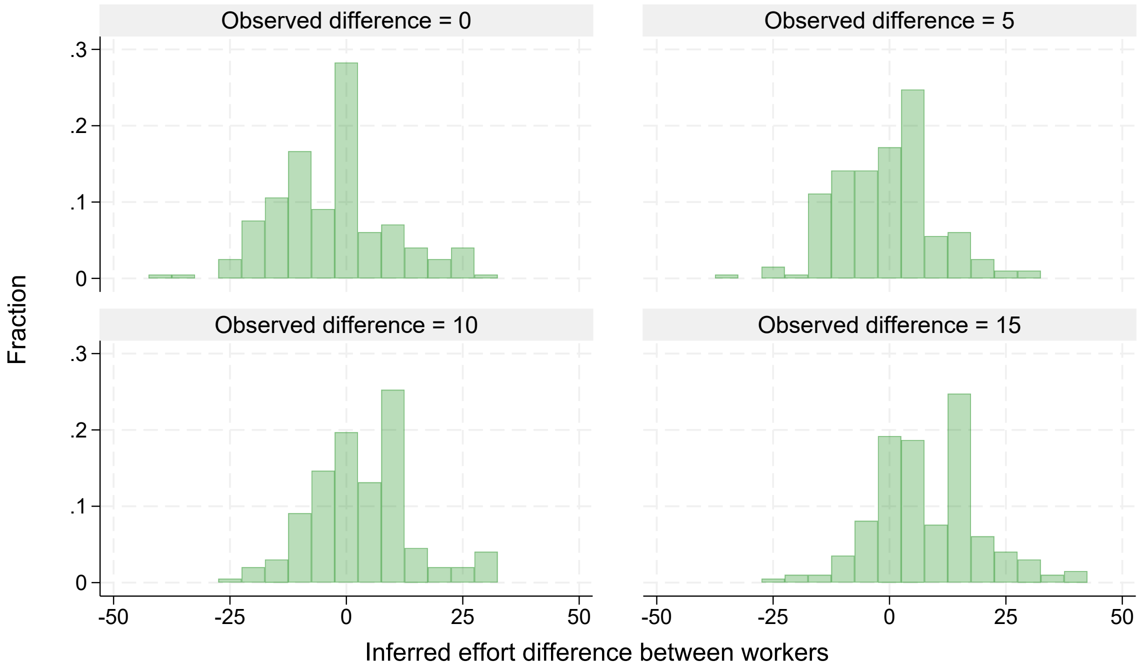
(b) Cognitive Ability



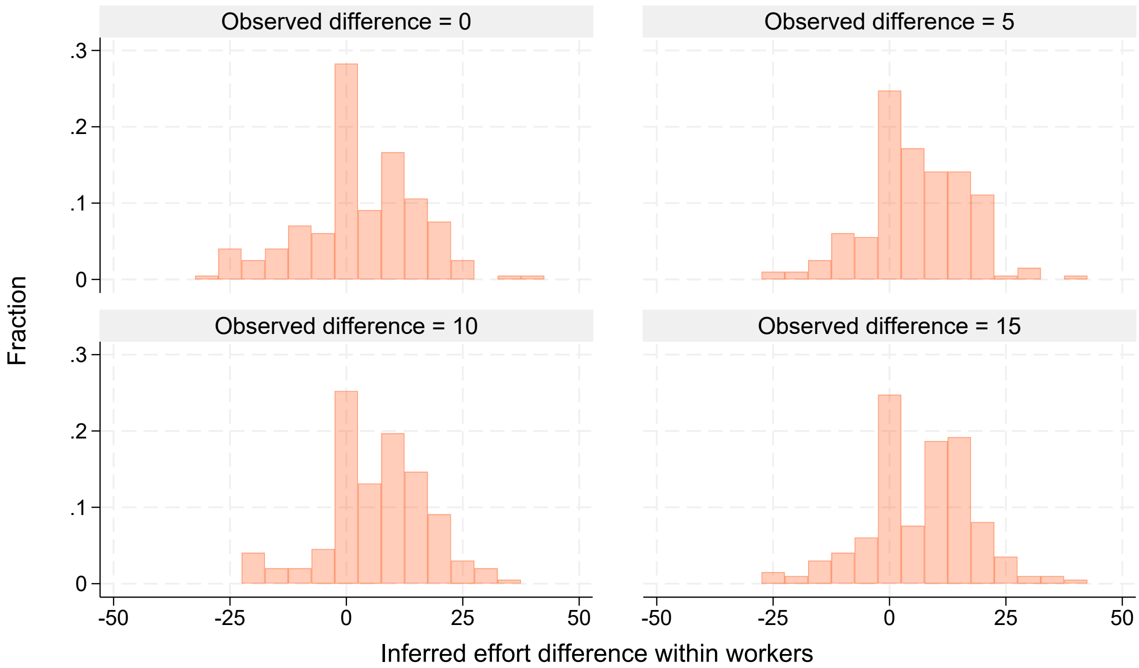
Notes: These figures plot the shares assigned to the unlucky workers. The mean initial share is plotted as a dashed line in gray.

