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The impact of gender and ethnic discrimination on redistribution and productivity

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Abstract

This study analyzes the impact of gender and ethnic discrimination on redistributive preferences and productivity using a large online experiment with US citizens on Amazon's Mechanical Turk. Participants are randomly allocated to different payment schemes for a real-effort task. Four payment schemes discriminate against women, men, whites, or people of color. Men's productivity slightly increases when they are discriminated against whereas productivity slightly decreases for women and people of color when they are discriminated against. After the task and revealing earnings, participants are given the chance to redistribute earnings by voting on a tax rate for the group. Discrimination against women highly increases preferred tax rates and discrimination against whites or people of color moderately increases the demand for redistribution. The results indicate that different forms of economic discrimination—even if financially indistinguishable—lead to very different reactions amongst the entire population and sub-groups. The results also indicate that brute luck of gender or ethnicity occurring at birth is perceived as different from brute luck experienced later in life.

JEL Code:

J71 – Discrimination

D63 – Equity, Justice, Inequality, and Other Normative Criteria and Measurement

D91 – Role and Effects of Psychological, Emotional, Social, and Cognitive Factors on Decision Making

Key words: luck, gender, ethnicity, discrimination, inequality, productivity, tax rate, demand for redistribution

1. Introduction and background literature

Compared to most other rich countries in the world, income or wealth inequality has been growing rapidly in the United States since the 1980s (Piketty, 2014; Piketty and Saez, 2014; Atkinson, 2015; World Inequality Report, 2018). In 1980, 10% of national income went to the top 1% in Western Europe, compared to 11% in the United States. By 2016, 12% of national income went to the top 1% in Western Europe, compared to 20% in the United States. Between 1980 and 2016, a stable share of about 22% of national income went to the bottom 50% in Western Europe. In the United States, however, the share of national income that went to the bottom 50% decreased from more than 20% in 1980 to 13% in 2016. Over the same period, the demand for redistribution has been stable in the United States (Kuziemko *et al.*, 2015). This observation is puzzling, given the “median voter hypothesis”, which suggests that the median voter in a democracy will vote for redistribution in favor of the poor when inequality rises (Meltzer and Richard, 1981).

A possible explanation for this phenomenon is that people have limited knowledge about inequality trends and levels (Norton and Ariely, 2011; Gimpelson and Treisman, 2017). Kuziemko *et al.*, (2015) conduct randomized online experiments that inform individuals about the actual distribution of income in the United States to raise awareness of high and growing levels of inequality. The study, however, does not find that such informational treatments increase the demand for redistribution, measured as stated tax and transfer preferences. This finding is partly explained by limited trust in the government to redistribute income (Kuziemko *et al.*, 2015).

Another explanation might be that Americans are aware of growing levels of income inequality, but they believe there are equal chances for everybody so the distribution is “fair”. People perceive distributions as fair when all individuals have equal opportunities *ex ante* to determine their outcomes and when differences in outcomes can be explained by individual decisions. Recent studies suggest that fairness is more important to people than equality (Norton and Ariely, 2011; Starmans, Sheskin and Bloom, 2017; Akbaş, Ariely and Yuksel, 2019). Across different cultures and demographic groups, and particularly in the United States, people tend to desire some minimum amount of inequality commensurate with individual differences in effort (Norton and Ariely, 2011). Americans might prefer inequality that is fair, in the sense that everybody has a fair chance of becoming successful regardless of her or his initial conditions or circumstances—what is often called the “American Dream” (Piketty, 1995; Benabou and Ok, 2001; Alesina and Angeletos, 2005; Chetty *et al.*, 2017). Under that world view, an equal distribution, in comparison, would be considered more “unfair”, since it is dependent on greater government intervention.

The experimental literature analyzing the impact of fairness on the demand for redistribution has mostly compared attitudes towards inequality resulting from “effort” versus “luck” (Fong, 2001; Alesina and Angeletos, 2005; Esarey, Salmon and Barrilleaux, 2012; Lefgren, Sims and Stoddard, 2016; Bortolotti *et al.*, 2017; Gee, Migueis and Parsa, 2017; Akbaş, Ariely and Yuksel, 2019). The general conclusion from this literature is that the demand for redistribution is greater when the income distribution is determined by luck. Gee, Migueis and Parsa (2017), for example, find that redistributive tax rate is greater by 14 percentage points if inequality is generated by luck, compared to effort.

We argue that conceptually there is a difference between “luck at birth”, which correlates with individual characteristics, such as gender and ethnicity, and “sheer luck” that people experience later in life. Only the former is socially constructed and hence, by definition, discriminatory. In a society, it might be less contentious to compensate people for discrimination they face because of characteristics that they have little or no power to influence. The United States, for instance, has witnessed policies of affirmative action, which aim to equalize the outcomes of population sub-groups that have historically suffered discrimination, such as women and African Americans (Sandberg, 2013; Arcidiacono and Lovenheim, 2016; Oppenheimer, 2018).

On the other hand, affirmative action is highly disputed in the United States, especially ethnic-based affirmative action (Arcidiacono and Lovenheim, 2016; Oppenheimer, 2018). Asian Americans, in particular, contend that they are treated unfairly in favor of other minorities (Inouye, 2016; Lee, Park and Wong, 2017; Chang, 2018; Oppenheimer, 2018). Moreover, people might also want to compensate or support other people who have had bad “sheer luck”, e.g., an accident, or bad “option luck”, where people even had an initiating role, e.g., bailouts given to victims of a finance-related *ex post* bad decision. Taken together, it is hard to draw clear conclusions about the “perceived” fairness of outcomes produced by different forms of luck (Ferreira and Peragine, 2015) and which forms require more redistribution.

We argue that in order to study the impact of discrimination or unfair inequality on redistributive preferences, it is not sufficient to set up experimental treatment groups where earnings are determined by sheer luck. We differentiate between sheer luck and luck at birth, which is linked to individual identity. While a strand of previous literature conflates such exogenous sources of inequality (Gee, Migueis and Parsa, 2017; Akbaş, Ariely and Yuksel, 2019), our study isolates and compares their distinct effects on redistributive preferences.

