Do workers discriminate against their out-group employers?

Evidence from a Gig Economy

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Abstract

We study possible worker-to-employer discrimination manifested via social preferences in an online labor market. Specifically, we ask, do workers exhibit positive social preferences for an out-race employer relative to an otherwise-identical, own-race one? We run a well-powered, model-based experiment wherein we recruit 6,000 workers from Amazon's M-Turk platform for a real-effort task and randomly (and unobtrusively) reveal to them the racial identity of their non-fictitious employer. Somewhat surprisingly, we find strong evidence of race-based altruism – white workers, even when they do not benefit personally, work relatively "harder" to generate more income for black employers. This raises the possibility that pro-social behavior of whites toward blacks, atypical in traditional labor markets, may emerge in the gig economy where associative (dis)taste is naturally muted due to limited social contact.

Keywords: Discrimination; Worker-to-Employer; Social Preferences; Taste-based discrimination; Gig Economy; Mechanical Turk; Structural Behavioral Economics.

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1 Introduction

By construction, Homo economicus is self-interested and only takes actions that maximize his payoffs. In contrast, Homo behavioralis, in addition to being self-interested, is also endowed with social preferences, a concern for how his actions affect the payoffs of others. This concern could be negative causing him to take actions that hurt or discriminate against others. It could also be positive – prosocial behavior, actions taken with an intent to benefit others with no expectation of personal benefit. Who are these "others"? These could be people who belong to his in-group, the group whose membership gives him social identity, a sense of belonging to the social world. Everyone else is in his out-group.

This paper is aimed at detecting evidence of social preferences, a concern for how one's actions affect the payoffs of those in their out-group, within the context of labor markets. The experimental setting is an online labor market (loosely, "gig economy") and group identity is assumed to be racial in origin. Within this environment, we ask, is there evidence that whites treat blacks differently than how they treat fellow whites? We depart from a half-century of research in labor economics that views this issue largely as one-sided: how white employers treat their black employees. We ask the reverse question: is there evidence that white workers in the gig economy treat their black employers better or worse than how they treat their otherwise-identical, white employers?

A series of questions come up right away. Why is it interesting to study discrimination or pro-social behavior of workers toward employers? Is there any evidence of this? and why the gig economy? We take these up one by one. That workers may treat their out-race employers differently, may, at first glance, seem implausible; after all, it is mostly bosses who get to frame labor contracts, and surely within the bounds of such contracts there cannot be much room left for workers to mistreat out-group bosses. Our view is that this first-pass line of thinking is limited. While admittedly it is easier for bosses to maltreat out-group workers, the latter are also keenly aware that the effort they put in, the diligence or care they show on the job, crucially affects the bottomline of their bosses. Moreover, as is well known, labor contracts are often "incomplete": they leave workers a considerable degree of discretion over work effort. It is, therefore, conceivable a worker with substantial leeway over effort may display differential social preferences – a race-dependent desire to work harder to a) see his boss succeed ('altruism') even if it does not benefit him personally and b) reciprocate any respect or fairness or kindness he receives from his boss.

Second, there is important evidence that workers care about the social identity of their bosses and differen-

tially perform for in versus out-group employers.[1] Sundstrom (1994), focusing on U.S. urban labor markets 1910-1950, notes "one of the most widely noted rules of the southern labor market was that blackswere not to supervise whites...[because it] would plainly invert the appropriate hierarchy" which meant "blacks were generally absent from supervisory positions". White employees simply did not wish to receive orders from (or work under) black supervisors. More recently, Glover, Pallais, and Pariente (2017) study whether discriminatory beliefs held by bosses directly affect minority workers' job performance in a real-world workplace. They investigate the performance of cashiers in a French grocery store chain, and find "minority cashiers, but not majority cashiers, are scheduled to work with managers who are biased (as determined by an Implicit Association Test), they are absent more often, spend less time at work, scan items more slowly, and take more time between customers." The upshot is, workers do adjust their effort based on the social identity of their bosses, and may perform better when paired with own-group managers than out-group ones.

And why study this question in the confines of the gig economy? To be clear, a gig economy is one where independent workers are paid by the gig (i.e., for a task or a project) as opposed to traditional workers who are paid a salary or hourly wage as part of a contract. One important distinction is that in the gig economy, particularly of the digital-platform type, there is little scope for close or repeated interactions between the employer and the employee; hence, associative distaste or liking is unlikely to be activated.[2] This means, if we are to detect any race-based differences in social preferences (altruism or reciprocity) in our gig economy setting, it will not be because of associative distaste or liking. Another critical difference is the vastly dissimilar "power dynamic" between worker and boss. In a gig economy, workers retain a lot of power in the worker-employer relationship: they may underprovide effort for a given employer or easily change employers without losing much "employment rent".[3] This new power dynamic makes the gig economy an ideal setting to study worker-to-boss discrimination, much more so than the conventional labor market setting.[4]

[1] In a recent paper, Oh (2019) find that 43% of Indian workers "refuse to spend ten minutes working on tasks associated with other castes, even when offered ten times their daily wage" suggesting the important role of social identity in determining work-related decisions.

[2] While our work is focused on an online labor market, others such as TaskRabbit offer tasks situated in the physical world and cover household errands and skilled tasks such as minor home repairs, assembling Ikea furniture, where the scope for more interaction between worker and boss, and hence, more associative (dis) taste, is clearly higher.

[3] After all, a typical Uber driver (or a M-Turker), each a worker, may go through ten "employers" in a day and ten different ones the very next day! The rider cannot pre-contract good, polite service before entering the Uber car. The driver can choose to be polite and helpful or not. The driver may offer good treatment towards the rider because of the social preference the driver feels for the rider, possibly a member of his in-group. Or he may not. But, once the rider is in the car, it is the driver that holds the power, to be nasty or prosocial.

[4] There are other ancillary reasons why our focus on the gig economy is pertinent. The argument is often made that blacks, often the victim of discrimination in conventional labor markets, would gravitate to the gig economy because of reduced expectations of discrimination in the latter. Are those expectations likely to be satisfied? Also, other than **?**, there is very little known about whether long established routes of discrimination researched on traditional labor markets with conventional worker-boss power dynamics continue to operate in the dawning gig

To the end of answering our research question, we run a well-powered, AEA preregistered, model-based experiment using 6,000 white subjects from one of the largest gig economy platforms: Amazon's Mechanical Turk (M-Turk).[5] Specifically, our experiment design uses U.S. based subjects from M-Turk (recruited as "workers") and black and white student subjects (recruited as "employers") from a major U.S. public university. The interaction between a worker and an employer is kept one-shot, as is typical in the gig economy, so that confounding reputation effects (of the kind that naturally emerge in Glover et al. (2017)) do not enter. In the experiment, workers engage in a real-effort task for a pre-assigned, non-fictitious employer who, in some treatments, may be racially identifiable as black or white. The real-effort task (unlike monetized costs in studies such as Charness, Rigotti, and Rustichini (2007); Fershtman and Gneezy (2001)) entails a real utility cost because it requires a worker to alternately press the 'a' and 'b' buttons on the keyboard for up to 10 minutes. Workers do not get to select their employer but are free to decide how much effort to provide on the task (an 'incomplete contract' environment). The worker's performance is measured by the number of times the buttons are alternately pressed, and the worker is informed (truthfully) of the payoff the employer will receive due to the worker's performance.[6] Race-dependent social preferences is potentially activated by unobtrusively revealing the employer's race to the matched worker.[7]

The design is tightly connected to a simple structural model à la DellaVigna, List, Malmendier, and Rao (2016) in which workers have social preferences towards their employer and maximize utility from the provision of costly effort. The ten treatments help us identify the cost-of-effort function and social-preference parameters (altruism and reciprocity) of the structural model separately for neutral, black, and white employers. Our preliminary findings reported in terms of average effort by white workers (see footnote 5) are as follows. First, not surprisingly, incentives via piece rates, have a strong, statistically-significant effect on effort. Second, as in Dellavigna and Pope (2018), we detect statistically significant evidence for altruism: workers put more effort when they know their work benefits an employer of unknown race ("altruism-neutral treatment") as compared to the piece rate 0-cent treatment where neither the worker nor the employer earns any payoff arising from worker effort. Parenthetically, there

economy.

[5] Roughly 50% of M-Turkers are from the United States. Based on 2015 data, about 77% are non-Hispanic white and only 6% are non-Hispanic black (Hitlin, 2016). The preliminary results reported below are for U.S. based white workers, by far the vast majority of workers on M-Turk and in our sample.

[6] In our experiment, the employers do not get to make any strategic choices (such as wage offers, payments, minutes of work, work times, etc.) thereby eliminating most channels for statistical discrimination by workers.

[7] Inspired by Doleac and Stein (2013), we take the approach of revealing race indirectly via the revelation of skin color and voice: employer-subjects are videotaped while they read off a script explaining and demonstrating the task for the workers. The camera placement only captures the hand of the employer along with the movement of the fingers alternating 'a' and 'b' button presses. Other identifiers, such as the face, are not revealed.

is no evidence of reciprocity.

Interestingly, white workers are significantly more altruistic towards black employers than white employers – categorically, they do not discriminate against their black employers. In addition to being statistically significant at the 2% level, the difference in effort provision is non-trivial. To see this, consider a baseline level of altruism, the differential effort provision by white workers knowing their effort enhances the payoff of an unknown race employer versus their effort when the piece rate is 0-cent. Our results indicate that the differential effort by white workers knowing their effort enhances the payoff of a white vs. a black employer is 75% of this baseline! Also, the differential effort by workers knowing their effort enhances the payoff of a black vs. an unknown-race employer is 45% of the baseline. The structural estimation exercise also reveals that black employers get 5% more effort than white employers at a 0-piece rate. Collectively, these represent strong evidence of pro-social behavior by whites toward black employers.

What explains this pro-social behavior? Is it racial heterophily? Is it "white guilt"? We did not collect data from M-Turk workers on any measure of racial bias such as the Implicit Association Test (IAT).[8] However, we combined IAT data from Project Implicit with county-level knowledge of worker residence and created a measure of implicit bias. We find that the pro-social response towards black employers is partially driven by workers with low implicit bias (based on our measure) against blacks. Peeking further, we find if we split the IAT data into two quantiles (top and bottom), the pro-black altruism is highly significant for workers in the bottom quantile – residing in the "least racist" counties – and is insignificant for those in the top quantile.[9][10]

In terms of the value-added to the literature, the primary contribution is to showcase the importance of looking at the worker-to-employer social preference angle. Our finding is interesting because it raises the possibility that positive social preference toward blacks, rarely detected in traditional labor markets, may emerge in environments where associative distaste is naturally muted (such as, the gig economy). Bear in mind, ours is a well-powered, AEA

[8] Perhaps the most well known measure of racial bias is the Implicit Association Test (IAT) which measures the "strength of association between categories such as European American versus African-American and words such as joy, laughter, and happy versus hurt, evil, and awful that represent categories of good versus bad." Upwards of 80% of whites in nationally representative American samples have shown an implicit preference for whites over blacks (Triplett, 2012).

[9] This is reminiscent of the finding in Tesler (2012) that whites who score low on a well-validated measure of racial resentment are more supportive of health care policy when it is associated with Barack Obama than when it is associated with Bill Clinton. Also see Huddy and Feldman (2009).

[10] It is tempting to draw conclusions about "white guilt", a supposedly collective guilt felt by whites for their group's actions toward blacks, not necessarily for their own actions. As Chudy, Piston, and Shipper (2019) point out "...whites who hold collective guilt acknowledge that their group is responsible for black suffering and that the inter-group relationship needs to be repaired." Just because someone lives in a county where an average person registers low animus toward African Americans in an IAT test does not mean such people will wish to do something to repair the aforementioned inter-group relationship. In our case, though, unlike research that relies on survey-based measures of white guilt, we are able to detect evidence of whites doing something extra for blacks when they do not need to.

pre-registered experiment which would have detected preference-based discrimination had it existed on the M-Turk platform; the fact we don't is encouraging, seeing how the gig economy is expanding (Katz & Krueger, 2019). Further, it is oft-repeated that the relative lack of success of black-owned businesses or the diminished presence of blacks in leadership positions in the United States is a major concern among policy makers; more so, because "business ownership has historically been a route of economic advancement for disadvantaged groups" (Fairlie & Robb, 2007). Our study can offer a partial answer in the negative to the following question: do entrepreneurial blacks shy away from business because they rationally fear discrimination by majority white workers? Curiously, our finding also shuts down another line of thinking connected to the issue of anticipation of discrimination. There is considerable evidence that employer-to-employee discrimination is mostly taste-based.[11] What if it is being miss-classified? What if an employer discriminates against his out-race workers because he rationally believes/anticipates being discriminated against by them? In that case, the employer-to- employee discrimination ought to be characterized as statistical. Within the confines of our environment, our finding that workers do not discriminate against their out-race employers essentially shuts down any rational expectation of bias an employer may have. Incorrect beliefs may persist, though citepBohren2019.

Our research is related to an emerging literature in economics studying discrimination by subordinates (Abel, 2019; Ayalew, Manian, & Sheth, 2018; Chakrabortyy & Serra, 2019; Grossman, Eckel, Komai, & Zhan, 2019). This literature focuses on gender as group identity and mostly finds belief-based discrimination against female leaders. Another study on Amazon's Mechanical Turk by Abel (2019) finds that workers do not discriminate in effort choices when they work for women leaders, even though the feedback from them is perceived as being less pleasant than from a male leader. Ours is the first to investigate the possibility of race-based discrimination by subordinates in the U.S. Evidence from Benson, Board, and Meyer-ter Vehn (2019) suggests that workers' performance is influenced by the social identity of their boss. They chalk it to the fact that bosses can better screen applicants from their own race. Our study shuts down this "selection effect" and yet finds no evidence of race-based discrimination by workers. Our result, along with that in Abel (2019), reaffirms our conclusion that worker-to-boss discrimination is less likely to elicit itself in a gig economy.

The rest of the paper proceeds as follows. In Section 2 we present the model of behavior and produce the treat-

[11] Indeed, 97% of the papers on discrimination against disadvantaged groups published in top economics outlets find significant evidence for it (Bohren, Haggag, Imas, & Pope, 2019; Lane, 2016). A caveat, though, none of this research looks at the worker-to-boss discrimination angle.

ments to identify the parameters of interest. In Section 3, we present the experiment design. Section 4 summarizes the data. In Section 5, we present the results followed by structural estimation in Section 6; concluding remarks are in Section 7.

2 Model and Treatments

We design our experiment by closely following the model in DellaVigna et al. (2016) and modifying it to model discrimination from the workers' side. In the setup workers take part in a real-effort task where they choose how much effort to provide. In the model, a risk neutral worker works for an employer j, $j \in \{Neutral, Black, White\}$, and solves the following problem:

$$\underbrace{max}_{e_j \geq 0} U_j = \underbrace{max}_{e_j \geq 0} \big(F + (s + \rho_j \mathbb{1}_{Gift} + \alpha_j v + p)e_j - c(e_j)\big) \tag{1}$$

where e_j is the number of points (on a button-pressing task) scored by worker when working for an employer j, F is the fixed money paid for participating in the experiment, s captures the sense of duty, norm, intrinsic motivation, and competitiveness of worker towards the task which is independent of the employer. ρ_j is the reciprocity parameter per unit of effort which kicks in whenever an employer j awards a gift to the worker, Gneezy and List (2006). $\mathbb{1}_{Gift}$ is an indicator function which assumes a value 1 when a gift is rewarded by the employer, 0 otherwise. α_j captures the altruistic preference of worker towards employer j per unit of effort Becker (1974), given that v is the value of the unit of effort to the employer. p is the piece rate per unit of effort. $c(e_j)$ is the cost of effort, which is assumed to be the same for all workers.[12] We assume the regularity conditions $c'() > 0$, $c''() > 0$, and $lim_{e \to \infty} c'(e) = \infty$. Following Dellavigna and Pope (2018) and DellaVigna et al. (2016), we analyze the optimality conditions assuming two different functional forms for the cost of effort function : a power function and an exponential function i.e.

$$c(e) = \frac{k e^{1+\gamma}}{1+\gamma} \tag{2}$$

[12] We relax this assumption later and allow for the possibility of heterogeneous cost.

and

$$c(e) = \frac{kexp^{\gamma e}}{\gamma} \tag{3}$$

Power cost function (2) characterizes a constant elasticity of effort with respect to return to effort given by $1/\gamma$, while exponential function (3) represents decreasing elasticity of effort with respect to return to effort given by $1/log(r/k)$, where r is the return to the effort. Workers' effort at different piece rates can be used to identify and structurally estimate both the parameters of the cost of effort functions, namely, k and γ.