Figure C.3: Inferred effort difference, by observed difference

(a) Between workers



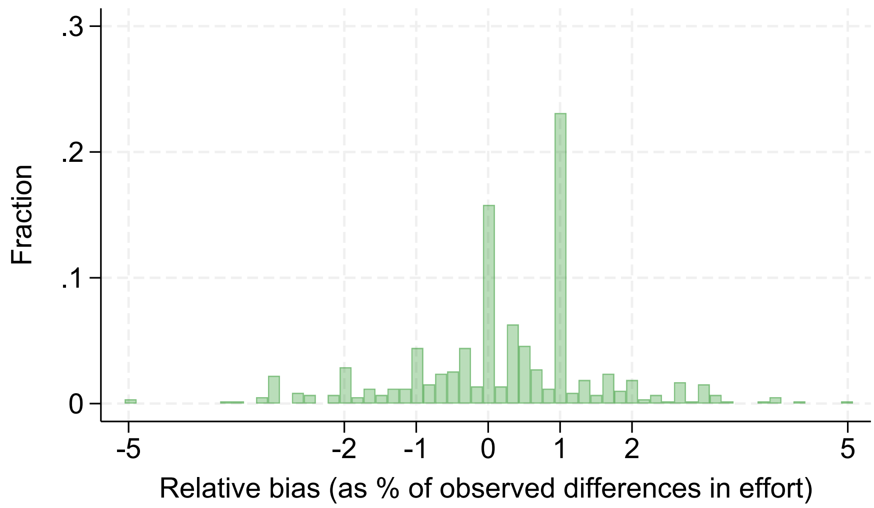
(b) Within workers



Notes: These figures plot mean inferred effort differences. Figure (a) shows inferred differences between workers in a pair when under equal opportunities. Figure (b) shows inferred differences when workers receive high piece-rate in comparisson to low piece-rate.

Figure C.4: Inferred effort difference

(a) Between workers



Notes: This figure plots inferred effort differences between the lucky worker and the unlucky worker. Outliers below 500% (XX of the observations) and above 500% (XX of the observations) are excluded from the graph.

Table C.4: Revealed preferences, by individual characteristics

		Observed diff.			
	Total	0	5	10	15
	(1)	(2)	(3)	(4)	(5)
Panel A. Age					
Ages 13-15	.014	.030	.045*	.004	-.022
	(.012)	(.023)	(.023)	(.023)	(.023)
Observations	792	198	198	198	198
R^2	.002	.009	.019	.000	.004
Panel B. Cognitive Ability					
High CA	.005	-.004	.020	.009	-.005
	(.012)	(.023)	(.022)	(.023)	(.023)
Observations	792	196	196	196	196
R^2	.000	.000	.004	.001	.000

Notes: This table reports the coefficients of dummies on preferred distribution criteria on the assigned share to the unlucky worker. The independent variables are valued 1 for each declared preferred distribution criteria , and 0 otherwise. The dependent variable is computed as assignment to the unlucky worker as a share of total assignments. Column (1) covers all decisions in hypothetical scenarios. Columns (2) to (5) cover each a scenario, which differs in the observed effort difference. Each column reports estimates from a linear model. Standard errors clusterized at individual level are reported in parentheses for the first column. Robust standard errors are reported in parentheses for the remaining columns. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