In addition, we study the impact of discrimination on productivity. Two main theories support the hypothesis that “unfair” inequality has a negative effect on the productivity of workers, namely “stereotype threat” and the “fair wage-effort hypothesis”. First, a large literature in social psychology discusses stereotype threat as “being at risk of confirming....a negative stereotype

about one's group" (Steele and Aronson, 1995, p.797). To set the stage for this body of literature, Steele and Aronson (1995) show that students of color in the United States underperform relative to other students in standardized tests, not necessarily because they are less capable, but because of stereotype threat. Hoff and Pandey (2006) also exploit the fact that caste identity is physically unobservable and exogenous to confirm stereotype threat among schoolchildren in India: when caste is publicly announced, lowcaste schoolchildren underperform in solving mazes. Davies, Spencer and Steele (2005) find that women had lower aspirations to take up leadership tasks after watching gender stereotypical TV commercials. From a sample of University of Michigan students, Spencer, Steele and Quinn (1999) find that females performed poorly relative to males in a difficult GRE mathematics test when they (females) were explicitly informed about stereotypical gender differences in math ability. Without this information, females performed equally as well as males on the same math test.

Second, the seminal work of Akerlof and Yellen (1990, pp. 256,261) formalizes the concept that "if people do not get what they think they deserve, they get angry....they try to get even." According to the "fair wage-effort hypothesis" the authors proposed, workers withdraw effort when their actual wage falls short of their perceived "fair wage", but do not supply more effort when their actual wage exceeds their fair wage. The fair wage may be in reference to own wage rate at a previous point in time (Bracha, Gneezy and Loewenstein, 2012), or the wage rate of peers or co-workers at a particular point in time (Bewley, 1999). A large number of experimental studies conducted in the laboratory with real-effort tasks as well as in the field have tested the fair wage-effort hypothesis with mixed results—some confirming the hypothesis, and others not (Charness and Kuhn, 2007; Cohn, Fehr and Goette, 2008, 2015; Hennig-Schmidt, Rockenbach and Sadrieh, 2010; Bartling and von Siemens, 2011; Bracha, Gneezy and Loewenstein, 2012; Card *et al.*, 2012; Kube, Maréchal and Puppe, 2013; Grosch and Rau, 2017; Breza, Kaur and Shamdasani, 2018; Dube, Giuliano and Leonard, 2019). For example, Kube, Maréchal and Puppe, (2013) announced a data entry job at a German university library, which offered the possibility of earning €15 per hour. On the day the new employees began work, three experimental conditions were created: baseline (€15 per hour), pay cut (€10 per hour), pay raise (€20 per hour). The authors find a reduction in work effort in the pay cut condition, but no increase in work effort in the pay raise condition. In all of these studies, luck that is not identity-based is the reason for differential payments. Our study adds to that literature by considering not only differences in payment by sheer luck, but also discrimination based on identity, such as gender and ethnicity.

Our study on the impact of discrimination on productivity also contributes to the recent research that decomposes national inequalities into "inequality of opportunity" and "inequality of effort" (Bourguignon, Ferreira and Medéndez, 2007; Ferreira and Gignoux, 2011; Marrero and Rodríguez, 2013; Brunori, Palmisano and Peragine, 2015; Ferreira *et al.* (2018). Inequality of opportunity is the inequality explained by differences in circumstances individuals face that are determined at

birth, and over which they have no control, such as their gender, ethnicity, place of birth, and parental socioeconomic background. Inequality of effort is the inequality explained by differences in individual effort and decisions for which people can be held responsible. In principle, there are both observable and unobservable circumstances that influence outcomes. In empirical work, a set of observable circumstances is often used to determine a lower-bound estimate for inequality of opportunity. For simplicity, the effort component of inequality can include all unobservable circumstances and characteristics, such as talent, motivation, and innate traits, as well as luck (e.g., Checchi and Peragine, 2010). Some authors, however, include luck as part of inequality of opportunity (e.g., Fleurbaey and Peragine, 2013) and others consider it to be a separate source of inequality (e.g., Lefranc, Pistolesi and Trannoy, 2009). When inequality is decomposed into inequality of opportunity and inequality of effort, Marrero and Rodríguez, (2013) find a negative relationship between inequality of opportunity and growth and a positive relationship between inequality of effort and growth across 26 states in the United States. Ferreira *et al.*, (2018) do not find robust empirical support for such a relationship in cross-country regressions.

Our study is based on a large randomized online experiment (N=8949) on Amazon’s Mechanical Turk (MTurk) platform that is designed to answer the following research questions: (1) What is the impact of gender discrimination on the demand for redistribution and productivity? (2) What is the impact of ethnic discrimination on the demand for redistribution and productivity? (3) What is the impact of sheer luck on the demand for redistribution and productivity? Different experimental conditions that represent gender discrimination, ethnic discrimination, and sheer luck are compared in terms of participants’ demand for redistribution and productivity. In particular, certain individuals face a discriminatory payment scheme—on the grounds of gender or ethnicity—for performing a real-effort task. The real-effort task, known as the “slider task”, is used to elicit productivity in this study. The slider task is a computer game in which study participants are asked to drag as many as 100 sliders to a pre-defined number ranging from 1 to 100 within three minutes. Productivity is measured as the total number of sliders correctly positioned. Redistributive preferences are elicited with a tax vote that is levied on participants’ earnings from the slider task. Within each experimental condition, all participants vote on a tax rate and the effective tax applied on all earnings is the median tax vote. Tax revenue is shared equally among all participants in each experimental treatment.

The results of the study show that different gender and ethnic groups react very differently to discrimination, even though the rate of discrimination is the same. Men’s productivity increases slightly when they are discriminated against, and the productivity of women and people of color decreases slightly when they are discriminated against. The productivity of whites, however, does not decrease when they are discriminated against. Women highly increase their preferred tax rate when they are discriminated against. Whites and men moderately increase their tax rate when discriminated against. Interestingly, people of color do not increase their tax rate when

they are discriminated against. We also find evidence showing that brute luck of gender or ethnicity occurring at birth is perceived as different from brute luck experienced later in life.