Solving 1 leads to the following solution (when interior):

$$e_j^\star = c'^{-1}\left(s + \rho_j \mathbb{1}_{Gift} + \alpha_j v + p\right) \tag{4}$$

An assumption of the power cost function yields the following optimality condition:

$$e_j^\star = \left(\frac{s + \rho_j \mathbb{1}_{Gift} + \alpha_j v + p}{k}\right)^{1/\gamma}$$

The exponential cost function on the other hand leads to the following first order condition:

$$e_j^\star = \frac{1}{\gamma} log\left(\frac{s + \rho_j \mathbb{1}_{Gift} + \alpha_j v + p}{k}\right)$$

We make a simplifying assumption that the workers are homogeneous given a treatment i.e. they will make the same effort choice in a given treatment. We later relax this assumption to account for heterogeneity in effort within a treatment. We design our treatments for the experiment by varying the incentives and behavioral motivators for the workers to identify the parameters of the above model.

2.1 Piece Rate Treatments

In the piece rate treatments, each worker works on a task at a given piece rate. We assign four different piece rates between 0 and 10 cents. In the first treatment, workers are paid no piece rate. In the next three treatments, the piece rates are 3, 6 and 9 cents per unit of effort. From the M-Turk standards, this variation in piece rates is substantial and is likely to elicit significant change in effort. The piece rates are earned on top of $1 fixed participation fee.

These four treatments differ only in the piece rates, everything else remains exactly the same.

These piece rates provide evidence on the responsiveness of effort to incentives for our particular task and hence, allow us to estimate the baseline parameters (s, k, and γ) which will be used to estimate other behavioral parameters. Formally, in the piece rate treatments, worker observes the piece rate p and then chooses effort e_j by maximizing 1. There is no employer j in these treatments which implies that for any worker, $\alpha_j = 0$ and there is no gift from the employer implying $\mathbb{1}_{Gift} = 0$. The equilibrium efforts $e_j^\star$ in these treatments is thus given as:

$$e_p^\star = c'^{-1}\left(s + p\right) \text{ for} p \in \{0,3,6,9\}$$

The solution of effort has one behavioral unknown (s), and two unknowns from the cost function (k and γ). To back out these parameters, we use effort corresponding to three different piece rates which gives us three equations to identify these three parameters.

2.2 Altruism Treatments

In the altruism treatments, each worker is matched to an employer (truthfully) and he/she observes the (true) value of the effort to the matched employer. Each employer earns 1 cent for every 100 points scored by the matched worker. We set the piece rate to 0. There are three treatments under altruism treatments. In the first treatment (altruism baseline) a worker does not observe the identity of the matched employer. In the 'altruism black' and 'altruism white' treatment the matched employer is black and white, respectively. Note that our notion of altruism captures "pure altruism" as well as "warm glow" of the workers, we don't aim to disentangle between these two.[13]

Formally, in the altruism treatments, worker i observes the zero piece rate ($p = 0$), the value of the unit of effort to the employer j ($v = 0.01$), and then chooses effort e_j by maximizing 1. There is no gift from the employer implying $\mathbb{1}_{Gift} = 0$. The equilibrium efforts $e_j^\star$ in these treatments is thus given as;

$$e_j^\star = c'^{-1}\left(s + \alpha_j v\right) \text{ for } j \in \{Neutral, Black, White\}$$

We are implicitly assuming that altruism parameter can be different for each employer's group identity. $\alpha_{White} >$

[13] See DellaVigna et al. (2016) for more on the distinction between pure altruism and warm glow.

α_{Black} ($\alpha_{White} < \alpha_{Black}$) represents the higher (lower) effort for whites as compared to blacks because of greater (lesser) altruistic preference towards the former as compared to latter. In other words, the difference in effort between the treatments 'altruism white' and 'altruism black' is interpreted as resulting from the differential altruistic preferences of the workers. The three altruism treatments help us identify $\alpha_{Neutral}$, α_{Black}, and α_{White}, given the baseline parameters.

2.3 Reciprocity Treatments

Reciprocity treatments build on from the altruism treatments and add a positive monetary gift (20 cents) from the employer to the worker. Rest of the details are exactly the same as in altruism treatments. Thus, the equilibrium effort is given as;

$$e_j^\star = c'^{-1}\left(s + \alpha_j v + \rho_j\right) \text{ for } j \in \{Neutral, Black, White\}$$

Once again we are implicitly assuming that reciprocity parameter can be different for each employer's group identity. $\rho_{White} > \rho_{Black}$ ($\rho_{White} < \rho_{Black}$) represents the higher (lower) effort for whites as compared to blacks because of greater (lesser) reciprocal preference towards the former as compared to latter. In other words, the difference in effort between the treatments 'reciprocity white' and 'reciprocity black' is interpreted as resulting from the differential reciprocal preferences of the workers. The three reciprocity treatments help us identify $\rho_{Neutral}$, ρ_{Black}, and ρ_{White} given the baseline parameters and the altruism parameters.

3 Experiment Design

The main goal of this study is to investigate the possibility of discrimination from the worker side in an online labor market. We designed the experiment to allow for the possibility of discrimination in the effort by workers towards the employers. Our experiment is carefully designed to ensure that observed difference in the effort towards the employers could only realize because of the social preferences of workers, i.e., we shut down the possibility of statistical discrimination (the employers did not get to make any strategic choices such as wage offer, minutes of work, etc.).

3.1 Task

We design this experiment to observe whether workers discriminate in their effort when working for different employer types and then to back out the behavioral parameters of distaste. For this purpose, we need a task which is costly to workers and is not meaningful to any particular race. We settled on a button-pressing task as in Dellavigna and Pope (2018). The task involves alternating presses of "a" and "b" on a keyboard for 10 minutes. We settled on this task because it is simple to understand and has features that parallel clerical jobs: it involves repetition, and it gets tiring, and thus, it tests the motivation of the workers.

3.2 Race Revelation

We take the approach of revealing race via the revelation of skin-color (Doleac & Stein, 2013). To that end, we record videos of employers while they read off a script explaining and demonstrating the task. The camera placement only captures the hand of the employer along with the movement of the fingers alternating 'a' and 'b' button presses. Other identifiers, such as the face, are not captured in the video to avoid psychological confounds which are associated with faces, such as attractiveness and trustworthiness (Eckel & Petrie, 2011). The employer's hand is bare or covered (with full sleeves and latex gloves) depending on the assigned treatment. For black employers, we only restrict to participants with dark skin tone to avoid any ambiguity about the race of the person. We use the digital voice for the videos in the piece rate treatments. We program each video to play with subtitles to aid easier understanding of the instructions. Here is the link to the sample video corresponding to the 'Piece Rate - 0 cents' treatment.

3.3 Experiment Flow

The experiment proceeds as follows: (1) We recruit employers from Iowa State University and record videos of them explaining the task, 2) we then post a HIT on Amazon's Mechanical Turk for a screener survey for the recruitment of workers, (3) we invite subjects who consent and meet the recruitment criteria (undisclosed) to initiate the experiment, (4) upon initiation we assign each subject to one of the treatment groups. Following Czibor, Jimenez-Gomez, and List (2019), we use the blocked randomization design to assign subjects to treatments. We define blocks based on demographic information collected in the screener survey (Gender, Age, Race, Education,

Table 1: Summary of treatments

Category	Treatment Wording	Voice	Skin Color	Sample Video
(1)	(2)	(3)	(4)	(5)
Piece Rate	Your score will not affect your payment in any way.	Muted	Concealed	Link
	As a bonus, you will be paid an extra 3 cents for every 100 points that you score.	Muted	Concealed	Link
	As a bonus, you will be paid an extra 6 cents for every 100 points that you score.	Muted	Concealed	Link
	As a bonus, you will be paid an extra 9 cents for every 100 points that you score.	Muted	Concealed	Link
Altruism	I will earn 1 cent for every 100 points that you score. Your score will not affect your payment in any way.	Muted	Concealed	Link
	I will earn 1 cent for every 100 points that you score. Your score will not affect your payment in any way.	Black	Black	Link
	I will earn 1 cent for every 100 points that you score. Your score will not affect your payment in any way.	White	White	Link
Reciprocity	I will earn 1 cent for every 100 points that you score. In appreciation to you for performing this task, I have decided to pay you extra 20 cents as a bonus. Your score will not affect your payment in any way.	Muted	Concealed	Link
	I will earn 1 cent for every 100 points that you score. In appreciation to you for performing this task, I have decided to pay you extra 20 cents as a bonus. Your score will not affect your payment in any way.	Black	Black	Link
	I will earn 1 cent for every 100 points that you score. In appreciation to you for performing this task, I have decided to pay you extra 20 cents as a bonus. Your score will not affect your payment in any way.	White	White	Link

Notes: The table list all the treatments in this study. Each piece rate treatment differs just in the last line of the script, uses no audio, and conceals the skin color of the hand. Social preference treatments (altruism and reciprocity) begin with the introduction of the employer (in the first person), explain the task using the same script as in piece rate treatments and then differ only in the last paragraph of the script. Both altruism and reciprocity categories have three treatments, each with black, white, and concealed skin tone of the employer (using gloves). In the social preference treatments of concealed skin tone, the ratio of black and white employers will be 1:1.

Income, Political Party Affiliation, and the Most-lived US State),[14] (4) we present instructions to each subject in a pre-recorded video (based on the assigned treatment). We program our study to require each worker to watch a video, (5) we then elicit beliefs of each worker about the matched employer, and finally 6) workers work on the task for 10-minutes.

3.3.1 Piece Rate Treatments

In the piece rate treatments, each worker sees a video demonstrating a task with a script: "*On the next page, you will play a simple button-pressing task. The object of the task is to alternately press the 'a' and 'b' buttons on your*

[14] See Cavaille (2018) for instructions on implementing sequential blocked randomization for online experiments.

keyboard as quickly as possible for ten minutes. Every time you successfully press the 'a' and then the 'b' button, you will receive a point. Note that points will only be rewarded when you alternate button pushes: just pressing the 'a' or 'b' button without alternating between the two will not result in points. Buttons must be pressed by hand only (key-bindings or automated button-pushing programs/scripts cannot be used), or task will not be approved. Feel free to score as many points as you can." Then the last line is based on the assigned treatment (0, 3, 6 or 9 cents). The wording is provided in table 1. Even though piece rates are framed in units of 100 points, workers are paid continuously for each point scored and they are able to see the earned bonus in real time as they score points.

3.3.2 Social Preference Treatments

In the altruism and reciprocity treatments, each video starts with the introduction by the employer: "*Hi, I am another participant in this study who is matched to you. In this study, you will work on a simple button-pressing task, and I will earn some money depending on how well you do on the task.*" Then the script follows the same instructions as in piece rate treatments with the last paragraph being the only difference. The wording is provided in table 1. There are three treatments each in the category of altruism and reciprocity. Altruism baseline and reciprocity baseline conceals the skin color of the employer using latex gloves. Although the voice in the baseline treatments can reveal some racial markers, we recruit an equal number of black and white employers in these treatments, therefore, on average, the effect of race from voice, if any, should cancel out in the baseline treatments. The videos shown in the altruism black (white), and reciprocity black (white) reveal the black (white) skin of the employers.

3.4 Recruitment of Subjects

Since this study involves the understanding of worker's motivation towards their employers, we need to recruit both employers and workers for this experiment.

3.4.1 Recruitment of Employers

To recruit employers, we invite male student subjects , above the age of 18, from Iowa State University, who racially identify as either African American or Caucasian. We restrict to male employer subjects to avoid confounds from identity effects of gender. Holding the sample size fixed, restricting to one social identity give us more power

to make credible inferences. We include employer subjects of only Black and White races because we intend to study racial discrimination in the context of the United States and also because our race revelation mechanism (as explained above) works best for these two races. We recruit subjects from Iowa State University for logistical convenience. We randomly assign each employer subject to one of the six social preference treatments. Based on the assigned treatment, subjects read from the script and demonstrate the task on a video. Each subject is paid $5 for showing up to our lab and an additional variable amount depending on the matched workers' performance. Our final sample include six employers in each social preference treatment (36 employers).

3.4.2 Recruitment of Workers

We recruit the workers for this experiment from an online labor market, Amazon's Mechanical Turk. Mechanical Turk is a crowd-sourcing web-service that allows employers (called requester) to get tasks (called Human Intelligence Tasks (HITs)) executed by employees (called workers) in exchange for a wage (called reward). Mechanical Turk is a widely used platform in research in economics and gives access to a large pool of applicants at a much affordable rate, thereby, allowing researchers to conduct a well-powered study. See Paolacci, Chandler, and Ipeirotis (2010) and Paolacci and Chandler (2014) for a discussion on demographic characteristics and representation of subjects from Mechanical Turk.

To recruit subjects we post a screener survey as the HIT on Mechanical Turk with the following description "*Fill out this 2-minute screener survey to qualify for a study that starts immediately, take up to 15 minutes, and pays participation bonus $1 with scope to earn extra. You will be required to watch and listen to a video. Do NOT take this study on mobile.*". Based on the responses in the screener survey; we invite participants above the age of 18 who report their race as "White or Caucasian" to participate in the experiment. Based on our pilot for this study, we found that it is difficult to recruit a representative number of Black workers from M-Turk to make a credible inference. Therefore, for this study we restrict to only white workers and study their effort choices for Blacks versus White employers. We pay five cents to each subject who do not meet the inclusion criteria for filling out the screener survey.

3.5 Pre-registration

We pre-registered the design on AEA RCT registry as AEARCTR-0003885. Since our choice of the task is the same as Dellavigna and Pope (2018), we can use results from their study to determine the sample size that can achieve sufficient power for our study. Dellavigna and Pope (2018) found that the points scored across all treatments have a standard deviation of around 660 points. Assuming this standard deviation for each treatment and assuming a minimum detectable effect of 0.2 standard deviations between two treatments, we will need around 400 subjects in each treatment to have a power of 80 percent. This implies that we will need 400 x 10= 4,000 observations in total for all ten treatments. We pre-registered the rule for sample size: we aim to recruit 6,000 participants from the United States within the first three weeks of posting the experiment.

4 Data

4.1 Employers

We recruit employer subjects for this experiment from the Iowa State University (ISU). We invite 50 student subjects who report their race as black or white to participate in the experiment. Our final sample include 36 employers (18 blacks and 18 whites). Each employer subject fill out a short demographic survey upon showing up to our lab for video recording and are then randomly assigned to one of the six social preference treatments. The demographic characteristics of the employer subjects in each treatment are presented in table C1.

4.1.1 Pre-Testing of Videos

To test whether the videos correctly reveal the race of the employer, we test these videos using an independent sample of subjects from the Academic Prolific, a data collection platform. We use Academic Prolific for video testing, rather than Mechanical Turk, to ensure that M-Turk subjects don't potentially watch these videos before they participate in the actual experiment. We invite white subjects from the United States to evaluate these videos. Each subject get to evaluate one randomly selected video. See figure 1 for the graphical representation of average perception of race across treatments. Overall the race is correctly perceived more than 80 percent of the times for all the race salient treatments indicating that our race revelation mechanism works. For the race neutral treatments,

only less than 30 percent of the people could guess the race and that is probably the result of random guessing. The pairwise comparisons of race perception among these treatments is presented in table C2. The results suggest that the race neutral treatments (altruism and reciprocity) are statistically indistinguishable from each other and significantly different from race salient treatments. The perception of race in the treatments 'Altruism Black' and 'Altruism White' is statistically indistinguishable, however 'Reciprocity Black' is not perceived as accurately as 'Reciprocity White'.