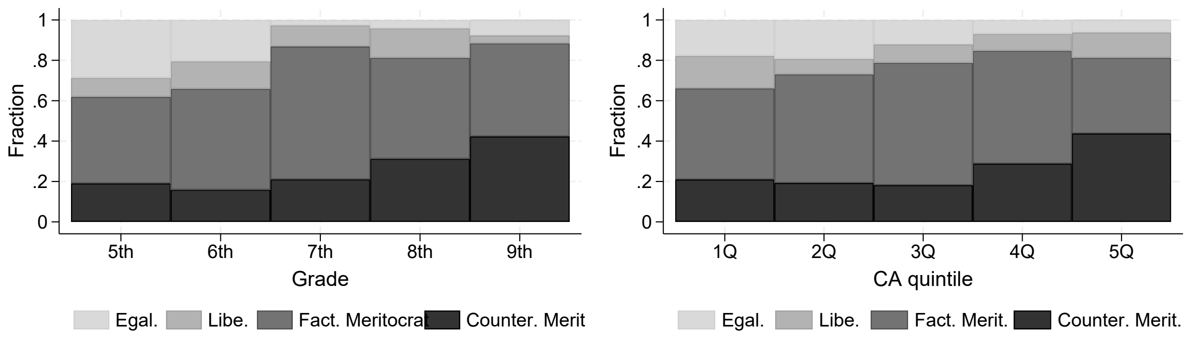
Table C.5: Revealed preferences, by stated preferences

		Observed diff.			
	Total	0	5	10	15
	(1)	(2)	(3)	(4)	(5)
Egalitarian	.081***	.073***	.081***	.088***	.082**
	(.021)	(.025)	(.028)	(.029)	(.035)
Libertarian	-.149***	-.141***	-.144***	-.170***	-.143***
	(.029)	(.038)	(.043)	(.030)	(.038)
Counter. Meritocrats	.050**	.049*	.060**	.058**	.033
	(.020)	(.027)	(.025)	(.026)	(.027)
Higher counter. share	-	Unlucky	Unlucky	Equal	Lucky
Observations	792	198	198	198	198
R^2	.147	.141	.159	.198	.128

Notes: This table reports the coefficients of dummies on preferred distribution criteria on the assigned share to the unlucky worker. The independent variables are valued 1 for each declared preferred distribution criteria , and 0 otherwise. The omitted category is Factual Meritocrats. The dependent variable is computed as assignment to the unlucky worker as a share of total assignments. Column (1) covers all decisions in hypothetical scenarios. Columns (2) to (5) cover each a scenario, which differs in the observed effort difference. Each column reports estimates from a linear model.
Standard errors clusterized at individual level are reported in parentheses for the first column. Robust standard errors are reported in parentheses for the remaining columns. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

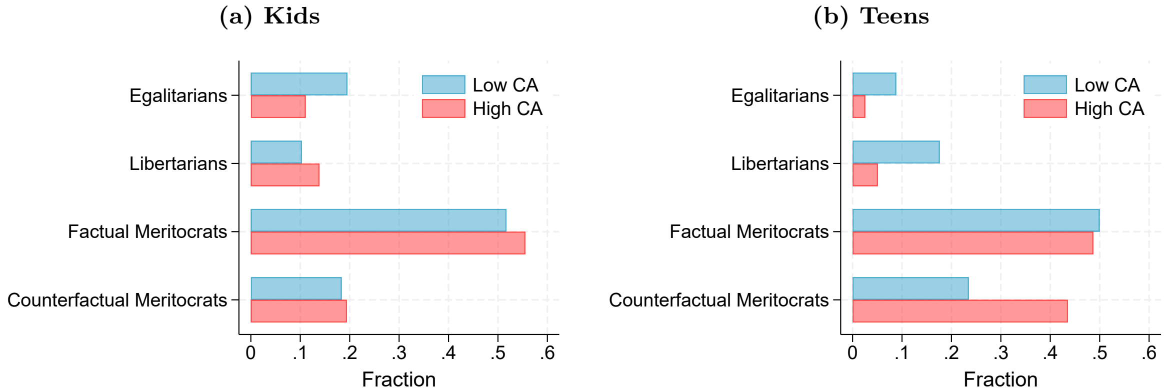
Figure C.5: Stated preferences for distributing between workers

(a) Grade **(b) Cognitive ability**



Notes: These figures plot preferred criteria for distributing between workers, as declared by spectators. Figure (a) distinguishes by grade. Figure (b) distinguishes by quintiles from the cognitive ability measurement.