The rest of the paper proceeds as follows. Section 2 describes the experimental design and methods. Section 3 discusses the experimental data. Section 4 presents the results and Section 5 checks the robustness of the results. Section 6 concludes.

2. Research methodology

2.1. Conceptual framework of the study

According to recent economic research, national and global inequality has three main sources (Lefranc, Pistolesi and Trannoy, 2009). First, inequality of effort is defined as the differences in outcomes due to differences in individual effort and decisions, for which the individual can be held responsible. Second, inequality of opportunity is defined as the differences in outcomes due to differences in circumstances, often determined at birth, for which the individual cannot be held responsible, such as gender, ethnicity, place of birth, and parental socioeconomic background. Third, a random, residual component is defined as inequality of luck. Some people get ahead in life because they have some good luck, while others get left behind in life because they have some bad luck.

The literature on luck describes two main types of luck that affect individual outcomes, namely “brute luck” and “option luck” (Vallentyne, 2002; Lefranc, Pistolesi and Trannoy, 2009; Mollerstrom, Reme and Sørensen, 2015). An individual has brute luck if they cannot influence the probability that an event occurs while an individual has option luck if they can influence the probability that an event occurs. This study focuses on how outcomes are influenced by brute luck. Brute luck can further be divided into two categories (Lefranc, Pistolesi and Trannoy, 2009). First, “initial brute luck” consists of a set of random events that occur until a “canonical moment” (Arneson, 1990, p.179) when the individual can be held responsible for their choices and decisions. The circumstances people face at birth may be considered as a stroke of good or bad initial brute luck. For example, an individual may be considered economically lucky if they are born to a billionaire, while an individual may be considered economically unlucky if they are born as a black woman in the United States.

Second, “later brute luck” consists of a set of random events that occurs after the canonical moment; e.g., the occurrence of a natural disaster, a financial crisis, or a policy reform that affects the life of an adult. In principle, later brute luck can hit anybody, unlike initial brute luck, which is linked to personal identity. Moreover, later brute luck can occur more often in life. For simplicity, in this study we analyze specific examples of initial brute luck, including gender and ethnicity, in

comparison to a specific example of later brute luck, namely, a lottery. The former is man-made, linked to personal identities and hence discriminatory; the latter is random and might hence be perceived as more “fair”. Thus, the former may disincentivize effort, or provoke demand for redistribution, even more than the latter form of luck. While a strand of previous literature analyzes the impact of luck on productivity and redistributive preferences more generally, our study differentiates between different forms of luck and compares their distinct effects.

2.2. Experimental design and identification

At the start of the experiment, participants are informed that **(a)** they are in a group of 100 MTurk participants, **(b)** everyone receives a flat rate of \$1.00 after completing the survey for answering some demographic and socioeconomic questions about themselves, and **(c)** they will earn additional money depending on their performance in a slider task that will be explained to them later (see Section 3.3 for more details). Later in the experiment, participants vote on a tax rate to redistribute the earnings from the slider task within their group of 100 (see Section 3.3 for more details).

On average, participants take 11.5 minutes to complete the whole survey. After the slider task and the tax vote, participants earned \$1.64 on average, including the flat rate of \$1.00. These earnings—\$1.64 for 11.5 minutes—are equivalent to \$8.56 per hour, which is higher than the federal minimum wage of \$7.25 per hour in the United States (US Bureau of Labor Statistics, 2019).

Control	Luck	Gender discrimination	Ethnic discrimination			
1. Socioeconomic and demographic questions are asked, including gender and ethnicity.						
2. Slider task is explained, comprehension questions are asked.						
3. Payment information is provided.						
A 1 cent per slider	B 2 cents per slider	C Lucky - 2 cents per slider, Unlucky - 1 cent per slider	D Female - 1 cent per slider, Male - 2 cents per slider	E Female - 2 cents per slider, Male - 1 cent per slider	F People of color - 1 cent per slider, Whites - 2 cent per slider	G People of color - 2 cents per slider, Whites - 1 cent per slider
4. Slider task is performed.						
5. Participants guess their own performance and the distribution of earnings from the slider task.						
6. Participants view their own performance and earnings from the slider task.						
7. Vote for redistribution is explained and takes place.						
8. Feedback on survey is elicited.						

Figure 1: Experimental design

Figure 1 shows the experimental design. After eliciting socioeconomic and demographic characteristics of participants (Figure 1, step 1) and explaining the slider task to them (Figure 1, step 2), participants are randomized into seven different experimental conditions, which are determined by the payment information they receive (Figure 1, step 3)¹. For the **Control** group, there are 2 conditions, namely “1 cent”, in which all participants earn 1 cent for each slider correctly positioned (Figure 1, A), and “2 cents”, in which all participants earn 2 cents for each slider correctly positioned (Figure 1, B).

For the sheer **Luck** treatment, there is one condition, namely “Lucky 2c, Unlucky 1c”, in which half of the participants are informed that they are randomly allocated to a sub-group called “Lucky group”, which earns 2 cents for each slider correctly positioned. The remaining half of the participants are informed that they are randomly allocated to a sub-group called “Unlucky group”, which earns 1 cent for each slider correctly positioned (Figure 1, C). In the **Discrimination** treatment, there are two conditions for gender discrimination and two conditions for ethnic discrimination. These include: “Female 1c, Male 2c”, in which women earn 1 cent and men earn 2 cents for each slider correctly positioned (Figure 1, D); “Female 2c, Male 1c”, in which women earn 2 cents and men earn 1 cent for each slider correctly positioned (Figure 1, E); “Color 1c, White 2c”, in which people of color earn 1 cent and whites earn 2 cents for each slider correctly positioned (Figure 1, F); and “Color 2c, White 1c”, in which people of color earn 2 cents and whites earn 1 cent for each slider correctly positioned². See Figure 2 for examples of the payment information.