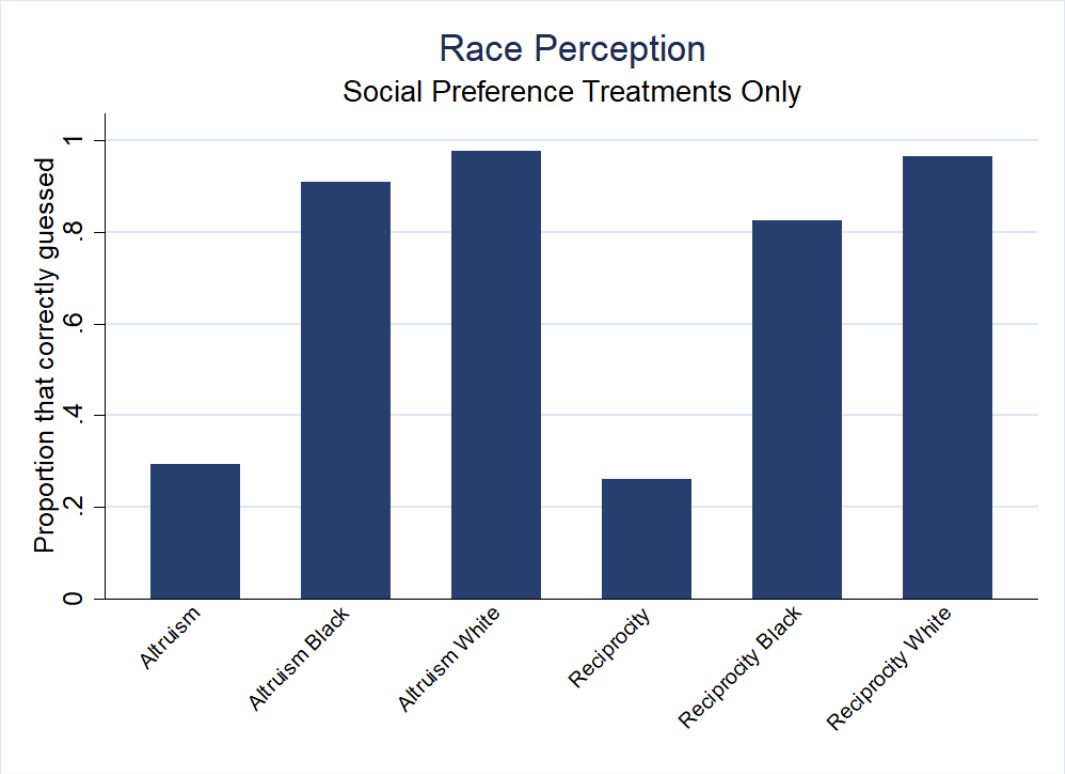


Figure 1: Race Perception

Notes: This figure shows the proportion of individuals who were able to correctly guess the race of the employer after watching a video.

We also evaluate the videos in race salient treatments for perception of skin color, the results are presented in figure 2. Overall, blacks' skin is correctly perceived as of darker tone and whites' as of lighter tone. The pairwise comparisons of skin color perception among these treatments is presented in table C2. The results suggest that the black treatments are statistically indistinguishable from each other and significantly different from white treatments.

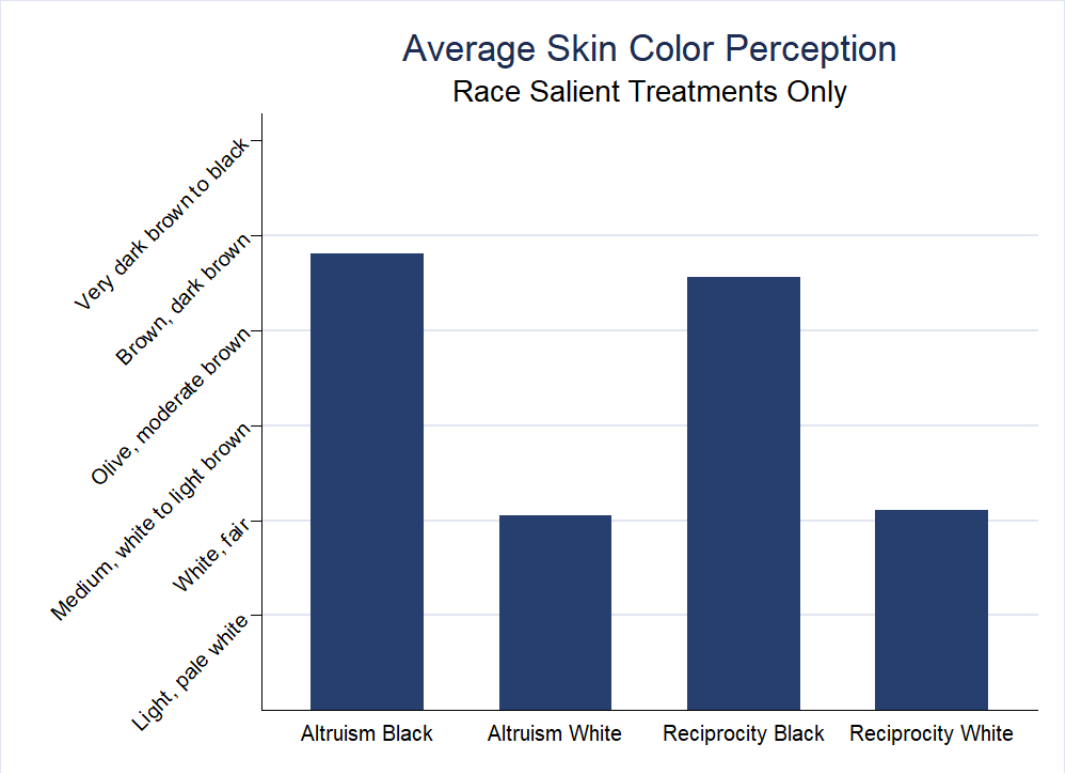


Figure 2: Skin Color Perception

Notes: This figure shows the average perceived skin tone accross the race salient treatments.

Finally, to ensure that these videos are not perceived differently on soft personality traits such as friendliness, professionalism, clarity etc., we get these videos rated on those traits. The results for positive traits are presented in figure B.1 of appendix, and results for negative traits are presented in figure B.2 of appendix. Pairwise comparisons of means across all the social preference treatments suggest that only the reciprocity black treatment is perceived to be significantly higher on positive traits while all the other treatments are statistically indistinguishable from each other on both positive and negative traits (see table C3 of appendix).

4.2 Workers

We ran the experiment for workers for three months from August 2019 to October 2019. Our data collection lasted longer than expected because of the slow take up of the study on M-Turk. As per the pre-registration, we apply the following restrictions to the collected data (1) we drop 17 workers for scoring above 4,000 points since this is physically impossible in 10 minutes and these users may have used some automated script to score points or

they may have experienced some technical problem[15], 2) we drop 64 workers who score zero points as this may reflect some malfunction or technical problem in points recording, (3) we drop 4 observations of the workers for participating in the study more than once as these people have already participated in the study under a potentially different treatment[16]. In addition to above, we dropped two observations of workers who could somehow take this study from outside the United States.[17] The final sample consists of 5,945 workers.

The summary statistics of the final sample is presented in table 2. Our sample over represents women, young, educated, middle-income and democrats as compared to the US population. This is typical of the population on online platforms. We present results of productivity by the demographics in table C12. Overall in our sample, men and younger workers are more productive than women and older workers respectively. We present test of balance of demographic variables across ten treatments in table C4, C5, and C6 of appendix. The treatments are balanced on all the observed variables, this is no surprise since we use blocked randomization to assign subjects to the treatments. Since the workers characteristics are balanced across treatments, there is no reason to believe that more/less productive workers are assigned to a specific treatment.

[15] We informed each worker to not to use any automated scripts/programs during the instructions.

[16] A worker can participate in our study only once, these exceptions must be an error on part of M-Turk.

[17] The study was restricted to workers from the United States only, but these people must have used some proxy or VPN to be able to take the study. We could identify them from the GPS coordinates recorded by Qualtrics.

Table 2: Summary Statistics, Worker Sample

	(1) Sample	(2) US Labor Force
Gender		
Female	0.58	0.47
Male	0.41	0.53
Race		
White or Caucasian	1.00	0.78
Age		
18-24	0.12	0.11
25-30	0.38	0.14
31-40	0.26	0.22
41-50	0.14	0.21
51-64	0.08	0.25
65 and over	0.03	0.06
Education		
Less than high school	0.01	0.14
High school or equivalent	0.13	0.39
Some college	0.28	0.35
College graduate	0.41	0.30
Graduate or professional degree	0.18	0.18
Income		
Less than $20,000	0.17	0.20
$20,000 - $44,999	0.31	0.26
$45,000 - $99,999	0.38	0.33
$100,000 - $149,999	0.09	0.12
$150,000+	0.03	0.08
Political Affiliation		
Democrat	0.39	0.31
Independent	0.28	0.38
Republican	0.27	0.29
Most lived US State		
Blue	0.31	0.47
Red	0.20	0.14
Swing	0.49	0.39
Observations	5945	162075000

Notes: The table presents demographic information of worker subjects. Column (1) presents proportion of the worker subjects by their gender, race, age, education, income, party, and the most lived state in the United States. Column (2) presents these demographics for US labor force based on 2018 numbers from Bureau of Labor Statistics/Current Population Survey. Estimates of population by political affiliation and by blue, red, and swing state are based on Gallup polling survey 2019.

5 Results

We present the average effort by workers against each treatment in column 1 of table 4 and in figure 3. Overall the incentives have a strong effect on effort, raising performance from 1627 points (no piece rate) to 2060 points (3-cent piece rate) and 2127 points (9-cent piece rate). The standard error for the mean effort per treatment is around

30 points or less, implying that differences across treatments larger than 85 points are statistically significant.

There is statistically significant evidence for altruism. Workers put more effort when there work benefit the employer (altruism neutral treatment) as compared to the piece rate 0-cent treatment. The one cent return to the employer induces an effort of 1746 points as compared to 1627 points in the 0-cent treatment. Interestingly, workers are significantly more altruistic towards black employers than white employers. The effort corresponding to black employers is 1798 points, which is significantly higher than the effort provided to the white employers (1708 points). However, effort towards any employer race is not significantly different from the effort towards the neutral employer, implying very week evidence for any sort of discrimination in altruistic preferences.

In the reciprocity treatments, worker receive an unexpected gift of 20-cents from the employer, unconditional on performance. This positive gift from the employer, does not induce a significant increase in effort as compared to the altruism treatment (1771 points in reciprocity neutral treatment as compared to 1746 points in altruism neutral treatment). The reciprocal response to the employer's racial identity is also insignificant, implying that, on average, the workers do not reciprocate towards any employer race. This result is consistent with the literature which finds weak evidence for positive reciprocity (such as Kube, Maréchal, and Puppe (2006)).

Although our treatments are balanced on the observed worker variables and the employer characteristics, we present the regression results (for robustness sake) by controlling for these variables in the table 3. We observe that workers pro-altruistic response for black employers stays significant after controlling for the demographic variables. Controlling for employer fixed effects makes the altruism effect larger in magnitude, however it does not remain statistically significant potentially because of lower power to detect the effect size (via loss in degrees of freedom).[18] The reciprocal response stays statistically indifferent from zero for all the specifications.

In column 2 of table 4, we restrict to workers who could correctly perceive the race of the employer as black, white or neutral in the social preference treatments. Most of the workers (88 percent) were able to correctly perceive the race of the employer in the race salient treatments however only few workers could remain indecisive about the race of the employer in the race neutral treatments. More than half (five percent) of the workers in race neutral treatments believed the employer to be white (black), even though there were no racial markers in the video that could identify the race of the employer. Restricting to workers who could correctly perceive the employer race

[18] The employer fixed effect controls for the personality traits of the employer, that may had an effect on worker's effort choice.

Table 3: Social Preference Treatments - Robustness

	Altruism			Reciprocity		
	(1)	(2)	(3)	(4)	(5)	(6)
White or Caucasian	-90.28*	-84.51*	-124.1	-5.379	-1.803	-70.48
	(39.92)	(40.77)	(99.48)	(40.01)	(40.89)	(102.3)
Constant	1798.4***	1822.5***	1709.2***	1803.6***	1772.0***	1753.7***
	(28.12)	(294.0)	(302.1)	(28.28)	(289.2)	(300.0)
Demographic Controls	No	Yes	Yes	No	Yes	Yes
Employer Fixed Effects	No	No	Yes	No	No	Yes
Observations	1193	1138	1138	1179	1126	1126

Notes: The table presents the estimates from an OLS regression of Points in the race salient social preference treatments on the employer's race. The omitted category is the Black employer. Demographic controls include age, gender, education, income, political affiliation and the voting pattern of the most lived state (red, blue, or swing) of the worker. There are total of 12 employer fixed effects for each of altruism and reciprocity treatments. Standard errors in parentheses.

do not substantially effect the direction or magnitude of results.

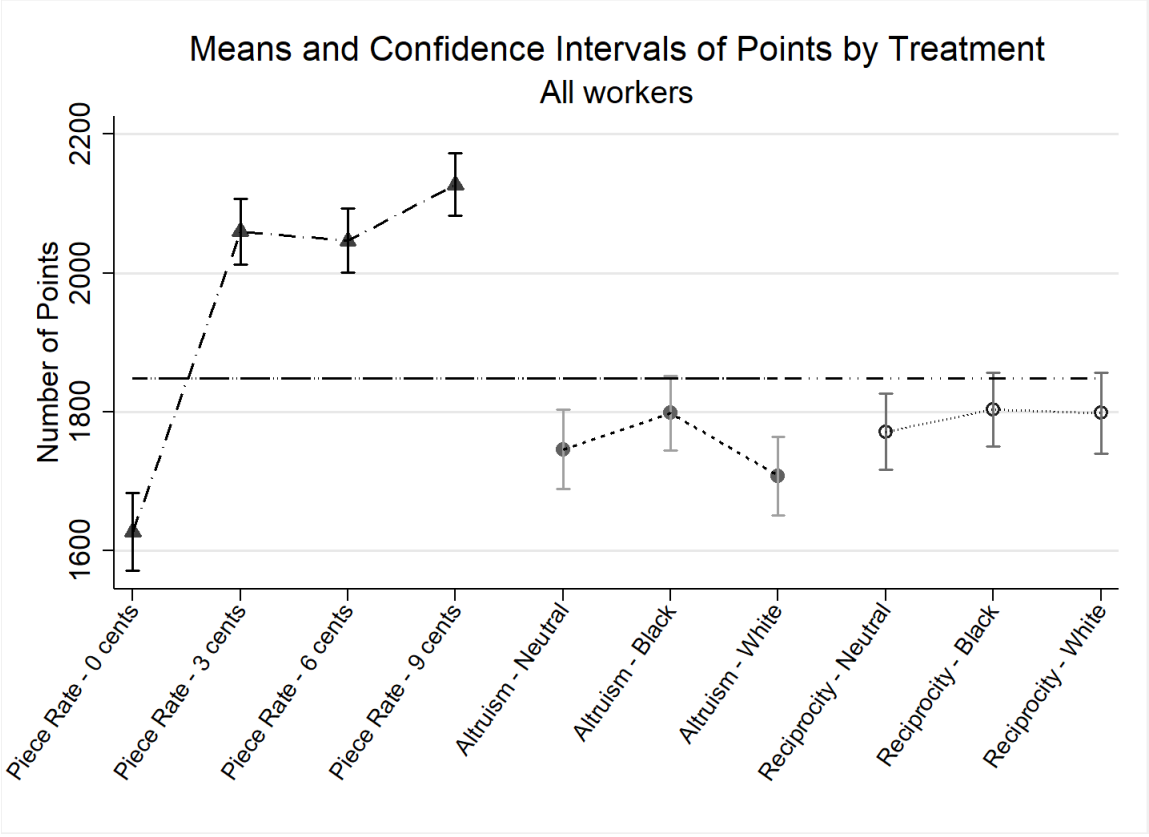


Figure 3: Effort by Treatment - All Workers

Notes: This figure presents the average score and confidence interval for each of ten treatments for all workers. Each treatment has about 590 participants.

Table 4: Effort by Treatment

	(1) All Workers		(2) Correctly Perceived Race	
	N	Mean (s.e)	N	Mean (s.e)
Piece Rate - 0 cents	599	1627.07	599	1627.07
		(28.56)		(28.56)
Piece Rate - 3 cents	595	2059.83	595	2059.83
		(24.19)		(24.19)
Piece Rate - 6 cents	592	2046.68	592	2046.68
		(23.62)		(23.62)
Piece Rate - 9 cents	588	2127.37	588	2127.37
		(23.01)		(23.01)
Altruism - Neutral	591	1746.06	261	1724.87
		(29.15)		(43.70)
Altruism - Black	601	1798.37	494	1807.68
		(27.55)		(29.58)
Altruism - White	592	1708.09	557	1715.24
		(28.90)		(29.52)
Reciprocity - Neutral	608	1771.15	265	1766.99
		(27.95)		(41.63)
Reciprocity - Black	590	1803.61	470	1818.78
		(26.95)		(29.73)
Reciprocity - White	589	1798.23	561	1803.75
		(29.58)		(30.33)
Total	5945	1848.08	4982	1865.98
		(8.80)		(9.49)

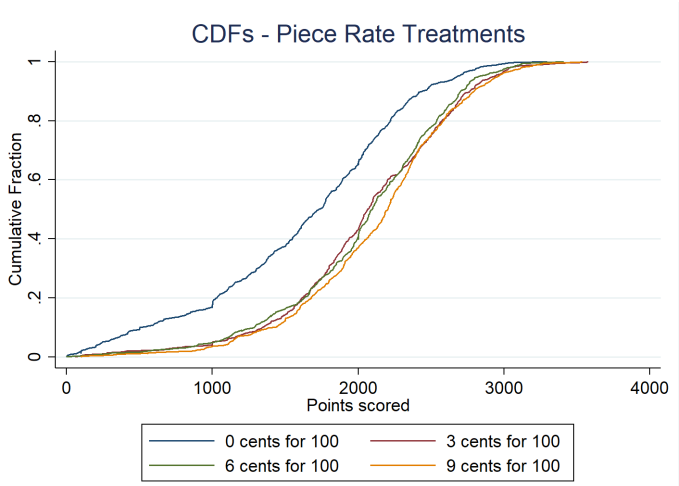
Notes: The table presents the effort choices in each treatment. Column 1 reports the effort choices by all the workers, column 2 reports the effort choices by workers who were able to correctly perceive the race of the employer as neutral, black or white in social preference treatments.