Figure C.6: Stated preferences for distributing between workers



Notes: These figures plot preferred criteria for distributing between workers, as declared by spectators. Figure (a) distinguishes between children scoring above and below the median in the cognitive ability measurement within younger children. Figure (b) distinguishes between children scoring above and below the median in the cognitive ability measurement within older children.

Table C.6: Information provision on revealed preferences

(a) Stated preferences

		Stated preferences			
	Total	Egal.	Libe.	Fact. Merit.	Counter. Merit.
	(1)	(2)	(3)	(4)	(5)
Complete Information	.037*	.006	-.044	.060***	-.003
	(.021)	(.031)	(.050)	(.017)	(.025)
Dep. var. mean	.355	.439	.235	.343	.418
Observations	544	68	64	268	144
R^2	.013	.001	.015	.040	.000

Notes: This table reports the coefficients of complete information treatment on the assigned share to the unlucky worker. Sample is restricted to participants with limited information (`LI`) and complete information (`CI`). The independent variables is valued 1 for participants provided with information on counterfactual effort, and 0 otherwise. The dependent variable is computed as assignment to the unlucky worker as a share of total assignments. Dependent variable mean for participants with limited information is displayed. Column (1) covers all decisions in hypothetical scenarios. Columns (2) to (5) cover each a scenario, which differs in the observed effort difference. Each column reports estimates from a linear model. Standard errors clusterized at individual level are reported in parentheses for the first column. Robust standard errors are reported in parentheses for the remaining columns. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

(b) Among meritocrats, by individual characteristics

		Age		Cognitive Ability	
	Total	Kids	Teens	Low	High
	(1)	(2)	(3)	(4)	(5)
Complete Information	.042**	.054*	.026	.069**	-.004
	(.021)	(.028)	(.033)	(.028)	(.033)
Dep. var. mean	.365	.356	.377	.346	.397
Observations	412	236	176	252	156
R^2	.020	.031	.008	.050	.000

Notes: This table reports the coefficients of complete information treatment on the assigned share to the unlucky worker. Sample is restricted decision in hypothetical scenarios from Factual and Counterfactual Meritocrats with limited information (`LI`) and complete information (`CI`). The independent variables is valued 1 for participants provided with information on counterfactual effort, and 0 otherwise. The dependent variable is computed as assignment to the unlucky worker as a share of total assignments. Dependent variable mean for participants with limited information is displayed. Column (1) includes all participants in the restricted sample. Columns (2) to (3) split sample by age. Columns (4) to (5) split sample by cognitive ability. Each column reports estimates from a linear model. Standard errors clusterized at individual level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.7: Inferred effort differences, by individual characteristics

		Observed diff.			
	Total	0	5	10	15
	(1)	(2)	(3)	(4)	(5)
Panel A. Age					
Ages 13-15	.52	1.20	1.56	-1.65	.96
	(1.07)	(1.77)	(1.48)	(1.55)	(1.61)
Panel B. Cognitive Ability					
High CA	1.99*	3.64**	1.00	-.20	3.50**
	(1.11)	(1.75)	(1.50)	(1.58)	(1.58)
Dep. var. mean	5.47	2.91	5.74	6.55	6.67
Observations	784	196	196	196	196
R^2	.007	.022	.002	.000	.022

Notes: This table reports the coefficients of dummies on preferred distribution criteria on the assigned share to the unlucky worker. The independent variables are valued 1 for each declared preferred distribution criteria , and 0 otherwise. The dependent variable is computed as assignment to the unlucky worker as a share of total assignments. Column (1) covers all decisions in hypothetical scenarios. Columns (2) to (5) cover each a scenario, which differs in the observed effort difference. Each column reports estimates from a linear model. Standard errors clusterized at individual level are reported in parentheses for the first column. Robust standard errors are reported in parentheses for the remaining columns. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.8: Implementation, by preferred criteria

(a) Share

	All	Egalit.	Libert.	Fact. Merit.	Counter. Merit.
	(1)	(2)	(3)	(4)	(5)
Equalize	.343	.644	.080	.322	.347
Maintain	.140	.058	.455	.119	.087
As factual choices	.375	.317	.159	.443	.362
As counterfactual choices	.278	.308	.136	.290	.301
As inferred choices	.250	.346	.080	.262	.250

Notes: This table reports shares for categorical decisions by individual's declared preferred criteria. All cells show shares. Observations can be represented in more than one categorical decision. Row 1 shows observations where the share assigned to the unlucky worker is between 45% and 55% of total income. Rows 2 to 5 show observations where the absolute difference between the share assigned to the lucky worker and the reference share is below 5%.