After the slider task (Figure 1, step 4), participants guess their own performance as well as their performance relative to other participants in their respective groups (Figure 1, step 5). Thereafter, their performance and earnings are displayed (Figure 1, step 6). In a seventh step, participants vote on a tax rate to redistribute slider task earnings (see Section 3.3 for more details on the tax vote). Lastly, we ask questions about the survey, including whether participants think the

¹ There is also a within-treatment randomization into two equally-sized sub-groups at this stage of the experiment, which applies to all experimental conditions. One sub-group receives information beforehand that at the end of the slider task their group will have the chance to make earnings more equal by voting on a tax rate to redistribute some of the money earned in the slider task. The other sub-group receives this information about redistribution only after the real-effort task has been completed. The experimental data collected suggest that it does not make any significant difference in the demand for redistribution whether or not this tax information is given beforehand, so the data are pooled together for the analysis.

² For the gender and ethnicity conditions, we implement a within-treatment randomization, in which some of the participants are reminded of the gender and ethnicity they indicated during the survey to make their identities more salient. Other participants are not reminded of their gender and ethnicity with the assumption that they feel attached to their identities. The experimental data collected suggest that it makes no difference in terms of productivity and demand for redistribution whether or not gender and ethnicity are made more salient. Data from both sub-groups are, therefore, pooled together for analysis to increase statistical power.

payment scheme for the slider task was fair or discriminatory. The full questionnaire is provided in Supplemental Appendix A.

<p>Information on earnings!</p> <p>50 of the 100 participants are randomly allocated to a group (called Unlucky Group) that earns 1 cent per slider correctly positioned, and the other half (remaining 50 participants) are randomly allocated to a group (called Lucky Group) that earns 2 cents per slider correctly positioned.</p> <p>By chance, you are in the sub-group (called "Unlucky Group") that earns 1 cent per slider correctly positioned, which means a maximum of $100 \times 1 \text{ cent} = \\1.00.</p>
<p>Information on earnings!</p> <p>Men earn 2 cents for each slider correctly positioned, which means a maximum of $100 \times 2 \text{ cents} = \\2.00.</p> <p>Women earn 1 cent for each slider correctly positioned, which means a maximum of $100 \times 1 \text{ cent} = \\1.00.</p> <p>You indicated that you are a woman.</p>
<p>Information on earnings!</p> <p>European Americans / Whites earn 1 cent for each slider correctly positioned, which means a maximum of $100 \times 1 \text{ cent} = \\1.00.</p> <p>All other ethnic or racial groups earn 2 cents for each slider correctly positioned, which means a maximum of $100 \times 2 \text{ cents} = \\2.00.</p> <p>You indicated that you are NOT European American / White.</p>

Figure 2: Payment information – three examples of all seven experimental conditions (Figure 1, C, D, G)

The discriminatory payouts of \$1 or \$2 for 100 correctly positioned sliders are very small in comparison to monthly wages. A non-discriminatory flat rate of \$1 is also paid out for answering socioeconomic and demographic questions, as indicated earlier in this section. In any case, to satisfy the requirements for ethical approval from the ETH Zürich Ethics Commission it is important that the discriminatory payments are low³.

³ We sought and obtained ethical approval for the experiment from the Research Ethics Committee of ETH Zurich, Switzerland. This committee scrutinizes proposed research projects from ETH researchers to conform to ethical

2.3. Econometric specification

The study specifies an OLS model to analyze the impact of discrimination on productivity and the demand for redistribution:

$$Y_i = \beta_0 + \sum_{j=1}^K \beta_j T_{ij} + \sum_{j=1}^L \alpha_j X_{ij} + e_i \quad (1)$$

where:

Y_i is the number of sliders correctly positioned or tax rate preferred by an individual participant i

T_{ij} is a treatment dummy variable (see Figure 1),

K is the total number of treatments,

X_{ij} is an observable characteristic,

L is the total number of observable characteristics, and

e_i is an individual error term.

Note that there are two dependent variables: (1) the number of sliders correctly positioned and (2) the tax rate participants voted on. Section 3.3 discusses these dependent variables and how they are used to obtain variation in productivity and the demand for redistribution, respectively.

Equation 1 controls for a set of basic demographic and socioeconomic characteristics, including age, household size, gender, ethnicity, employment status, income class, educational status, relationship status, citizenship, and whether a respondent has children or not. The device used to perform the slider task is also added to the set of control variables. Participants used different devices to complete the survey, including computer, laptop, smartphone, and tablet. An additional control variable for analyzing the impact of our treatments on preferred tax rate is the earnings from the slider task. By design, the vote for redistribution takes place after participants perform the slider task and earn some money as a result. Participants' voting decisions may be influenced by their earnings from the slider task independent of the experimental conditions they are in. Thus, all tax rate regressions in the main text of the study control for the earnings from the slider task. However, tax rate regression results are shown in the appendix with and without the earnings from the slider task as an additional control variable, for comparison.

Note that the total number of treatments K in Equation 1 is five (C, D, E, F, and G in Figure 1). The control group is the combination of the 1 cent condition together with the 2 cents condition

research codes and conducts. The committee reviews important elements of research projects, which include, *inter alia*, informed consent of participants, anonymity of personal data, voluntary participation of subjects, the right to withdraw from the study, payments accruing to participants given the time required to complete the study, expected risks of the study (e.g., discomfort) as well as precautionary measures.

(Figure 1, A and B). All participants in these control conditions earn equal rates per slider in their respective groups. Participants in the 1 cent condition do not know that there is another condition where participants earn 2 cents per slider correctly positioned, and participants in the 2 cents condition do not know that there is another condition where participants earn 1 cent per slider correctly positioned. All the treatments (C, D, E, F, and G in Figure 1) have some participants earning 1 cent and others earning 2 cents, but this time they know that there is a sub-group within the group of 100 MTurkers earning less or more. The 1 cent and 2 cents conditions are combined as a control group for all the treatments so as not to bias the results of the study.