5.1 Distribution of Effort

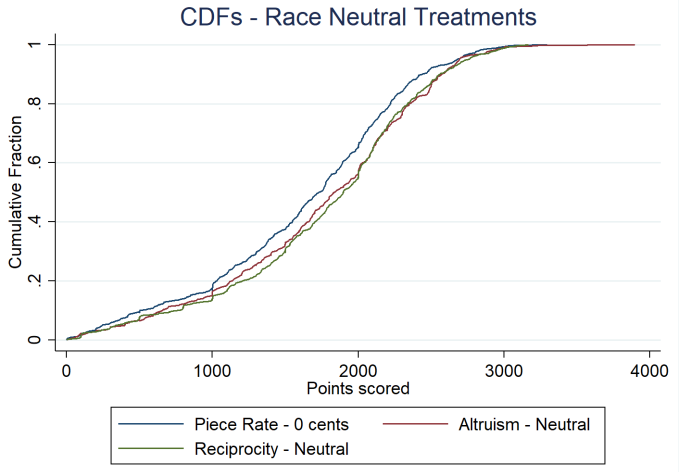
Beyond the average effort, we present the distribution of effort in all the treatments in figure B.3 of appendix and by each treatment in figure B.4 of appendix. Overall, very few workers score below 500 points and even fewer score above 3000 points.

Figure 4a presents the cumulative distribution function for the piece rate treatments. Incentives induce a clear rightward shift in effort relative to 0-cent treatment. However, there is not much change in effort between 3-cent and 6-cent treatments. Figure 4b shows the strong evidence for altruistic preferences as observed by the clear rightward shift of the altruism treatment as compared to the 0-cent treatment. The reciprocity treatment is indistinguishable from the altruism treatment, implying a lack of reciprocal preferences. Figure 4c shows that altruism is stronger towards blacks as compared to whites while the cumulative density function is indistinguishable for reciprocity-black and reciprocity-white treatments. Quantile regression estimates for effort (not tabulated) show that black employers get higher effort than white employers at each quantile for the altruism treatments, on the other hand there is no difference between black and white employers for the reciprocity treatments at any quantile. This shows that altruistic response for the black employers is coming from the entire effort distribution and not just from one particular part of effort distribution.

(a)



(b)



(c)

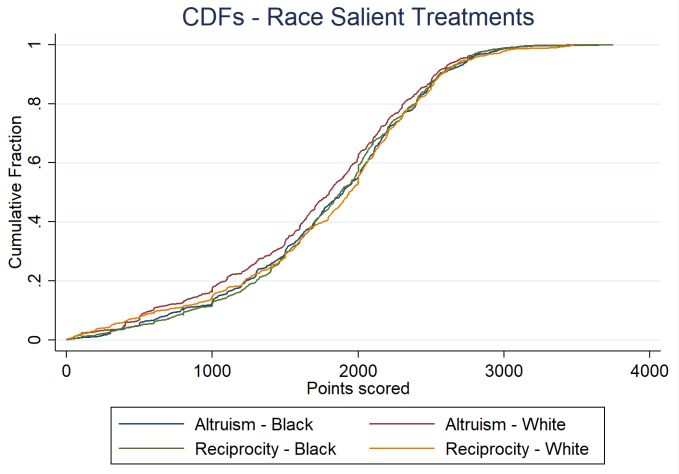


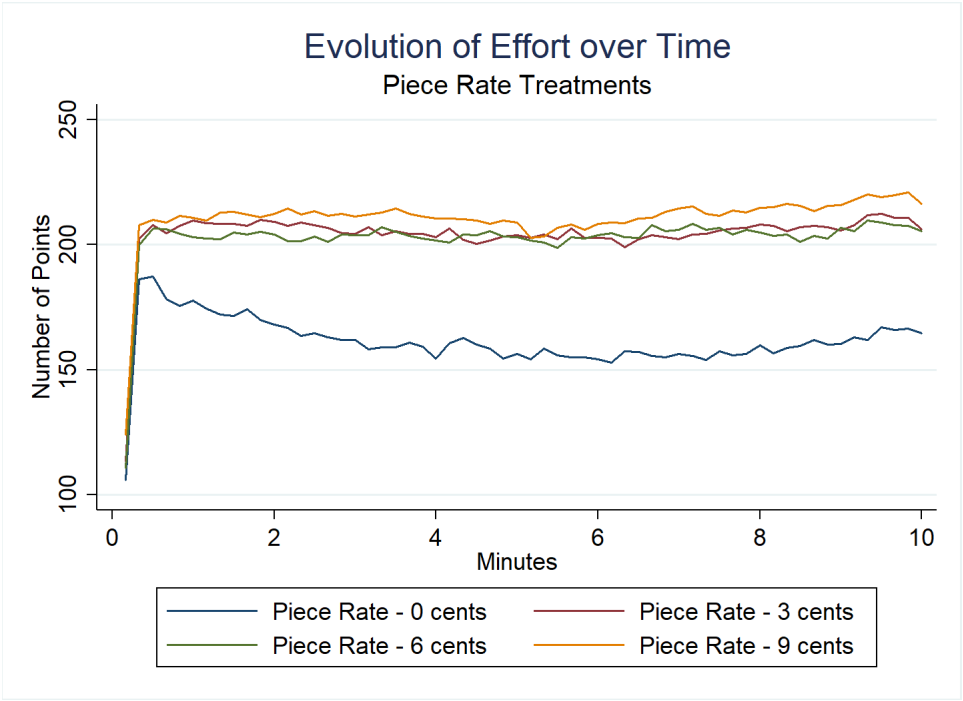
Figure 4: Cumulative distribution function

Notes: The figure presents the cumulative distribution function of points for the workers in each of the treatments featured. The sample size in each treatment is approximately 590 subjects. Figure a features the four piece rate treatments (no piece rate, 3-cent per 100 points, 6 cents per 100 points, and 9 cents per 100 points). Figure b presents the results for the race-neutral treatments. Figure c presents the results for the race-salient treatments.

5.2 Evolution of Effort

We present the evolution of effort over the 10-minutes period in figure 5. Figure 5b shows that in the social preference treatments, overall the effort declines over time, this may be due to workers getting tired as they continue working over the 10-minutes interval. However, the piece rate treatments are able to sustain the consistent higher effort throughout the time interval (figure 5a), with workers in 9-cent treatment pushing extra hard near the end.

(a)



(b)

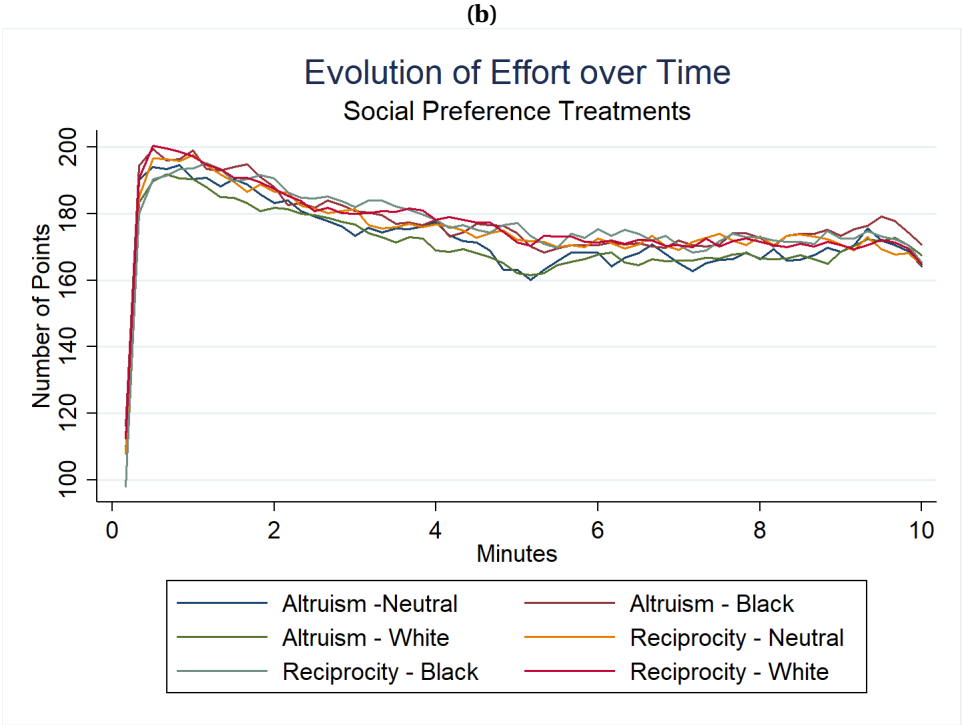


Figure 5: Evolution of effort over time

Notes: This figure presents the effort over time for selected treatments. The y axis indicates the average number of points scored in that treatment per minute.

5.3 Heterogeneity

5.3.1 Heterogeneity by Demographics

To examine the heterogeneity in our average treatment effects based on demographic characteristics of the sample, we present the conditional average treatment effects in table C7 and C8 of appendix for altruism treatments and in table C9 and C10 of appendix for reciprocity treatments. Overall, we do not find evidence of heterogeneity on the basis of gender, age, education, income, and state voting pattern for both altruism and reciprocity treatments. However, we do find evidence for heterogeneity in altruism on the basis of party affiliation. Interestingly, we find that republicans and independents exert significantly more effort than democrats for the black employers relative to the white employers, indicating the presence of pro-black altruistic preferences among republicans and independents as compared to democrats.

5.3.2 Heterogeneity by the share of black population in the neighborhood

Following Andreoni, Payne, Smith, and Karp (2016), we explore the effects of local racial composition on social preferences of the workers in our sample. We condition on the zip code level racial composition of the worker, and examine the difference in effort provided to black versus white employers. Figure 6 presents the conditional average treatment effects for each decile of the share of black population for workers who correctly perceived the employer race. Overall, the difference in effort provided to the black versus white employers is statically zero at each level of black share of population.

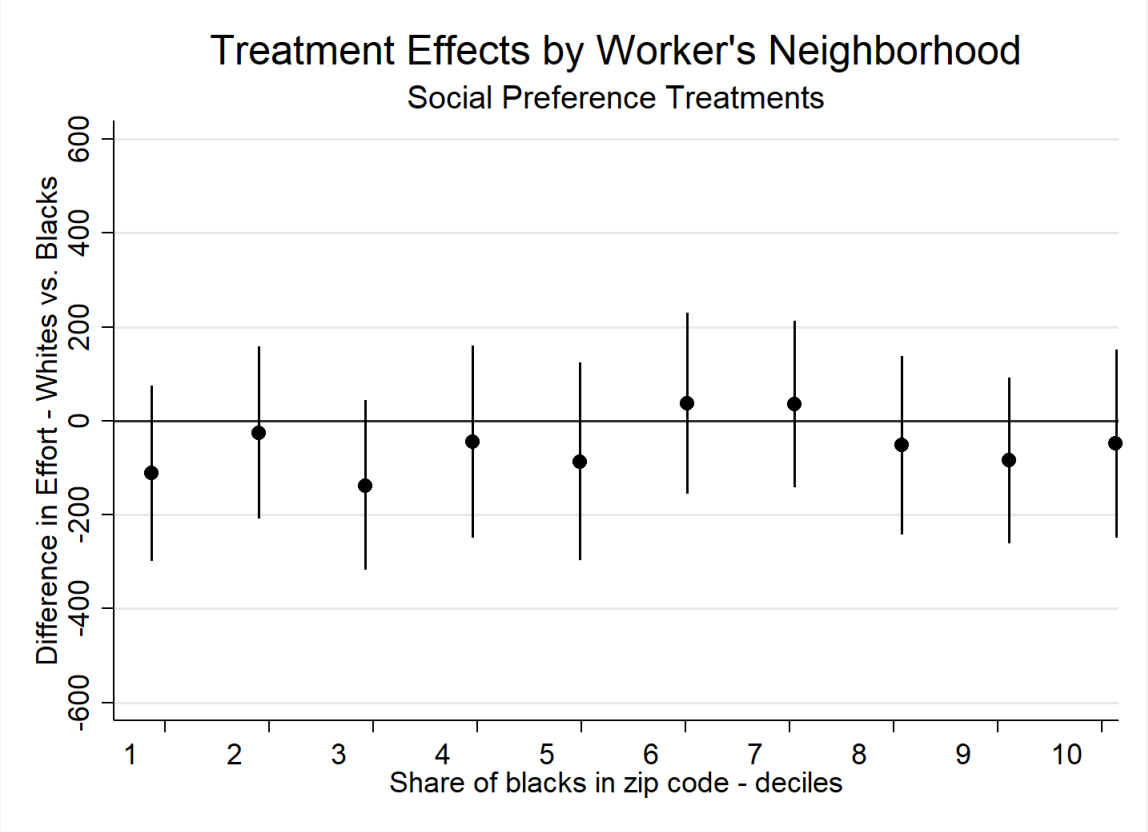
5.3.3 Heterogeneity by Geographical Area

It is a well established fact that racial disparities are not equally distributed across the United States. We present the summary of workers performance by their geographical area in table 5. Interestingly, there is a week evidence in favor of workers from south being relatively pro-social to black employers.

5.3.4 Heterogeneity by Implicit Biases

We examine the heterogeneity in treatment effects based on the implicit biases of the workers as measured by the implicit association test (IAT). IATs are widely used in social psychology to measure implicit and unconscious

Figure 6: Treatment effects by local racial composition



Notes: The figure presents the conditional average treatment effects (conditioned on the share of blacks in a zip code). The x-axis represents deciles of the share of black population in a zip code. Measure of conditional treatment effect is obtained by pooling data from race salient social preference treatments of workers who could correctly perceive the employer race and running a regression of Points on Employer Race for each decile of the black share. The cutoff values of the deciles are 0, 0.009, 0.018, 0.03, 0.045, 0.065, 0.094, 0.137, 0.207, and 0.351.