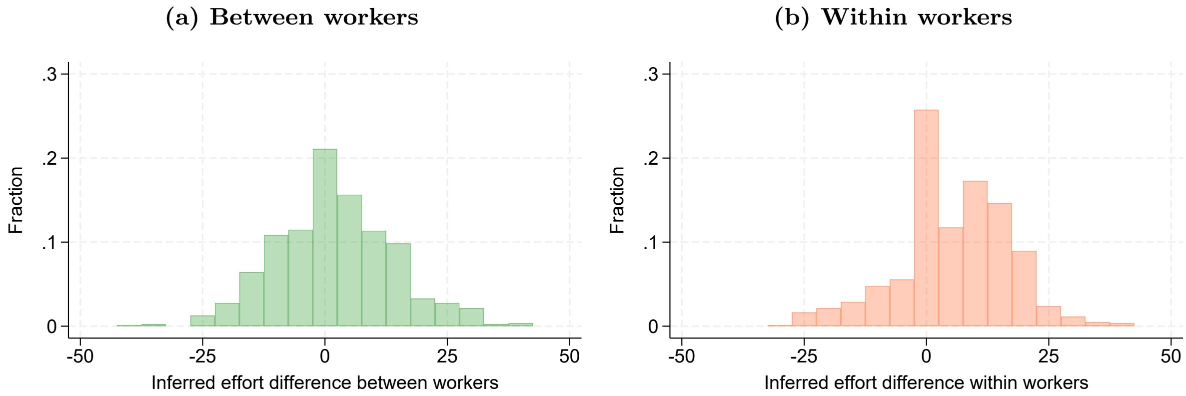
(b) Count

	All	Egalit.	Libert.	Fact. Merit.	Counter. Merit.
	(1)	(2)	(3)	(4)	(5)
Equalize	1.37	2.58	0.32	1.29	1.39
Maintain	0.56	0.23	1.82	0.47	0.35
As factual choices	1.50	1.27	0.64	1.77	1.45
As counterfactual choices	1.11	1.23	0.55	1.16	1.20
As inferred choices	1.00	1.39	0.32	1.05	1.00

Notes: This table reports mean number of decision implementation by individual's declared preferred criteria. All cells show number of implementations. Observations can be represented in more than one categorical decision. Row 1 shows observations where the share assigned to the unlucky worker is between 45% and 55% of total income. Rows 2 to 5 show observations where the absolute difference between the share assigned to the lucky worker and the reference share is below 5%.

C.1 Beliefs

Figure C.7: Inferred effort difference



Notes: These figures plot mean inferred effort differences. Figure (a) shows inferred differences between workers in a pair when under equal opportunities. Figure (b) shows inferred differences when workers receive high piece-rate in comparisson to low piece-rate.

Table C.9: Inferred effort difference, by observed difference

	Between		Within	
	# Tasks	Relative	# Tasks	Relative
Observed diff.	(1)	(2)	(3)	(4)
0	-2.91		2.91	.095
5	-.74	-.147	5.74	.200
10	3.45	.345	6.55	.290
15	8.33	.555	6.67	.337

Notes: This table describes beliefs by observed effort differences between the lucky worker and the unlucky worker. Columns (1) and (2) show mean inferred effort difference between the lucky and the unlucky worker under equal opportunities. Column (1) reports the difference in number of tasks and column (2) reports the difference as a share of the observed difference under unequal opportunities. Columns (3) and (4) show mean inferred effort difference for high piece-rate versus low piece-rate within the same worker. Column (3) reports the difference in number of tasks and column (4) reports the difference as a share of the observed number of tasks.