To define clear hypotheses for the study, Equation 1 is re-stated as follows:

$$Y_i = \beta_0 + \beta_1 f1m2_i + \beta_2 f2m1_i + \beta_3 c1w2_i + \beta_4 c2w1_i + \beta_5 luck_i + \dots + e_i \quad (2)$$

where:

$f1m2_i$ is a dummy variable which indicates 1 if a participant is randomized into Female 1c, Male 2c condition and 0 otherwise,

$f2m1_i$ is a dummy variable which indicates 1 if a participant is randomized into Female 2c, Male 1c condition and 0 otherwise,

$c1w2_i$ is a dummy variable which indicates 1 if a participant is randomized into Color 1c, White 2c condition and 0 otherwise,

$c2w1_i$ is a dummy variable which indicates 1 if a participant is randomized into Color 2c, White 1c condition and 0 otherwise, and

$luck_i$ is a dummy variable which indicates 1 if a participant is randomized into Lucky 2c, Unlucky 1c condition and 0 otherwise.

For the impact of discrimination and luck on productivity, Equation (2) is a productivity function that hypothesizes that $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5 < 0$. That means, gender or ethnic discrimination decreases productivity, and luck also decreases productivity. For the impact of discrimination and luck on demand for redistribution, Equation (2) is a tax rate function that hypothesizes that $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5 > 0$. That means, gender or ethnic discrimination increases the demand for redistribution, and luck also increases the demand for redistribution.

Moreover, we argue that inequality that is linked to individual identity (or luck at birth) is different from inequality based on sheer luck (see Section 2.1). To test this empirically, Equation (1) is re-stated as follows:

$$Y_i = \beta_0 + \beta_1 f1m2_i + \beta_2 f2m1_i + \beta_3 c1w2_i + \beta_4 c2w1_i + \dots + e_i \quad (3)$$

The control group for Equation (3) is the Lucky 2c, Unlucky 1c condition. If Equation (3) estimates productivity, we hypothesize that $\beta_1, \beta_2, \beta_3, \beta_4 < 0$. That means, gender or ethnic discrimination decreases productivity more than luck. If Equation (3) estimates tax rate, we

hypothesize that $\beta_1, \beta_2, \beta_3, \beta_4 > 0$. That means, gender or ethnic discrimination increases demand for redistribution more than luck.

To analyze the drivers of the results obtained from Equation (2) we also conduct various subsample regressions which restrict our sample to sample sub-groups; such as, male only, female only, white only, and people of color only as well as white male only, white female only, men of color only, and women of color only. For these subsample analyses, Equation (2) is estimated with either the 1 cent (Figure 1, A) **or** 2 cents condition (Figure 1, B) as control group. Moreover, for these subsample analyses, the Lucky 2 cents, Unlucky 1 cent condition is separated into 2 different conditions, whether individuals were assigned to the Lucky 2 cents or the Unlucky 1 cent group. We estimate the following equation on the different subsamples (e.g., women only):

$$Y_i = \beta_0 + \beta_1 f1m2_i + \beta_2 f2m1_i + \beta_3 c1w2_i + \beta_4 c2w1_i + \beta_5 lucky_i + \beta_6 unlucky_i + \dots + e_i \quad (4)$$

where:

lucky_i is a dummy variable which indicates 1 if a participant is randomized into the Lucky 2c sub-treatment group and 0 otherwise.

unlucky_i is a dummy variable which indicates 1 if a participant is randomized into the Unlucky 1c sub-treatment group and 0 otherwise.

Equation (4) helps us to study how men, women, whites, and people of color respond to both advantageous and disadvantageous discrimination as well as good and bad luck. Suppose we want to study how women respond to disadvantageous discrimination and bad luck, we estimate Equation 4 on the women-only subsample, with the 1 cent condition as the control group. The coefficients of interest are β_1 and β_6 . The coefficient β_1 indicates the change in women's productivity or tax rate when they are discriminated against. The coefficient β_6 indicates the change in women's productivity or tax rate when they have bad luck.

3. Experimental data

3.1. Online survey instruments

We conducted a large online experiment between May and June 2018. The experiment was designed with Qualtrics, an online survey software, and implemented using participants recruited on Amazon's Mechanical Turk (MTurk) platform. A Qualtrics link was posted on the MTurk platform that directs prospective participants to the experiment.⁴ MTurk is an online platform for securing jobs known as Human Intelligence Tasks (HITs) (Horton, Rand and Zeckhauser, 2011; Goodman, Cryder and Cheema, 2013; Sheehan and Pittman, 2016). Participation on MTurk is

⁴ The Qualtrics link to the experiment is found at: https://descil.eu.qualtrics.com/jfe/form/SV_e5tIzEv4KNyWAI9.

voluntary, and most participants live in the United States. MTurk is becoming popular in social science research as an important source of experimental data, including the literature on redistributive preferences (e.g., Kuziemko *et al.*, 2015; Lefgren, Sims and Stoddard, 2016). Due to low-cost access to large non-student populations, it improves the external validity as well as the statistical power of experiments (Horton, Rand and Zeckhauser, 2011; Goodman, Cryder and Cheema, 2013; Sheehan and Pittman, 2016).

We collaborated with the ETH Decision Science Laboratory (DeSciL) to launch the experiment online. The Lab recruits from their subject pool of 30,000 to 50,000 workers on MTurk. The Lab launched the experiment as a study on human decision-making, so that prospective participants did not know *ex ante* that it was a study on discrimination. No selection bias is expected, even as individuals were randomly allocated to the different treatments. Payments were made to participants upon providing a password, which was available only after they had completed the survey. For a more homogeneous sample, only adult US residents with IP addresses from the United States were recruited into the study. On MTurk, US workers are screened by their Social Security Numbers, so that there are no multiple worker accounts (Sheehan and Pittman, 2016).⁵ Thus, the Lab made sure that respondents did not participate in the survey more than once. At the end of the survey, participants randomized into gender discrimination were informed about gender inequalities in wage earnings in the United States. Similarly, participants randomized into ethnic discrimination were informed about ethnic inequalities in wage earnings in the United States.