Table 5: Heterogeneity by Geographical Area

	Regions			
	(1)	(2)	(3)	(4)
	North East	Mid West	South	West
White or Caucasian	-34.55	-36.83	-72.28	-31.67
	(72.20)	(57.17)	(48.99)	(73.74)
Constant	3083.1	1634.6	1366.0	1630.7
	(737.4)	(390.5)	(333.7)	(438.9)
Demographic Controls	Yes	Yes	Yes	Yes
Observations	377	529	771	405

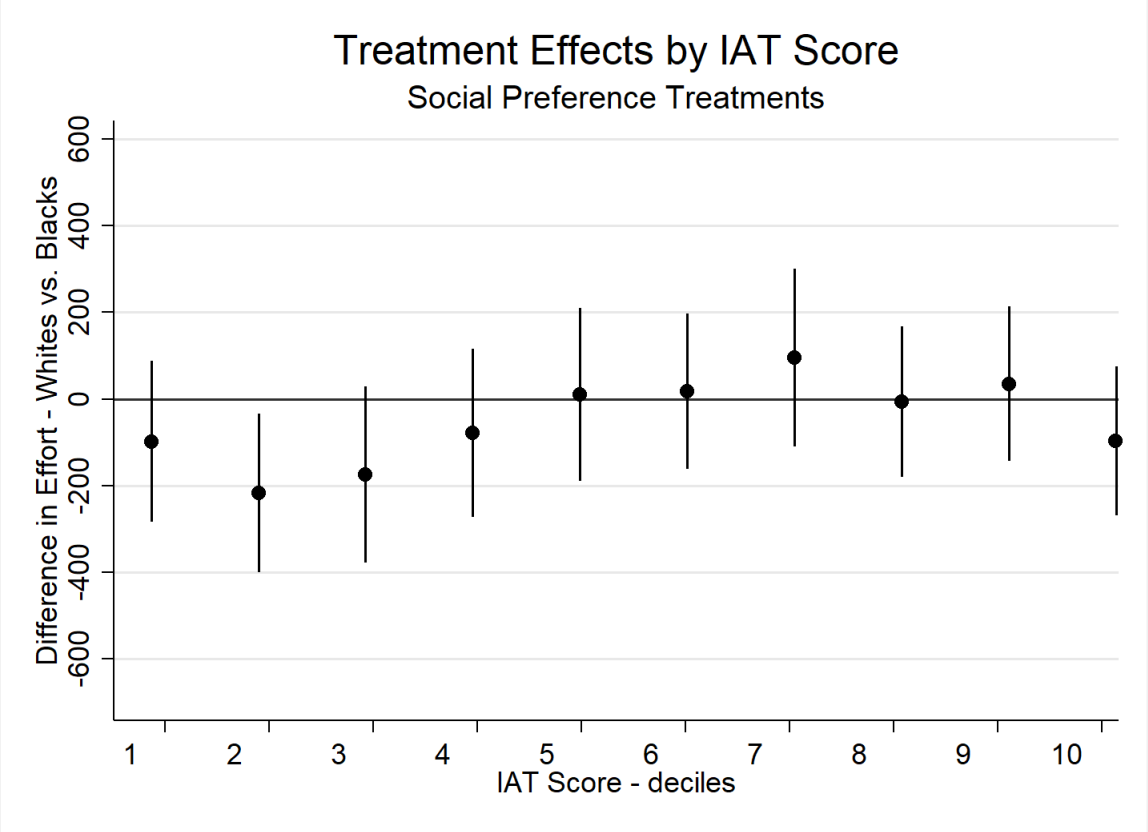
Notes: The table presents the conditional average treatment effect by the geographical location of the worker. *Measure of conditional treatment effect is obtained by pooling data from race salient social preference treatments of workers who could correctly perceive the employer race and running a regression of Points on Employer Race for each geographical region. Standard errors in parenthesis.*

biases towards a particular group. The test involves categorizing two sets of words to the left or right hand side of the computer screen. Implicit bias is measured by a time difference in associating good or bad words to the relevant group identities. The idea is that making a response is easier when closely related items share the categorization to the same side of the screen. In case of race IAT, we would say that one has an implicit preference for white people relative to black people if they are faster to categorize words when white face and good words (friend, glorious, enjoy, joyous, terrific, beautiful, magnificent, and fabulous) share a response key and black faces and bad words (detest, poison, nasty, disgust, pain, despise, sadness, evil) share a response key, relative to the reverse.

For this study, we did not conduct IAT test for individual workers instead we proxy the IAT score of individual worker by using the geo-coded race IAT data by project implicit, which provides historical record of tests taken on the project's website. These tests can be taken by anyone from anywhere in the world. For our purpose we restrict to white individuals from the United States and use the data of more than two million tests takers over the time period from 2006 to 2018. We map the county level (lowest available resolution) IAT score to workers in our sample based on the worker's geographic location. Our worker sample comes from 190 counties spanning over all 50 states in the United States.

According to the typical thresholds in literature (Greenwald, Nosek, & Banaji, 2003; Hahn, Judd, Hirsh, & Blair, 2014; Rooth, 2010), IAT scores below -0.15 indicate some preference for minorities; scores between -0.15 and 0.15 indicate little to no bias; scores between 0.15 and 0.35 indicate a slight bias against minorities; and scores above 0.35 show moderate to severe bias against minorities. The average score (standard deviation) of white test takers in our sample is 0.38 (0.42) implying that on average white people have moderate to severe implicit bias against blacks. Like black share, we explore the effects of local IAT score on social preferences of the workers in our sample. We condition on the county level IAT score of the worker, and examine the difference in effort provided to black versus white employers. Figure 7 presents the conditional average treatment effects for each decile of the IAT score for workers who could correctly perceive the employer race. Overall, there is some indication that workers with low implicit bias exhibit higher social preference towards the black employers as compared to white employers. However, at higher level of implicit biases, the difference in effort provided to the black versus white employers is statistically zero. Restricting to two quantiles of IAT score clearly shows (not presented) that black employers get significantly higher effort than white employers in the lower quantile (lower implicit bias), while there is no

Figure 7: Treatment effects by local IAT



Notes: The figure presents the conditional average treatment effects (conditioned on the IAT score of the worker's county). The x-axis represents deciles of the IAT score at county level. Measure of treatment effect is obtained by pooling data from race salient social preference treatments of workers who could perceive the employer race correctly and running a regression of Points on Employer Race for each decile of the IAT score. The cutoff values of the deciles are 0.295, 0.349, 0.376, 0.381, 0.386, 0.396, 0.404, 0.413, 0.415, and 0.444.

difference in effort provision for black and white employers in the upper quantile (higher implicit bias).

6 Estimates of Behavioral Parameters

We designed our experiment with the structural model given in Section 2. The advantage of designing field experiments on the basis of model of behavior is that it allows researchers to estimate the nuisance parameters in the environment that is relevant to the decision making (DellaVigna, 2017). Because of the simplicity of our task, there are only three nuisance parameters that we need to estimate. We will thus use data from the piece rate treatments to identify these parameters. Once we have the estimate of these nuisance parameters, we can estimate behavioral parameters using data from the social preference treatments. We closely follow the estimation procedure in

Dellavigna and Pope (2018) to estimate our model.

6.1 Minimum Distance Estimation

We first use minimum distance estimation method to estimate these parameters. In the minimum distance estimation one identifies the set of moments in data (average effort) and then find the set of model parameters that minimizes the distance between the empirical moments and the theory-predicted moments. To estimate nuisance parameters, we use data from the piece rate treatments. Specifically, we use the average effort corresponding to three piece rates (0 cents, 3 cents and 9 cents), to estimate γ, s, and k. Specifically, in the case of power cost function, to estimate nuisance parameters, we use first moments from the piece rate treatments and solve the following equations

$$\bar{e}_p = \frac{1}{\gamma}\left[log(s+p) - log(k)\right] \text{ for } p \in \{0, 0.03, 0.09\}$$

where $\bar{e}_p$ is the average effort in the piece rate p treatment. These parameters estimates are used to present marginal cost and marginal benefits curve in figure 8.

Once these parameters are estimated, we use average effort corresponding to altruism neutral, altruism black and altruism white treatment to estimate behavioral parameters $\alpha_{Neutral}$, α_{Black}, and α_{White} respectively. Specifically, for power cost function, we solve the following equations for α_j for $j \in \{Neutral, Black, White\}$ taking estimates of γ, s, and k as given

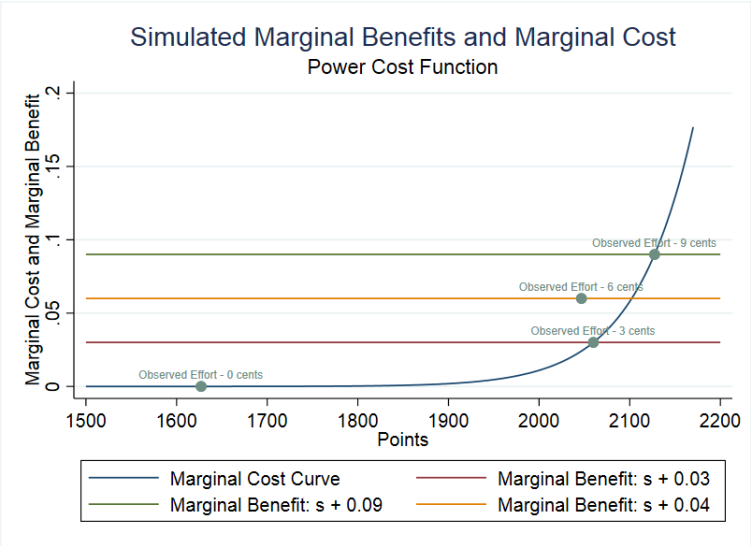
$$log(\bar{e}_{\alpha_j}) = \frac{1}{\gamma}\left[log(s+\alpha_j v) - log(k)\right] \text{ for } j \in \{Neutral, Black, White\}$$

where $\bar{e}_{\alpha_j}$ is the average effort in the altruism j treatment.

Similarly, to calculate reciprocity parameters for neutral ($\rho_{Neutral}$), black (ρ_{Black}) and white (ρ_{White}) employers, we use average effort from reciprocity neutral, reciprocity black, and reciprocity white treatments and solve the following equations taking estimates of γ, s, k, and α_j for $j \in \{Neutral, Black, White\}$ as given

$$log(\bar{e}_{\rho_j}) = \frac{1}{\gamma}\left[log(s+\rho_j+\alpha_j v) - log(k)\right] \text{ for } j \in \{Neutral, Black, White\}$$

Figure 8: Illustration of the Model: Marginal Benefits and Cost Curves



Notes: The figure presents the marginal benefit and marginal cost curves using minimum-distance estimates for power cost function.

where $\bar{e}_{\rho_j}$ is the average effort in the reciprocity j treatment.

Estimates using exponential cost function are similarly calculated. Table 6 presents the parameter estimates for power cost function (column 1) and exponential cost function (column 3). The standard errors for these parameter estimates are estimated using a bootstrap procedure with thousand draws.

6.2 Non-Linear Least Squares Estimation

The minimum distance estimator just relies on the moment and hence, does not use all the variation in the data. There are methods such as maximum likelihood and non-linear least squares that can be used to estimate these parameters using all the variation in the data. We use non-linear least square method to estimate these parameters allowing for the heterogeneous cost of effort. Allowing for a heterogeneous marginal cost of effort in 1, we assume for a worker i, for a power cost case, $c(e_{ij}) = \frac{ke_{ij}^{1+\gamma}}{1+\gamma} exp(-\gamma\epsilon_{ij})$ with $\epsilon_{ij} \sim N(0, \sigma_\epsilon^2)$. The first order condition 4 can then be written as;

$$s + 1_{Gift}\rho_j + \alpha_j v + p - ke_{ij}^{\gamma} exp(-\gamma\epsilon_{ij}) = 0$$

Taking the last term to the right and taking logs, we obtain

$$log(s + 1_{Gift}\rho_j + \alpha_j v + p) + \epsilon_{ij} = log(k) + \gamma log(e_{ij}) - \gamma\epsilon_{ij}$$

Solving for $log(e_{ij})$, we obtain the estimating equation

$$log(e_{ij}) = \frac{1}{\gamma}\left[log(s + 1_{Gift}\rho_j + \alpha_j v + p) - log(k)\right] + \epsilon_{ij} \tag{5}$$

Similarly using exponential cost function, we get

$$e_{ij} = \frac{1}{\gamma}\left[log(s + 1_{Gift}\rho_j + \alpha_j v + p) - log(k)\right] + \epsilon_{ij} \tag{6}$$

Equations 5 and 6 can be estimated with non-linear least squares (NLS). Table 6 presents the NLS parameter estimates for power cost function (column 2) and exponential cost function (column 4). The NLS parameter estimates are nearly identical to minimum distance estimation for the exponential cost case. The model predictions are also very similar to minimum distance ones.

The NLS estimates for the power cost function yield a lower curvature than the minimum-distance estimates ($\hat{\gamma}_{NLS}$ = 20.29 versus $\hat{\gamma}_{MD}$ = 34.05). The NLS model matches expected log effort, while the minimum-distance matches the log of expected effort. Both NLS and minimum-distance fit the in sample moments and make similar predictions for the 6-cent piece rate treatment.

The parameter estimate for altruism black is significantly higher than altruism white in all the specifications, indicating that white workers have significantly higher altruistic preferences for black employers as compared to white employers. The reciprocity estimates also indicate almost no effect from the gift exchange for any employer in all the specifications. Even though the parameter values are very close to zero, but they translate to meaningful difference in effort provided to black and white employers at zero piece rate. Figure 9 presents the simulated effort for neutral, black and white employer using parameter estimates along with zero social-preference case. Black employers receive around five percent higher effort than white employers at zero piece rate. The difference between black and white employers becomes negligible at higher piece rates because workers respond much more

Table 6: Parameter Estimates

	Power cost of effort		Exponential cost of effort	
	Minimum distance estimator on average effort	NLS on Individual effort	Minimum distance estimator on average effort	NLS on individual effort
	(1)	(2)	(3)	(4)
Baseline Parameters				
Curvature γ of cost of effort function	34.05	20.30	0.0163	0.0163
	(15.9)	(8.85)	(.0207)	(.00807)
Intrinsic motivation s (cents per point)	0.00000977	0.00000802	0.0000264	0.0000264
	(.000246)	(.000032)	(.000389)	(.000101)
Level k of cost of effort function	4.50e-115	2.98e-70	8.58e-17	8.58e-17
	(2.7e-46)	(2.5e-68)	(7.1e-09)	(1.5e-15)
Altruism Parameters				
Altruism α_{Neutral} towards neutral employer	0.00983	0.000426	0.0156	0.0156
	(.00779)	(.0017)	(.0103)	(.0427)
Altruism α_{Black} towards black employer	0.0285	0.000776	0.0402	0.0402
	(.0186)	(.00274)	(.0226)	(.0953)
Altruism α_{White} towards white employer	0.00413	0.000270	0.00722	0.00722
	(.00367)	(.00129)	(.00552)	(.0215)
Reciprocity Parameters				
Reciprocity ρ_{Neutral} towards neutral employer	0.0000676	0.0000272	0.0000921	0.00124
	(.000136)	(.000103)	(.000173)	(.00318)
Reciprocity ρ_{Black} towards black employer	0.0000307	0.0000395	0.0000381	0.00220
	(.000265)	(.00014)	(.000308)	(.00513)
Reciprocity ρ_{White} towards white employer	0.000243	0.0000255	0.000328	0.00200
	(.00021)	(.0001)	(.000257)	(.00477)
Implied effort at 6-cents		expected log effort		
(observed effort 2047, log 7.624)	2102	7.746	2102	2102.4

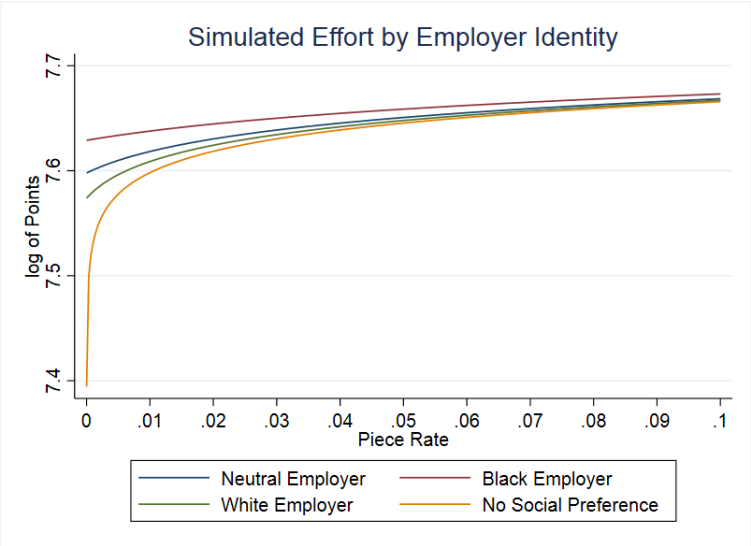
Notes: This table reports the structural estimates of the model in section 2. Column (1) and (3) use a minimum-distance estimator employing three moments (average effort in three piece rate treatments) and three parameters (γ , s and k), and is thus exactly identified. Column (2) and (4) use a non-linear least squares employing individual effort in all the treatments and thus estimating all the parameters simultaneously. We use power cost (column 1 and 2) and exponential cost (column 3 and 4) function to estimate the model. Implied effort is calculated using estimated parameters for each model. For the altruism parameters, the baseline parameters are taken as given and the average effort for neutral, black, and white employers is used to estimate $\alpha_{Neutral}$, α_{Black}, and α_{White} from the altruism treatments. Similarly for the reciprocity parameters, the baseline and altruism parameters are taken as given and the average effort corresponding to reciprocity neutral, reciprocity black, and reciprocity white is used to estimate $\rho_{Neutral}$, ρ_{Black}, and ρ_{White}. Standard errors for minimum-distance estimator are calculated by taking a bootstrap sample of 1000 draws and recalculating these parameters for each draw.

to monetary incentives as compared to social preferences.