Table C.10: Inferred effort difference, by observed difference

(a) Between workers

	Inferred effort diff.	
	(1)	(2)
Observed diff.	.758***	.758***
	(.061)	(.071)
Individual FE	No	Yes
Observations	792	792
R^2	.124	.528

Notes: This table reports the coefficients for observed effort difference on inferred effort difference. The dependent variable is the inferred difference between the number of tasks of the lucky worker and the unlucky worker under equal opportunities. The independent variable is the observed difference under unequal opportunities. Sample is restricted to the hypothetical scenarios, with observed differences in [0,5,10,15]. Each column reports estimates from a linear model. Standard errors clusterized at individual level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

(b) Within workers

	Inferred effort diff.	
	(1)	(2)
Observed diff.	.242***	.242***
	(.061)	(.071)
Individual FE	No	Yes
Observations	792	792
R^2	.014	.468

Notes: This table reports the coefficients for observed effort difference on inferred effort difference. The dependent variable is the inferred effort difference for high piece-rate versus low piece-rate within the same worker. The independent variable is the observed difference under unequal opportunities. Sample is restricted to the hypothetical scenarios, with observed differences in [0,5,10,15]. Each column reports estimates from a linear model. Standard errors clusterized at individual level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.11: Inferred effort difference, by worker's luck

Observed diff.	Unlucky worker (1)	Lucky worker (2)	Unlucky vs. Lucky (3)
0	4.75	0.96	-3.79**
			(1.72)
5	6.74	4.76	-1.98
			(1.49)
10	6.75	6.35	-0.40
			(1.54)
15	7.27	5.83	-1.44
			(1.63)
Total	6.40	4.45	-2.72**
			(1.15)

Notes: This table reports inferred effort difference for unlucky and lucky workers. The outcome variable is the inferred effort difference for high piece-rate versus low piece-rate within the same worker. All responses are contemporary to those of vaccine distribution. Columns (1) and (2) show means. Column (3) shows differences between unlucky workers (randomly drawn the Low piece-rate) and the lucky workers (randomly drawn the High piece-rate). Standard errors clusterized at individual level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

C.2 Treatment

Table C.12: Implementation

(a) Descriptive table

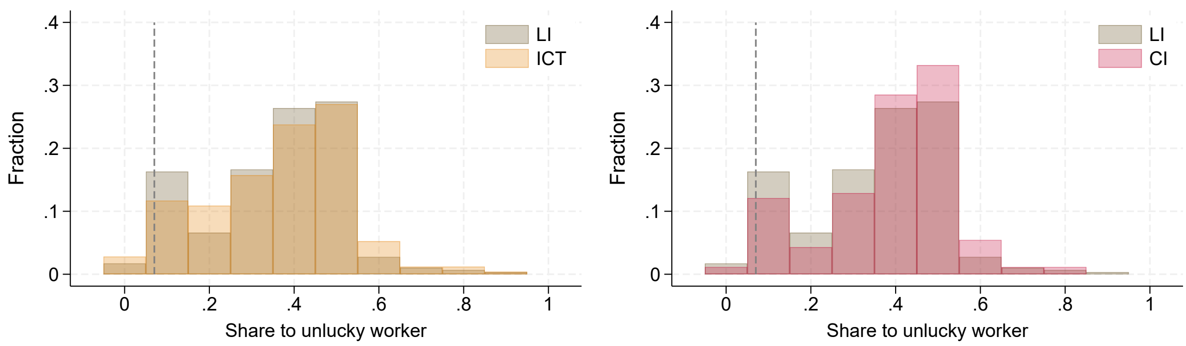
	All	LI	ICT	CI
	(1)	(2)	(3)	(4)
Equalize	.343	.319	.315	.398
Maintain	.140	.153	.137	.129
As factual choices	.375	.413	.335	.371
As counterfactual choices	.278	.243	.262	.332
As inferred choices	.250	.205	.282	.270

(b) Treatment

	Equalize	Maintain	As fact.	As counter.	As belief
	(1)	(2)	(3)	(4)	(5)
ICT	-.005	-.016	-.079	.019	.077
	(.054)	(.052)	(.057)	(.038)	(.051)
CI	.079	-.024	-.042	.089**	.065
	(0.053)	(.051)	(.057)	(.041)	(.050)
Individual FE	No	No	No	No	No
Observations	792	792	792	792	792
R^2	.006	.001	.004	.007	.006