3.2. Sample size

Table 1 shows the sample sizes for the different experimental conditions. After a first round of data collection in May 2018, we did another round of data collection in June 2019 to be able to conduct sub-group analyses of women, men, whites, and people of color. The sample sizes of the different experimental conditions differ to allow for sub-group analysis.⁶ For example, the control conditions, 1 cent and 2 cents, have a relatively large sample size to investigate differences between men and women and differences between whites and people of color in response to negative and positive discrimination. We, hence, ensure that we have enough women, men,

⁵ It has been detected that the MTurk platform has been hacked into, contaminating data collected by researchers since March, 2018 (Bai, 2018). To diagnose the problem, the author recommends that the data be checked for multiple cases of “88639831” in the latitude field. Following this recommendation, sixty of such cases were found, representing 0.6% of the entire raw data. These observations were excluded from the entire data analysis at the very beginning. None of the following tables includes these data.

⁶ Parameters obtained from data collected in a pilot of the study were used to do power calculations for the first round of the experiment. In the second round, we re-adjusted the sample sizes of experimental conditions based on power calculations done with parameters obtained from data collected in the first round. The aim was to improve statistical power of the study, as the study involves comparisons between sample sub-groups.

whites, and people of colour in the 1 cent and 2 cents control conditions. In contrast, for gender discrimination we just ensure that there were enough men and women in the sample. The ethnic discrimination treatments are even larger because of the limited share of people of color in the MTurk sample. To allow for subsample regressions, we had to increase the sample size for this group to have enough people of color in our sample.

Table 1: Distribution of sample size across experimental conditions

Condition	First Round	Second Round	Both (desired)	Both (actual)
1 cent	800	400	1200	1324
2 cents	800	400	1200	1212
Female 1c, Male 2c	400	400	800	811
Female 2c, Male 1c	400	400	800	812
Lucky (2 cent)	200	600	800	816
Unlucky (1 cent)	200	600	800	818
Color 1c, White 2c	800	800	1600	1572
Color 2c, White 1c	800	800	1600	1584
Total	4400	4400	8800	8949

Notes: The Qualtrics survey was designed to recruit a few more participants than desired for each condition in order to accommodate participants who might drop out of the study. Participants who were randomized into the gender and ethnicity conditions at the beginning of the experiment, but responded “Prefer not to tell” for gender and ethnicity questions, are moved to the 1 cent condition. The observations of these participants, 106 in total, are excluded from the analysis. Color refers to people of color.

The total of 8,949 observations in Table 1 excludes 161 participants who dropped out during the experiment and whose data are not part of the main analysis. This drop-out figure accounts for 1.77% of all observations in the entire data set, indicating only limited loss of power for the whole study. Drop-out rates do not differ significantly across experimental conditions. An ANOVA test does not reject the null hypothesis of equality of drop-out rates across all conditions ($F(6, 9093) = 0.45$; $p = 0.84$)).

3.3. Dependent variables – productivity and demand for redistribution

One of the two main dependent variables is productivity. We conducted a real-effort task, known as the “slider task”, to measure the productivity of individuals. A real-effort task is particularly important for this experiment in order to elicit individual effort (Gill and Prowse, 2013; Lezzi, Fleming and Zizzo, 2015). Social science researchers have used a wide array of real-effort tasks in experiments, including solving mazes, solving math problems, counting, decoding, answering general knowledge questions, word-search puzzles, slider tasks, and many other similar tasks requiring physical and/or mental effort. The chosen real-effort task for this study is the slider task, which has been shown to have a high level of variation in effort or performance levels (Gill and Prowse, 2013). Moreover, the slider task is an easy task for everybody and not correlated with cognitive abilities or education (as, for example, word-search puzzles or knowledge questions). In

a slider task, a number of sliders are displayed on a computer screen, with a default position of 0. Study participants are asked to drag each slider to a pre-defined point, ranging from 0 to 100. Depending on the type of computer device, they can use a mouse or finger to move as many sliders as possible to the pre-defined points.

The slider task begins now. You have 3 minutes to drag as many sliders as possible to the right position. When the 3 minutes are over, the survey will automatically advance.

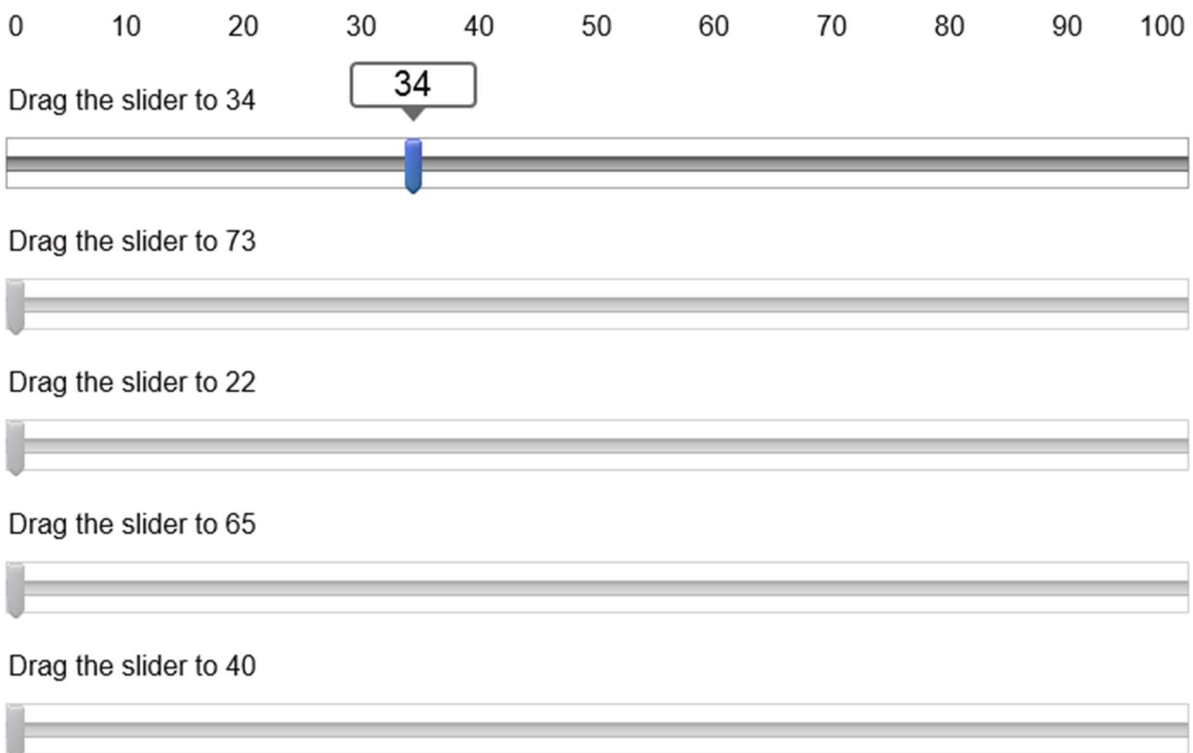


Figure 3: Slider task (snapshot)

In this study, participants were shown 100 sliders that they were asked to position correctly. For each correctly positioned slider task, participants earned 1 or 2 cents. Participants had three minutes to work on the sliders. The productivity of a participant is measured as the total number of sliders they correctly position within three minutes. On average, across all conditions, participants correctly positioned 43 sliders. Figure 3 shows a screenshot of the slider task.