7 Conclusion

This paper uses insights from behavioral and experimental economics to shed light on a pressing issue in American society, namely, racial discrimination. Almost all of the economic literature on discrimination presume that labor market discrimination goes from employers to workers, this paper instead asks, could it be that workers may also discriminate against their out-race employers in an online labor market? The results suggest that workers do not discriminate in effort provision against black employers, instead black employers illicit statistically higher effort from workers as compared to white employers. There seems to be suggestive evidence that the higher effort towards black employers is driven by the workers with relatively lower implicit bias against blacks. Worker

Figure 9: Simulated Effort by Employer Race at Different Piece Rates



Notes: The figure presents the simulated effort using the parameter estimates from table 6 *for power cost, minimum distance specification. Neutral/Black/White employer uses the respected social preference parameter estimates to calculate the predicted effort at each piece rate. No Social Preference assumes that altruism and reciprocity estimates are zero.*

with higher implicit bias do not provide disparate effort depending on employer's race. Our results imply that preference-based discrimination against minorities may not elicit itself in a gig economy and therefore with transition to gig economy we may end up with discrimination-free workplace.

It should be noted that our results may not be externally valid to settings in which employer-worker engagement is longer and involves physical interaction. In those settings, it is likely that workers may still exhibit discrimination against the employers from a particular group. Future research needs to test worker side discrimination in different environments. Additionally, in this paper we have focused only on intensive margin. We acknowledge that understanding of discrimination on extensive margin is equally important as workers from dominant group may systematically select out of the jobs by disadvantaged-group employers, thereby limiting the labor resources at the disposal of disadvantaged group employers. We aim to study the worker-to-employer discrimination on extensive margin in future research.

There are not many papers investigating the issue of discrimination in gig economy. Cook, Diamond, Hall, List, and Oyer (2019) is one of the notable papers which investigates gender earning-gap in one of the gig economies: Uber. Future work should investigate discrimination more generally in gig economies and particularly in labor markets.

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A Experiment Material Appendix

Iowa State University
Department of Economics
Consent for Participation in Research

Title of Study: Decisions in Labor Market
Investigator: Sher Afghan Asad, Ritwik Banerjee, Joydeep Bhattacharya

This brief screener is a part of a research project at Iowa State University. You will receive $0.05 for completing the screener, which is used to see if you are eligible for the full study. Individuals who qualify for the study will be invited to participate in a 15-minute study for the pay of 1 dollar plus bonus. If you do not qualify for participation based on this screening questionnaire, all the information about you will be destroyed.

Description of Procedures
To be considered for participation in the study, you will have to answer a few demographic questions. Once you have answered those questions, you may be invited to participate in the full study. In the full study, you may be randomly matched with another participant and you will then work on a simple task that may affect your and your matched participant earnings. The experiment will last for approximately 15 minutes. You will be given more information about the structure of the study in the instructions.

Risks or Discomforts
There are no foreseeable risks currently in participating in the study.

Benefits
If you decide to participate in this study, there are no direct benefits to you. It is hoped that the information gained in this study will benefit the field of economics by providing more insight into the process of how decisions are made in the labor markets.

Costs and Compensation
You will not bear any costs from participating in this study. If you participate you will spend no longer than 15 minutes completing procedures. Participants will earn $1 for participating in the experiment and a bonus amount depending on the decisions in the experiment. Your final compensation will vary depending on your and your randomly matched participant choices.

Participant Rights

Participating in this study is completely voluntary. You may choose not to take part in the study or to stop participating at any time, for any reason, without penalty or negative consequences. If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, 515-294-4566, IRB@iastate.edu, or Director, 515-294-3115, Office for Responsible Research, Iowa State University, Ames, Iowa 50011.

Confidentiality

This consent form and any other documents identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies, auditing departments of Iowa State University, and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy study records for quality assurance and data analysis. These records may contain private information. This experiment is approved by the Institutional Review Board at Iowa State University (ISU IRB: 18-201-01, Approved Date: 03/25/2019, Expiration Date: 07/17/2020). It is assured that the confidentiality of your data and the choices that you make in the study will be strictly maintained. To ensure confidentiality to the extent permitted by law, the following measures will be taken: Data will be stored on a secure cloud-based drive (Dropbox) under password protection. Your identifiable information will be separated from your decisions in the experiment. When we report results, we will group responses in aggregate; individual responses will not be shared. Please be aware that any work performed on Amazon MTurk can potentially be linked to information about you on your Amazon profile. We will not be accessing any information about you that you may have put on your Amazon public profile page. We will store your MTurk worker ID separately from the other information you provide to us.

Future Use of Data

De-identified information collected about you during this study may be shared with other researchers or used for future research studies. We will not obtain additional informed consent from you before sharing the de-identified data.

Questions

You are encouraged to ask questions at any time during this study. For further information about the study, contact Sher Afghan Asad at 515-735-6309 or saasad@iastate.edu or Joydeep Bhattacharya at joydeep@iastate.edu.

Consent and Authorization Provisions

By clicking the box below, you acknowledge, that you voluntarily agree to participate in this

study, that the study has been explained to you, that you have been given the time to read the document, and that your questions have been satisfactorily answered. You may print a copy of this informed consent document for your records.

If you don't agree with this consent document, then close this form and return the HIT.

◯ I acknowledge that I have read the material above and I agree to participate in the study.

Subjects who consent to participating in the study will fill out this screener survey before being considered for participation in this study.

Thank you for participating. Now that you have started, **<u>you may not restart</u>** this survey at any point or else your HIT will be rejected.

Please answer the following questions to the best of your ability.

Gender you most closely identify with:

- ◯ Male
- ◯ Female
- ◯ Prefer not to answer
- ◯ Other

Race you most closely identify with:

- ◯ American Indian or Alaskan Native
- ◯ Asian
- ◯ Black or African American
- ◯ Hispanic or Latino
- ◯ Native Hawaiian or other Pacific Islander
- ◯ White or Caucasian
- ◯ Prefer not to answer
- ◯ Other

If “White or Caucasian” is not selected, survey will end with 5 cents compensation.

Age (in years):

- ◯ Under 18
- ◯ 18 - 24
- ◯ 25 - 34
- ◯ 35 - 44
- ◯ 45 - 54
- ◯ 55 - 64
- ◯ 65 or older
- ◯ Prefer not to answer

If "Under 18" is selected, survey will end with 5 cents compensation.

Highest education level reached:

- ◯ Less than high school
- ◯ High school or equivalent
- ◯ Vocational / Technical School
- ◯ Some college
- ◯ College graduate
- ◯ Master's degree
- ◯ Professional degree
- ◯ Doctoral degree
- ◯ Prefer not to answer

Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent, or something else?

- ◯ Republican
- ◯ Democrat
- ◯ Independent
- ◯ Other

[ ]

- ◯ No preference

Annual pre-tax income

- ◯ Less than $10,000
- ◯ $10,000 - $19,999
- ◯ $20,000 - $29,999
- ◯ $30,000 - $44,999
- ◯ $45,000 - $99,999
- ◯ $100,000 - $149,999
- ◯ $150,000 - $199,999
- ◯ $200,000+
- ◯ Prefer not to answer

In which US state have you resided the longest?

[ ]

Subjects who report their race as "White or Caucasian", age as above 18, and their device type is not mobile will be shown the following screen. Rest of them will be shown the exit screen with 5 cents compensation.

Congratulations! You meet the criteria to participate in the full study.

This study will take up to 10 minutes, pay a bonus of 1 dollar and possibly an additional amount depending on your decisions in the study.

Make sure that you are not distracted for the next 10 minutes. Once you click next, you may not restart this study at any point or else your HIT will be rejected. When you are ready, click next to begin.

You may have to click the next button multiple times to move forward.

Participants will be blocked randomized to one of the ten treatments when they click next.

Instructions for each treatment will be explained in the video.

The script of each video will differ only on the incentive and bonus structure, the video format will be same for each treatment. The video will only show the hands of the other participant demonstrating the task. The skin will be revealed/concealed (using gloves) in the video depending on the assigned treatment. The next few pages presents the interface for each treatment.

Instructions for piece rate treatments. The videos have the hands covered in gloves and the audio is muted.

The following video explains what you are supposed to do in this study. You **MUST watch** this ~1-minute video to continue with the study.

The video has no sound, please carefully read the captions.

Below is an example of how the task will work. Try pressing `a' and `b' alternatively to score points. We have limited the point total below to a maximum of 5 as this is just practice, but the overall task will not have a limit.

Press `a' then `b'...

Points: 0

Proceed to the next page when you are ready to play the task. Your 10-minute task will begin immediately when the page loads.

The next button will appear only after you have finished watching a video. PLEASE WATCH AND LISTEN TO THE VIDEO TO CONTINUE.

Instructions for race neutral treatments. The videos have the hands covered in gloves and the audio is muted.

The following video explains what you are supposed to do in this study. You **MUST watch** this ~1-minute video to continue with the study.

The person in the video is **another participant** in the study. The video has no sound, please carefully read the captions.

The payment to the other participant will be paid in a couple of weeks. The proof of payment will be posted here. The ID of your other participant (assigned by us) is 18.

Below is an example of how the task will work. Try pressing `a' and `b' alternatively to score points. We have limited the point total below to a maximum of 5 as this is just practice, but the overall task will not have a limit.

Press `a' then `b'...

Points: 0

The next page will ask you some questions about the other participant. You will play the task after answering those questions.

The next button will appear only after you have finished watching a video. PLEASE WATCH AND LISTEN TO THE VIDEO TO CONTINUE.

Instructions for race salient treatments. The videos have the bare hands and the audio is not muted.

The following video explains what you are supposed to do in this study. You **MUST watch** this ~1-minute video to continue with the study.

The person in the video is **another participant** in the study.

The payment to the other participant will be paid in a couple of weeks. The proof of payment will be posted here. The ID of your other participant (assigned by us) is 62.

Below is an example of how the task will work. Try pressing `a' and `b' alternatively to score points. We have limited the point total below to a maximum of 5 as this is just practice, but the overall task will not have a limit.

Press `a' then `b'...

Points: 0

The next page will ask you some questions about the other participant. You will play the task after answering those questions.

The next button will appear only after you have finished watching a video. PLEASE WATCH AND LISTEN TO THE VIDEO TO CONTINUE.

These questions are presented only in the race salient and race neutral treatments.

Before you play the task, please give your **best guess** about the participant in the video. For each question, you will be paid **an extra 2 cents** as bonus if your guess is correct, we will **deduct 2 cents** from your final bonus payment if your guess is incorrect. Select "Cannot decide" if you cannot decide between the two options, in which case **no extra amount** will be rewarded or deducted for that question.

The other participant is either male or female, please guess the gender of the other participant?

- ◯ Male
- ◯ Female
- ◯ Cannot decide

The other participant's income is either less than or greater than $45,000, please guess the income of the other participant?

- ◯ Less than $45,000
- ◯ Greater than $45,000
- ◯ Cannot decide

The other participant's education is either 'below college' or 'some college or above', please guess the highest education level attained by the other participant.

- ◯ Below college
- ◯ Some college or above
- ◯ Cannot decide

The other participant is either black or white, please guess the race of the other participant?

- ◯ Black or African American
- ◯ White or Caucasian
- ◯ Cannot decide

The other participant is either 'under 35' or '35 or above', please guess the age group of the the other participant?

- ◯ Under 35
- ◯ 35 or above
- ◯ Cannot decide

Proceed to the next page when you are ready to play the task. Your 10-minute task will begin immediately when the page loads.

Task screen for Altruism Black treatment

08 45

Press 'a' then 'b'...

Points: 155

Your bonus payout: $1

Other participant's earning: $ 0.016

The other participant will be paid 1 cent for every 100 points that you score.

Your score will not affect your payment in any way.

Demonstration of the task by the other participant

This page will automatically submit after 10 minutes are over. Do NOT refresh / reload this page.

Task screen for Altruism Neutral treatment

0 9 1 8

Press 'a' then 'b'...

Points: 110

Your bonus payout: $1
Other participant's earning: $ 0.011

The other participant will be paid 1 cent for every 100 points that you score.

Your score will not affect your payment in any way.

Demonstration of the task by the other participant

This page will automatically submit after 10 minutes are over. Do NOT refresh / reload this page.

Task screen for Altruism White treatment

0924

Press 'a' then 'b'...

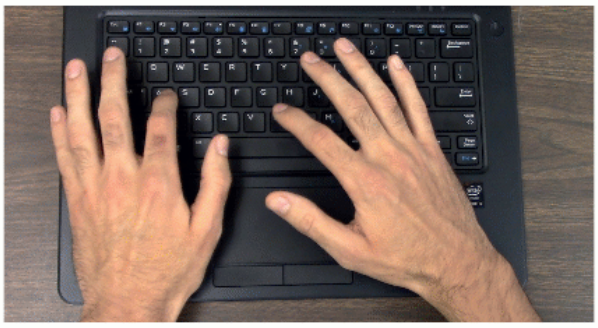
Points: 132

Your bonus payout: $1

Other participant's earning: $ 0.013

The other participant will be paid 1 cent for every 100 points that you score.

Your score will not affect your payment in any way.



Demonstration of the task by the other participant

This page will automatically submit after 10 minutes are over. Do NOT refresh / reload this page.

Task screen for Piece Rate - 0 cents treatment

0938

Press 'a' then 'b'...

Points: 57

Your bonus payout: $1

Your score will not affect your payment in any way.

Demonstration of the task

This page will automatically submit after 10 minutes are over. Do NOT refresh / reload this page.

Task screen for Piece Rate - 3 cents treatment

0934

Press 'a' then 'b'...

Points: 44

Your bonus payout: $1 + 0.013

As a bonus, you will be paid an extra 3 cents for every 100 points that you score.

Demonstration of the task

This page will automatically submit after 10 minutes are over. Do NOT refresh / reload this page.

Task screen for Piece Rate - 6 cents treatment

0 9 0 0

Press 'a' then 'b'...

Points: 38

Your bonus payout: $1 + 0.023

As a bonus, you will be paid an extra 6 cents for every 100 points that you score.

Demonstration of the task

This page will automatically submit after 10 minutes are over. Do NOT refresh / reload this page.

Task screen for Piece Rate - 9 cents treatment

0916

Press 'a' then 'b'...

Points: 68

Your bonus payout: $1 + 0.061

As a bonus, you will be paid an extra 9 cents for every 100 points that you score.

Demonstration of the task

This page will automatically submit after 10 minutes are over. Do NOT refresh / reload this page.

Task screen for Reciprocity Black treatment

0929

Press 'a' then 'b'...

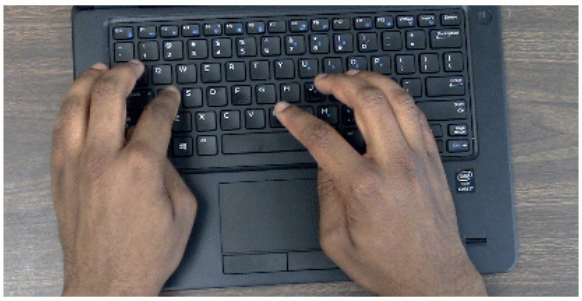
Points: 117

Your bonus payout: $1 + 0.2
Other participant's earning: $ 0.012

The other participant will be paid 1 cent for every 100 points that you score.

In appreciation to you for performing this task, the other participant has decided to pay you an extra 20 cents as a bonus.

Your score will not affect your payment in any way.



Demonstration of the task by the other participant

This page will automatically submit after 10 minutes are over. Do NOT refresh / reload this page.

Task screen for Reciprocity Neutral treatment

0914

Press 'a' then 'b'...

Points: 114

Your bonus payout: $1 + 0.2
Other participant's earning: $ 0.011

The other participant will be paid 1 cent for every 100 points that you score.

In appreciation to you for performing this task, the other participant has decided to pay you an extra 20 cents as a bonus.

Your score will not affect your payment in any way.

Demonstration of the task by the other participant

This page will automatically submit after 10 minutes are over. Do NOT refresh / reload this page.

Task screen for Reciprocity White treatment

0 9 0 8

Press 'a' then 'b'...

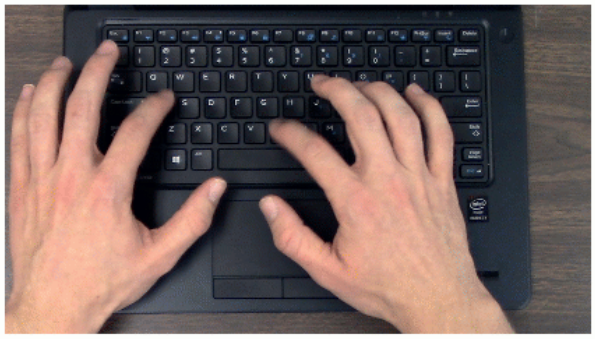
Points: 138

Your bonus payout: $1 + 0.2
Other participant's earning: $ 0.014

The other participant will be paid 1 cent for every 100 points that you score.