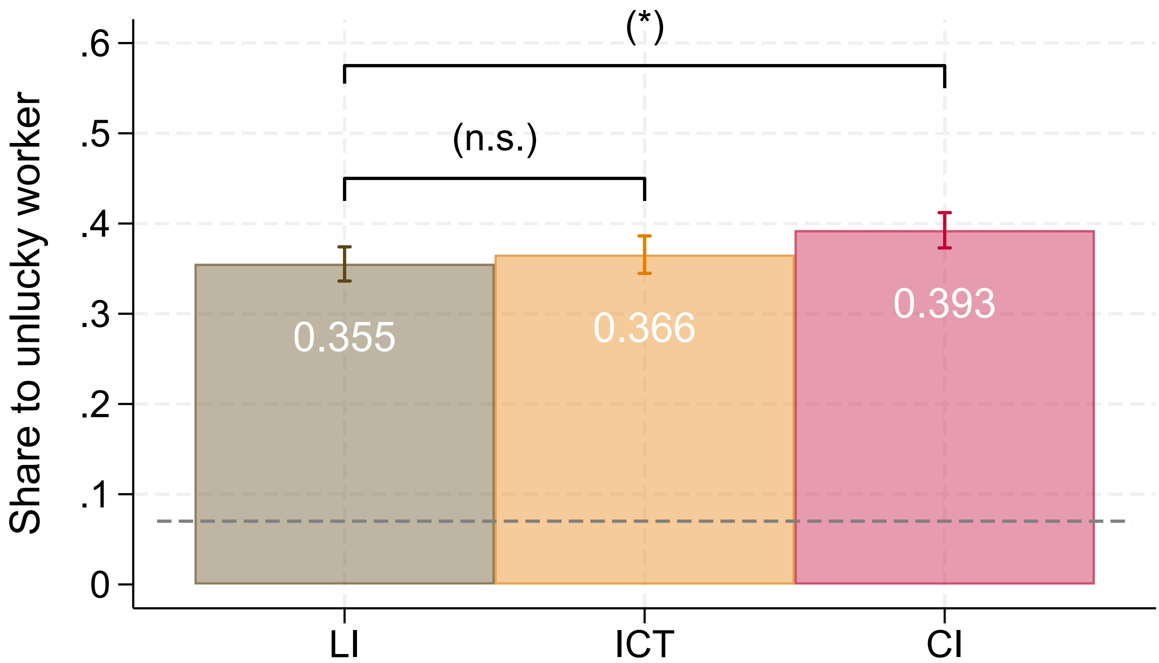
Figure C.8: Share assigned to unlucky worker, by treatment

(a) LI vs. ICT **(b) LI vs. CI**



Notes: These figures plot the shares assigned to the unlucky workers, by treatment conditions. The mean initial share is plotted as a dashed line in gray. Figure (a) shows treatment conditions LI and ICT. Figure (b) shows treatment conditions LI and CI.

Figure C.9: Share assigned to unlucky worker, by treatment



Notes: These figures plot the shares assigned to the unlucky workers, by treatment conditions. The mean initial share is plotted as a dashed line in gray.

Table C.13: Cognitive Ability and Age

	Cognitive Ability	
	Mean score	Share High
	(1)	(2)
Panel A. Age		
Ages 10-12	.583	.293
Ages 13-15	.700	.534
Panel B. Grade		
Year 5	.532	.167
Year 6	.605	.349
Year 7	.616	.368
Year 8	.688	.468
Year 9	.721	.654

Notes: This table reports cognitive ability measurements by school grade. Column (1) shows mean scores out of 100%. Column (2) shows the share of students above school median score.

Table C.14: Treatments

	Belief elicitation first	Belief elicitation after
Limited information	ICT	LI
Complete information	CI	

Notes: This table shows the differences across treatments in information provided (rows) and flow order (columns). Information provision is limited when when worker's production commitment under equal piece-rate is missing; and complete when worker's production commitment under equal piece-rate is included. Belief elicitation is first when it precedes the redistributive decisions; and after when it follows the redistributive decisions. In the merged treatment with complete information, belief elicitation is done after.