Our second dependent variable is participants' vote for redistribution within their group of 100, measured as a preferred tax rate. The study follows the relevant experimental literature that elicits the tax rate that people are willing to vote for redistribution (Klor and Shayo, 2010; Esarey, Salmon and Barrilleaux, 2012; Großer and Reuben, 2013; Agranov and Palfrey, 2015; Lefgren, Sims and Stoddard, 2016; Gee, Migueis and Parsa, 2017). Participants are informed that everybody can

vote on a tax rate (between 0% and 100%) and that the median tax rate is effectively applied to the experimental group. This tax is deducted from every participant's earnings and put into a group account. At the end of the study, every participant will receive an equal share of the group account. The proportional tax scheme coupled with equal distribution of tax revenue to all participants in a group makes it an equalizing tax. (See Supplemental Appendix A for the full description of the vote for redistribution with examples.) A higher tax rate implies greater support to participants with relatively low earnings, while a lower tax rate implies less support to participants with relatively low earnings. In our study, the tax vote for redistribution takes place after participants have finished the slider task and have learned about their performance. On average, across all conditions, participants voted for a median tax rate of 20% (the mean tax rate is 28%). As expected, this tax rate and the redistribution that resulted from it reduced inequality from a Gini estimate of 26 before redistribution to a Gini estimate of 22 after redistribution.

We identify and drop observations that might be outliers in terms of productivity—the number of sliders correctly positioned—and/or preferred tax rate for redistribution. We consider as outliers all observations that are three standard deviations greater or less than the mean number of sliders correctly positioned; that means, all observations where productivity is less than 1.15 sliders or more than 84.85 sliders. **This amounts to dropping 32 observations.** We also drop all observations with a preferred tax rate of more than 90% as outliers. **This amounts to dropping another 200 observations.** See Appendix A for the change in the distribution of sliders correctly positioned and the preferred tax rate before and after we drop the outliers. Additionally, we drop the observations of participants randomized into the gender and ethnicity conditions who were moved to the 1 cent condition because they preferred not to tell their gender or ethnicity. **This amounts to dropping another 106 observations. With these steps, we dropped 338 observations in all, approximately 3.8% of the entire raw data.** The average productivity of 43 sliders, median tax rate of 20%, and mean tax rate of 28% are estimated after dropping outliers.

3.4. External validity: MTurk data vs. US probability samples

Sheehan and Pittman (2016) discuss the resemblance of MTurk data to the US population. MTurk data match the US population better than student samples, but may not perfectly match national probability samples. In Table 2, we compare our MTurk sample to the MTurk sample of a related study (Kuziemko *et al.*, 2015), and to a representative survey of the US population. Our MTurk data are similar to the MTurk sample of Kuziemko *et al.*, (2015) in terms of basic demographics. Chi-square tests suggest that corresponding ratios are not statistically significantly different from each other. For nationally representative data of the US population constructed with probability sampling methods, we use the American Life Panel (APL), which is a longitudinal online panel survey collected by the RAND Corporation. Apart from the fact that the MTurk sample is younger, more educated and more likely to be white than the average US citizen, the MTurk sample and the APL sample are fairly similar. Chi-square tests suggest that corresponding ratios are not

statistically different from each other. Furthermore, our MTurk sample is geographically representative of the US population at the state level, using data from the US Census Bureau (compare the maps in Appendix B).

Table 2: Comparing MTurk data to US probability samples

	(1)	(2)	(3)
Demographics	MTurk sample (own)	MTurk sample (other)	American Life Panel (ALP)
Male	0.444	0.428	0.417
Age	35.64	35.41	48.94
White (non-Hispanic)	0.753	0.778	0.676
Black	0.083	0.075	0.109
Hispanic	0.066	0.044	0.180
Other racial/ethnic group	0.078	0.075	0.041
Employed (full or part)	0.664	0.465	0.557
Unemployed	0.056	0.123	0.103
Married	0.407	0.397	0.608
Has college degree	0.407	0.433	0.309
Political views, conservatives (1) to liberal (3)	2.131	2.176	N/A
Observations	8514	3741	1002

Notes: Results in columns (2) and (3) are obtained from Table 1 of a related study (Kuziemko *et al.*, 2015). The American Life Panel (ALP) is an online survey pool of US subjects, which is nationally representative. Other racial/ethnic group is Asian/Asian American in our MTurk sample.

3.5. Internal validity: Summary statistics and balance tests

Table 3 presents summary statistics and balance tests of basic demographic and socioeconomic variables. The average age of participants is 36 years old. The average household size is three. Fifty-eight percent of participants are single or in a relationship, 41% are married, 1% are widowed. There are more females (55%) than males (44%), with the rest indicating “Other / Prefer not to tell”. Eight percent of participants describe themselves as African American / African, 8% are Asian American / Asian, 75% are European American / White, 7% are Hispanic / Latino, and 2% indicate “Other / Prefer not to tell”. Hence, we have a subsample of 75% whites and 23% people of color. Fifty-four percent of participants report they have no children. Seventy-seven percent of participants are in some form of employment, 6% are unemployed and looking for a job, 7% are students, and 9% are not in the labor force (e.g., retired). Forty-six percent of participants report an annual household income of less than \$50,000, 37% report \$50,000 to \$99,999, and 15% report \$100,000 and more. Ninety-five percent of participants were born in the United States.