In appreciation to you for performing this task, the other participant has decided to pay you an extra 20 cents as a bonus.

Your score will not affect your payment in any way.



Demonstration of the task by the other participant

This page will automatically submit after 10 minutes are over. Do NOT refresh / reload this page.

Here is the summary of what happened in the experiment.

Points Scored: 38
Your Bonus Payout: $1.023

Please note that any bonus payment must be approved before they are given. Your bonus amount (if any) will be paid in 24 hours.

Did you have any questions, concerns or comments about this study? If so, enter them here.:

On the next screen, you will be given a survey code that you must enter into the textbox on Mechanical Turk to get paid.

Thank you for participating in this study.

Your MTurk completion code is: 28377

It is **very important** that you do not share any of your results and that you do not provide any details about this study to other potential participants. We trust in you to keep this study and your results confidential.

B Miscellaneous Figures

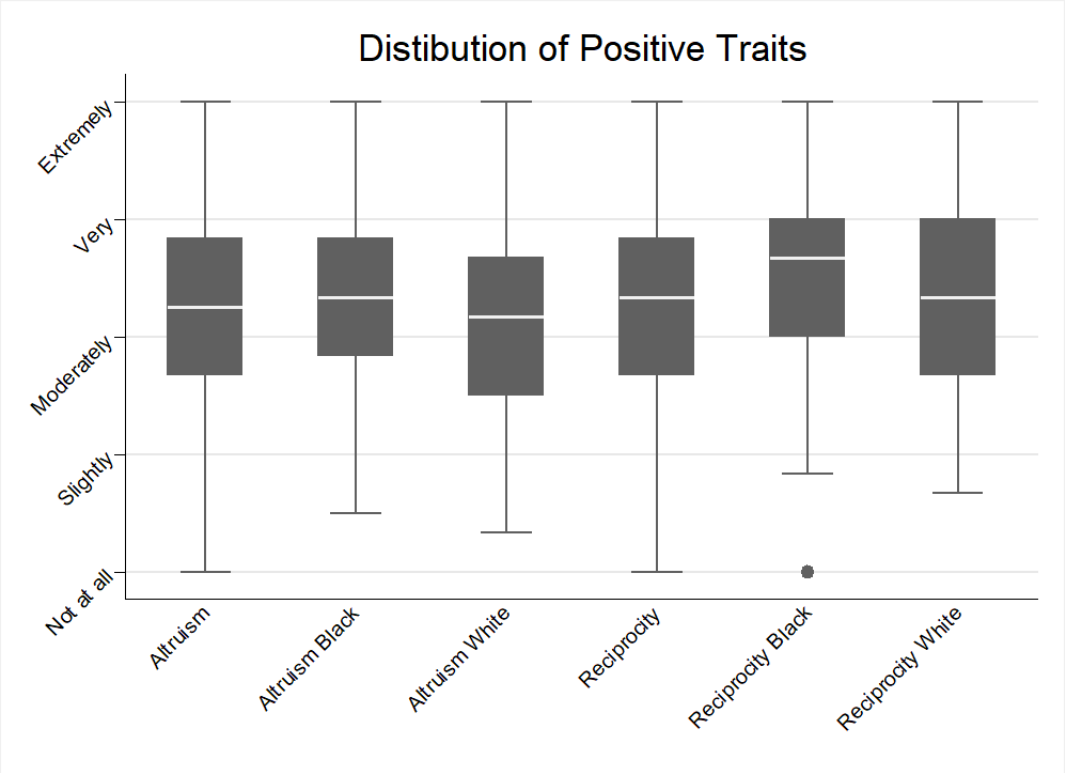


Figure B.1: Perception of Positive Personality Traits

Notes: This figure presents the box-plot of average of positive traits as rated by the evaluators. After the evaluators watched the video they were asked "Please rate the following characteristics about the the person in the above video". The positive traits were friendliness, confidence, encouragement, trustfulness, clarity, and motivation .

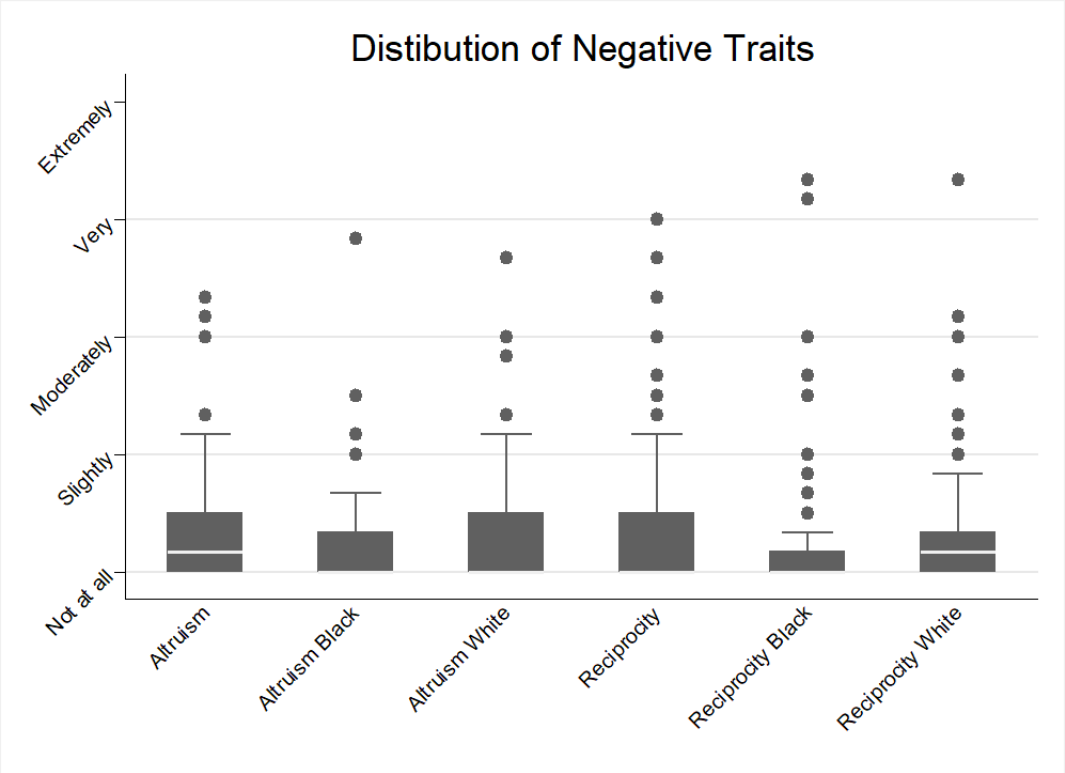


Figure B.2: Perception of Negative Personality Traits

Notes: This figure presents the box-plot of average rating of negative traits by the evaluators. After the evaluators watched the video they were asked "Please rate the following characteristics about the person in the above video". The negative traits were arrogance, laziness, bossinesss, rudeness, hostility, and undermining.

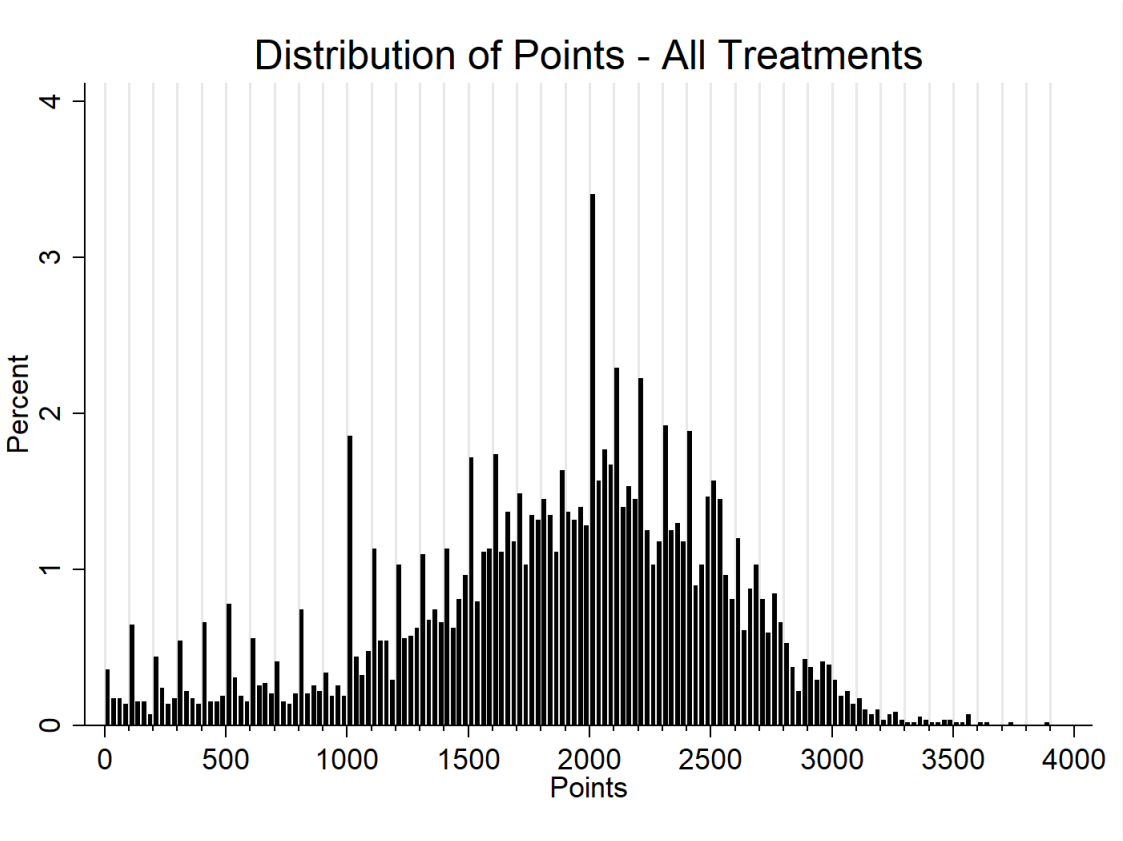


Figure B.3: Distribution of effort

Notes: This figure plots a histogram of the observed points over all 10 treatments.

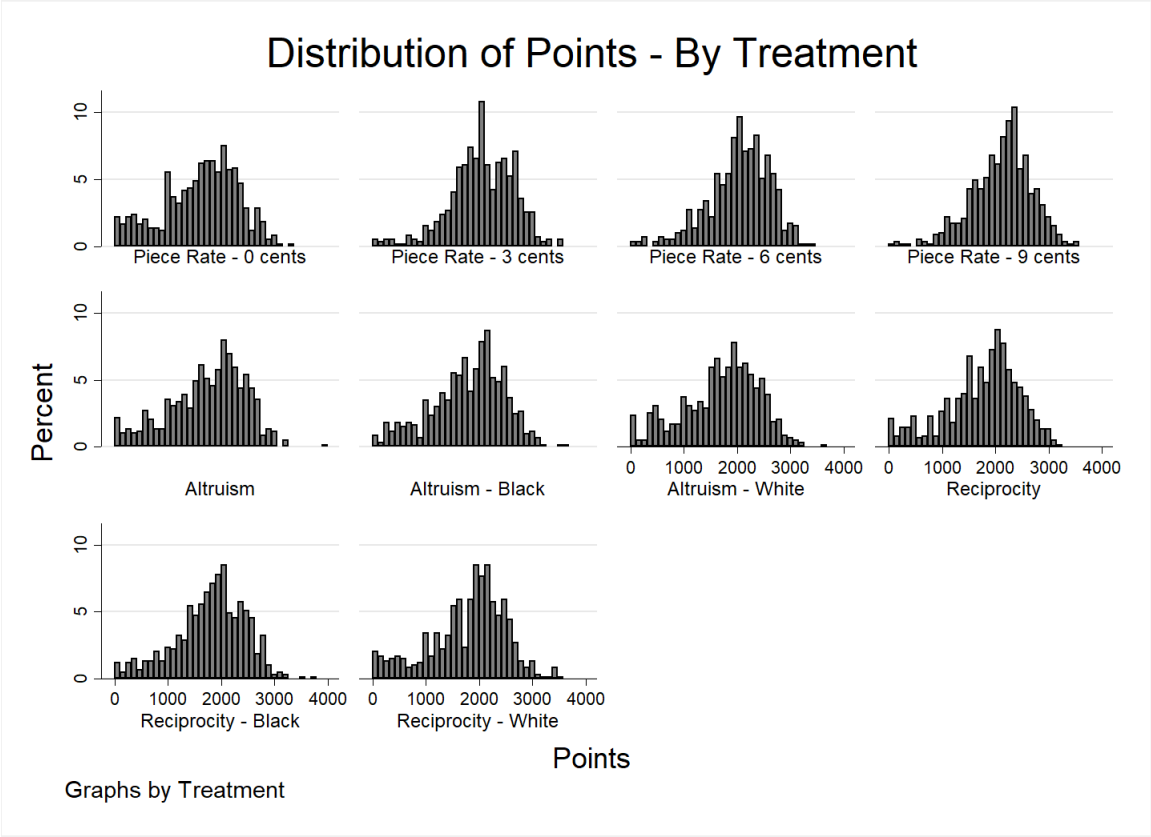


Figure B.4: Distribution of effort by Treatment

Notes: This figure plots a histogram of the observed points by each of the 10 treatments.

C Miscellaneous Tables

Table C1: Demographic Information of Employer Subjects

	(1) All Subjects	(2) Blacks	(3) Whites
Gender			
Male	1.00	1.00	1.00
Female	0.00	0.00	0.00
Race			
Black or African American	0.50	1.00	0.00
White or Caucasian	0.50	0.00	1.00
Age			
18-24	0.78	0.61	0.94
25-34	0.14	0.22	0.06
35-44	0.06	0.11	0.00
45-54	0.03	0.06	0.00
Education			
High school or equivalent	0.06	0.00	0.11
Some college	0.64	0.50	0.78
College graduate	0.19	0.28	0.11
Master's degree	0.08	0.17	0.00
Doctoral degree	0.03	0.06	0.00
Most lived state			
Blue	0.28	0.22	0.33
Red	0.03	0.06	0.00
Swing	0.69	0.72	0.67
Observations	36	18	18

Notes: The table presents demographic information of employer subjects. Column (1) presents proportion of all the employer subjects by their gender, race, age and education. Column (2) and column (3) presents these information for only black and white employers respectively.

Table C2: Test of Difference of Perception of Race and Skin Color

Panel A: Average Perception of Race

	(1) Race Perception		
	Proportion	SE	Group
Altruism	0.29	(0.03)	1
Altruism Black	0.91	(0.03)	23
Altruism White	0.98	(0.03)	3
Reciprocity	0.26	(0.03)	1
Reciprocity Black	0.83	(0.03)	2
Reciprocity White	0.96	(0.03)	3
Degrees of Freedom	1016		

Panel B: Average Perception of Skin Color

	(1) Skin Color Perception		
	Mean	SE	Group
Altruism Black	4.81	(0.05)	1
Altruism White	2.05	(0.05)	2
Reciprocity Black	4.57	(0.05)	1
Reciprocity White	2.11	(0.05)	2
Degrees of Freedom	667		

Notes: Panel A presents the proportion of subjects who could correctly guess the race of the employer in the video. Panel B presents the average skin color as perceived by the subjects in each treatment. The skin color can vary from 1 to 6 where 1 represents the 'light, pale white' while 6 represents the 'very dark brown to black' skin tone. Proportions sharing a digit in the 'Group' column are not significantly different at the 5% level. The comparisonwise error rate is adjusted using the Bonferroni method.

Table C3: Test of Difference of Personality Traits

	(1) Positive Traits			(2) Negative Traits		
	Mean	SE	Group	Mean	SE	Group
Altruism	3.27	(0.07)	12	1.33	(0.04)	12
Altruism Black	3.33	(0.07)	12	1.19	(0.04)	1
Altruism White	3.15	(0.07)	1	1.30	(0.04)	12
Reciprocity	3.26	(0.07)	12	1.38	(0.04)	2
Reciprocity Black	3.51	(0.07)	2	1.24	(0.04)	12
Reciprocity White	3.28	(0.07)	12	1.28	(0.04)	12
Degrees of Freedom	852			929		

Notes: The table presents the average of perceived positive and negative traits across the social preference treatments. The perception of the trait can vary from 1-Not at all to 5-Extremely. Positive Trait is constructed by taking an average of the ratings on; friendliness, confidence, encouragement, trustfulness, clarity, and motivation . Negative Trait is constructed by taking an average of the ratings on; arrogance, laziness, bossinesss, rudeness, hostility, and undermining. Means sharing a digit in the group label are not significantly different at the 5% level. The comparisonwise error rate is adjusted using the Bonferroni method.

Table C4: Balance Checks - Piece Rate Treatments

	(1) Piece Rate - 0	(2) Piece Rate - 3	(3) Piece Rate - 6	(4) Piece Rate - 9
Gender				
Female	-0.01 (0.01)	0.01 (0.01)	-0.00 (0.01)	0.01 (0.01)
Age				
25-30	0.01 (0.01)	0.01 (0.01)	0.02 (0.01)	0.01 (0.01)
31-40	0.01 (0.01)	0.00 (0.01)	0.03 (0.01)	-0.00 (0.01)
41-50	0.01 (0.02)	0.00 (0.02)	0.02 (0.02)	0.01 (0.02)
51-64	-0.00 (0.02)	-0.00 (0.02)	0.04 (0.02)	0.01 (0.02)
65 and over	0.01 (0.03)	0.02 (0.03)	0.01 (0.03)	0.01 (0.03)
Education				
High school or equivalent	0.01 (0.05)	0.06 (0.05)	-0.03 (0.05)	-0.05 (0.05)
Some college	0.02 (0.05)	0.03 (0.05)	-0.02 (0.05)	-0.05 (0.05)
College graduate	0.02 (0.05)	0.03 (0.05)	-0.03 (0.05)	-0.06 (0.05)
Graduate or professional degree	0.01 (0.05)	0.04 (0.05)	-0.02 (0.05)	-0.05 (0.05)
Income				
$20,000 - $44,999	-0.02 (0.01)	-0.00 (0.01)	-0.00 (0.01)	-0.01 (0.01)
$45,000 - $99,999	-0.02 (0.01)	-0.00 (0.01)	-0.00 (0.01)	-0.01 (0.01)
$100,000 - $149,999	-0.04 (0.02)	-0.00 (0.02)	0.01 (0.02)	0.01 (0.02)
$150,000+	-0.05 (0.02)	0.02 (0.02)	0.04 (0.02)	0.00 (0.02)
Most lived US State				
Blue	0.01 (0.01)	0.01 (0.01)	-0.00 (0.01)	0.00 (0.01)
Red	0.02 (0.01)	-0.01 (0.01)	0.01 (0.01)	0.00 (0.01)
Party				
Democrat	0.00 (0.01)	-0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Republican	0.01 (0.01)	-0.01 (0.01)	0.02 (0.01)	-0.00 (0.01)
Constant	0.09 (0.05)	0.06 (0.05)	0.09 (0.05)	0.14 (0.05)
Observations	5945	5945	5945	5945
R^2	0.002	0.003	0.004	0.002
F	0.78	0.87	1.24	0.65

Notes: In Columns 1-4 we regress the assignment to different conditions (Piece Rate Treatments) on the worker demographics. Standard errors in parentheses.

Table C5: Balance Checks - Altruism Treatments

	(1) Altruism - Neutral	(2) Altruism - Black	(3) Altruism - White
Gender			
Female	-0.01 (0.01)	-0.00 (0.01)	-0.00 (0.01)
Age			
25-30	-0.01 (0.01)	-0.01 (0.01)	0.01 (0.01)
31-40	0.00 (0.01)	-0.01 (0.01)	0.01 (0.01)
41-50	0.01 (0.02)	-0.02 (0.02)	0.02 (0.02)
51-64	-0.01 (0.02)	-0.01 (0.02)	0.02 (0.02)
65 and over	0.00 (0.03)	-0.02 (0.03)	-0.00 (0.03)
Education			
High school or equivalent	0.04 (0.05)	-0.02 (0.05)	-0.01 (0.05)
Some college	0.04 (0.05)	-0.03 (0.05)	0.01 (0.05)
College graduate	0.04 (0.05)	-0.02 (0.05)	0.02 (0.05)
Graduate or professional degree	0.05 (0.05)	-0.01 (0.05)	0.00 (0.05)
Income			
$20,000 - $44,999	0.01 (0.01)	0.00 (0.01)	-0.01 (0.01)
$45,000 - $99,999	0.01 (0.01)	-0.00 (0.01)	-0.01 (0.01)
$100,000 - $149,999	-0.00 (0.02)	-0.01 (0.02)	-0.01 (0.02)
$150,000+	-0.00 (0.02)	-0.01 (0.02)	-0.02 (0.02)
Most lived US State			
Blue	-0.00 (0.01)	-0.00 (0.01)	-0.00 (0.01)
Red	0.01 (0.01)	-0.01 (0.01)	0.00 (0.01)
Party			
Democrat	-0.00 (0.01)	-0.00 (0.01)	0.00 (0.01)
Republican	-0.02 (0.01)	-0.00 (0.01)	0.01 (0.01)
Constant	0.07 (0.05)	0.14 (0.05)	0.09 (0.05)
Observations	5945	5945	5945
R^2	0.002	0.001	0.002
F	0.68	0.37	0.69

Notes: In Columns 1-3 we regress the assignment to different conditions (Altruism Treatments) on the worker demographics. Standard errors in parentheses.

Table C6: Balance Checks - Reciprocity Treatments

	(1) Reciprocity - Neutral	(2) Reciprocity - Black	(3) Reciprocity - White
Gender			
Female	0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Age			
25-30	-0.03 (0.01)	-0.01 (0.01)	-0.00 (0.01)
31-40	-0.03 (0.01)	-0.02 (0.01)	0.01 (0.01)
41-50	-0.05 (0.02)	-0.02 (0.02)	0.00 (0.02)
51-64	-0.03 (0.02)	-0.03 (0.02)	0.02 (0.02)
65 and over	-0.08 (0.03)	0.02 (0.03)	0.02 (0.03)
Education			
High school or equivalent	0.04 (0.05)	-0.03 (0.05)	-0.01 (0.05)
Some college	0.03 (0.05)	-0.03 (0.05)	0.01 (0.05)
College graduate	0.03 (0.05)	-0.04 (0.05)	0.01 (0.05)
Graduate or professional degree	0.03 (0.05)	-0.02 (0.05)	-0.01 (0.05)
Income			
$20,000 - $44,999	0.01 (0.01)	0.02 (0.01)	0.00 (0.01)
$45,000 - $99,999	0.02 (0.01)	0.02 (0.01)	0.01 (0.01)
$100,000 - $149,999	0.02 (0.02)	0.02 (0.02)	-0.01 (0.02)
$150,000+	0.04 (0.02)	-0.03 (0.02)	0.00 (0.02)
Most lived US State			
Blue	-0.00 (0.01)	-0.00 (0.01)	-0.01 (0.01)
Red	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Party			
Democrat	-0.01 (0.01)	0.00 (0.01)	0.01 (0.01)
Republican	0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Constant	0.09 (0.06)	0.14 (0.05)	0.10 (0.05)
Observations	5945	5945	5945
R^2	0.004	0.002	0.003
F	1.32	0.76	0.99

Notes: In Columns 1-3 we regress the assignment to different conditions (Reciprocity Treatments) on the worker demographics. Standard errors in parentheses.

Table C7: Heterogeneous Treatment Effects - Altruism Treatments

	(1) Gender	(2) Age	(3) Education
White or Caucasian	-60.32	16.31	-128.2
	(52.19)	(116.6)	(115.2)
Male	154.6**		
	(56.95)		
White or Caucasian × Male	-74.43		
	(80.90)		
Age 25 - 34		35.29	
		(90.83)	
Age 35 - 44		63.93	
		(95.68)	
Age 45 - 54		-23.21	
		(111.1)	
Age 55 - 64		-243.6	
		(129.3)	
Age 65 or older		-46.72	
		(194.5)	
White or Caucasian × Age 25 - 34		-125.9	
		(133.2)	
White or Caucasian × Age 35 - 44		-152.5	
		(140.8)	
White or Caucasian × Age 45 - 54		-96.19	
		(158.2)	
White or Caucasian × Age 55 - 64		46.03	
		(184.5)	
White or Caucasian × Age 65 or older		-275.0	
		(281.4)	
Some college			-130.2
			(95.29)
College graduate			-198.7*
			(87.83)
Graduate or professional degree			-160.0
			(100.2)
White or Caucasian × Some college			127.9
			(139.2)
White or Caucasian × College graduate			3.194
			(129.7)
White or Caucasian × Graduate or professional degree			36.75
			(149.4)
Constant	1735.0***	1790.5***	1946.4***
	(36.82)	(78.53)	(76.77)
Observations	1187	1192	1193

Notes: The table presents the estimates from an OLS regression of Points in the race salient altruism treatments on the employer's race. The omitted employer is the Black employer. Column (1), (2), and (3) test for the heterogeneity in treatment effects by gender, age, and education respectively. The omitted categories for gender, age, and education are female, age between 18 and 24, and high school or less. Standard errors in parentheses.

Table C8: Heterogeneous Treatment Effects - Altruism Treatments

	(1) Income	(2) Political Affiliation	(3) State Voting Pattern
White or Caucasian	26.40	-156.7*	-32.94
	(98.09)	(71.10)	(72.13)
Income $20,000 - $44,999	31.32		
	(85.53)		
Income $45,000 - $99,999	42.77		
	(83.30)		
Income $100,000 - $149,999	1.883		
	(119.2)		
Income $150,000+	86.45		
	(177.0)		
White or Caucasian × Income $20,000 - $44,999	-185.3		
	(121.3)		
White or Caucasian × Income $45,000 - $99,999	-110.1		
	(117.6)		
White or Caucasian × Income $100,000 - $149,999	-33.72		
	(165.7)		
White or Caucasian × Income $150,000+	-190.2		
	(250.1)		
Democrat		-109.3	
		(66.71)	
Republican		31.42	
		(73.48)	
White or Caucasian × Democrat		168.2	
		(95.54)	
White or Caucasian × Republican		-14.72	
		(104.3)	
Red			144.9
			(82.31)
Swing			76.50
			(64.10)
White or Caucasian × Red			-212.3
			(115.3)
White or Caucasian × Swing			-31.55
			(91.68)
Constant	1763.5***	1830.7***	1732.9***
	(69.71)	(49.26)	(50.37)
Observations	1167	1171	1193

Notes: The table presents the estimates from an OLS regression of Points in the race salient altruism treatments on the employer's race. The omitted employer is the Black employer. Column (1), (2), and (3) test for the heterogeneity in treatment effects by income, political affiliation, and the voting pattern of the most lived state (red, blue, or swing) of the worker respectively. The omitted categories for income, political affiliation, and state voting pattern are less than $20,000, democrat, and blue state. Standard errors in parentheses.

Table C9: Heterogeneous Treatment Effects - Reciprocity Treatments

	(1) Gender	(2) Age	(3) Education
White or Caucasian	42.95	-0.996	58.85
	(52.94)	(112.1)	(113.7)
Male	171.1**		
	(57.27)		
White or Caucasian × Male	-113.1		
	(81.06)		
Age 25 - 34		-100.2	
		(89.40)	
Age 35 - 44		-119.0	
		(95.48)	
Age 45 - 54		-216.9*	
		(109.7)	
Age 55 - 64		-319.6*	
		(131.3)	
Age 65 or older		-520.6**	
		(167.4)	
White or Caucasian × Age 25 - 34		24.34	
		(129.5)	
White or Caucasian × Age 35 - 44		-4.573	
		(136.9)	
White or Caucasian × Age 45 - 54		-63.38	
		(156.9)	
White or Caucasian × Age 55 - 64		-110.6	
		(180.6)	
White or Caucasian × Age 65 or older		303.7	
		(243.0)	
Some college			190.1*
			(93.43)
College graduate			20.81
			(89.36)
Graduate or professional degree			-24.39
			(100.4)
White or Caucasian × Some college			-117.5
			(135.9)
White or Caucasian × College graduate			-63.39
			(129.5)
White or Caucasian × Graduate or professional degree			-42.49
			(149.5)
Constant	1731.1***	1941.5***	1747.4***
	(37.40)	(77.08)	(77.05)
Observations	1170	1176	1178

Notes: The table presents the estimates from an OLS regression of Points in the race salient reciprocity treatments on the employer's race. The omitted employer is the Black employer. Column (1), (2), and (3) test for the heterogeneity in treatment effects by gender, age, and education respectively. The omitted categories for gender, age, and education are female, age between 18 and 24, and high school or less. Standard errors in parentheses.

Table C10: Heterogeneous Treatment Effects - Reciprocity Treatments

	(1) Income	(2) Political Affiliation	(3) State Voting Pattern
White or Caucasian	85.03	49.63	-67.15
	(100.9)	(62.58)	(72.69)
Income $20,000 - $44,999	15.20		
	(88.56)		
Income $45,000 - $99,999	100.2		
	(86.06)		
Income $100,000 - $149,999	98.32		
	(116.9)		
Income $150,000+	29.43		
	(219.8)		
White or Caucasian × Income $20,000 - $44,999	37.44		
	(123.4)		
White or Caucasian × Income $45,000 - $99,999	-195.8		
	(119.2)		
White or Caucasian × Income $100,000 - $149,999	-325.6		
	(170.2)		
White or Caucasian × Income $150,000+	-63.35		
	(284.5)		
Independent		134.1*	
		(66.38)	
Republican		76.13	
		(71.70)	
White or Caucasian × Independent		-127.8	
		(94.79)	
White or Caucasian × Republican		-35.17	
		(101.7)	
Red			12.30
			(82.52)
Swing			16.26
			(64.50)
White or Caucasian × Red			89.20
			(117.8)
White or Caucasian × Swing			86.19
			(91.82)
Constant	1752.3***	1729.4***	1793.2***
	(73.27)	(44.43)	(50.53)
Observations	1161	1149	1179

Notes: The table presents the estimates from an OLS regression of Points in the race salient reciprocity treatments on the employer's race. The omitted employer is the Black employer. Column (1), (2), and (3) test for the heterogeneity in treatment effects by income, political affiliation, and the voting pattern of the most lived state (red, blue, or swing) of the worker respectively. The omitted categories for income, political affiliation, and state voting pattern are less than $20,000, democrat, and blue state. Standard errors in parentheses.

Table C11: Social Preference Treatments - Robustness, Employer Race Correctly Perceived

	Altruism			Reciprocity		
	(1)	(2)	(3)	(4)	(5)	(6)
White or Caucasian	-92.45*	-92.45*	-25.12	-15.02	-5.901	-33.61
	(41.94)	(42.97)	(106.6)	(42.88)	(43.80)	(108.6)
Constant	1807.7***	1703.7***	1487.5***	1818.8***	1788.0***	1739.3***
	(30.53)	(316.5)	(325.1)	(31.63)	(290.1)	(303.7)
Demographic Controls	No	Yes	Yes	No	Yes	Yes
Employer Fixed Effects	No	No	Yes	No	No	Yes
Observations	1051	1000	1000	1031	986	986

Notes: The table presents the estimates from an OLS regression of Points in the race salient social preference treatments on the employer's race for workers who could correctly perceive the race of the employer. The omitted category is the Black employer. Demographic controls include age, gender, education, income, political affiliation and the voting pattern of the most lived state (red, blue, or swing) of the worker. There are total of 12 employer fixed effects for each of altruism and reciprocity treatments. Standard errors in parentheses.

Table C12: Overall Productivity by Demographics

	(1)
	Points
Gender	
Female	-135.42 (17.77)
Age	
25-30	-26.53 (29.58)
31-40	-83.18 (31.39)
41-50	-126.63 (35.09)
51-64	-257.55 (40.42)
65 and over	-356.25 (58.48)
Education	
Some college	1.78 (29.12)
College graduate	-96.92 (28.06)
Graduate or professional degree	-97.23 (32.92)
Prefer not to answer	-1260.07 (472.82)
Income	
$20,000 - $44,999	33.00 (25.98)
$45,000 - $99,999	40.73 (26.24)
$100,000 - $149,999	84.57 (37.01)
$150,000+	91.32 (54.65)
Party	
Democrat	-60.48 (20.59)
Republican	-25.35 (22.64)
Most lived US State	
Blue	-47.50 (20.02)
Red	-13.10 (23.06)
Constant	2074.68 (38.74)
Observations	5945
R^2	0.034
F	11.68

Notes: The table presents the estimates of an OLS regression of points scored on worker demographics. Standard errors in parentheses.