In general, the F-tests reject the hypothesis that the experimental conditions are different from each other across observable characteristics. Thus, the randomization of the study worked well,

even after we exclude possible “fraud” entries (see Section 3.1), drop-outs (see Section 3.2) and outliers (see Section 3.3). Overall, the summary of the data described above is fairly similar across the different experimental conditions. Given that observables are generally balanced across all seven experimental conditions, one can expect that unobservables are also similar across treatment groups.

Table 3: Summary statistics & balance tests

Basic demographics	Mean	F-statistic	p-value
Age (in completed years)	35.65	0.54	0.78
Household size	2.82	1.97	0.07
Single & in a relationship	0.58	1.60	0.14
Married	0.41	1.82	0.09
Widowed	0.01	0.28	0.94
Female	0.55	0.95	0.46
African American / African	0.08	0.70	0.65
Asian American / Asian	0.08	1.12	0.35
European American / White	0.75	0.45	0.84
Hispanic / Latino	0.07	0.78	0.59
Have no children	0.54	0.81	0.56
Full-time employee	0.55	1.56	0.15
Part-time employee	0.11	0.23	0.97
Self-employed or small business owner	0.11	0.48	0.82
Not in labor force (e.g., retired)	0.09	1.49	0.18
Student	0.07	1.83	0.09
Unemployed and looking for a job	0.06	0.61	0.72
High-school diploma	0.09	0.36	0.91
Bachelor's degree	0.41	1.01	0.41
Graduate Degree (Master's, Ph.D.)	0.15	0.62	0.71
Some college, no degree	0.30	0.65	0.69
Some high school, no degree	0.01	1.24	0.28
Other educational status	0.04	1.16	0.32
Low-income earners (<\$50,000)	0.46	1.31	0.25
Middle class (\$50,000 - \$99,999)	0.37	0.67	0.67
High-income earners (<\$100,000 +)	0.15	1.19	0.31
Born in the US	0.95	1.89	0.08

Notes: Only the main observables have been displayed in this table. See Appendix C for the remaining variables of our study.

4. Results

4.1. Main regressions: the impact of discrimination on productivity and redistributive preferences

The main objective of this study is to investigate the impact of gender and ethnic discrimination

on productivity and the demand for redistribution. Table 4 presents some key results of the study. Columns 1 and 2 of Table 4 show the actual productivity without and with control variables, respectively, whereas columns 3 and 4 show participants' guess. Productivity falls when people of color are discriminated against, both objectively and subjectively. On average, productivity as measured by the actual number of sliders correctly positioned falls by 0.77 sliders and productivity, as guessed by participants, falls by 1 slider. These two effect sizes are marginal, given that participants correctly position 43 sliders, on average, in the control group and participants think they correctly position 38 sliders, on average, in the control group. This result provides some evidence for stereotype threat. Gender discrimination does not seem to affect productivity, no matter whether females or males are discriminated against in the payment scheme. The same applies for discrimination against whites: no statistically significant change in productivity, measured or guessed, is detected, on average.

Table 4: The impact of discrimination on productivity and redistributive preferences I

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Productivity: # of sliders</i>				<i>Demand for redistribution</i>	
	Actual	Actual	Guess	Guess	Tax rate	Tax rate
1 cent & 2 cents	-	-	-	-	-	-
Female 1c, Male 2c	-0.25 (0.66)	-0.23 (0.63)	-0.21 (0.78)	-0.18 (0.80)	5.10*** (0.00)	5.01*** (0.00)
Female 2c, Male 1c	0.35 (0.55)	0.59 (0.22)	-0.11 (0.88)	0.15 (0.82)	1.20 (0.28)	1.06 (0.34)
Color 1c, White 2c	-0.81* (0.08)	-0.77** (0.05)	-1.03* (0.07)	-1.00* (0.07)	3.13*** (0.00)	3.08*** (0.00)
Color 2c, White 1c	-0.53 (0.25)	-0.49 (0.20)	-0.95* (0.10)	-0.80 (0.15)	2.08** (0.02)	1.97** (0.03)
Lucky 2c, Unlucky 1c	-0.32 (0.48)	-0.12 (0.76)	0.38 (0.51)	0.61 (0.27)	2.00** (0.02)	1.83** (0.04)
Slider task earnings					-9.55*** (0.00)	-9.41*** (0.00)
Mean in control group	43	43	38	38	26	26
Observables	No	Yes	No	Yes	No	Yes
Observations	8113	8113	8113	8113	8113	8113
Adjusted R-squared	0.00	0.31	0.00	0.10	0.01	0.02

Notes: The first dependent variable is productivity, which is the number of sliders correctly positioned, as actually observed in the data or as guessed by participants. The second dependent variable is the preferred tax rate (%) participants vote for redistribution. The control group is the 1 cent condition together with 2 cent condition. Observables controlled for are basic demographic and socioeconomic characteristics, including age, household size, gender, ethnicity, employment status, income class, educational status, relationship status, citizenship, and whether respondent has children or not. The device used in performing the slider task is also added to the set of control variables. The tax rate regressions controls for earnings from the slider task in both estimations. This is done to address the concern of possible endogeneity that may result from the fact that the slider task precedes the vote for redistribution in the experimental sequence. Tax rate regressions are shown in Appendix D. with and without earnings

from the slider task as an additional control variable, for comparison. P-values of the estimates are in parentheses. ***, **, and * indicate that the estimates are statistically significant at the 1%, 5%, and 10% levels, respectively.

We observe a strong increase in the demand for redistribution in the presence of discrimination, especially when females are discriminated against. The tax rate increases by 5 percentage points when females are discriminated against, by 3 percentage points when people of color are discriminated against, and by 2 percentage points when whites are discriminated against. All three effect sizes do differ from each other statistically ($F(2, 8075) = 2.95$; $p = 0.052$), though the two effects of ethnic discrimination are not statistically different from each other ($F(1, 8075) = 1.17$; $p = 0.28$). With an average tax rate of 26% in the control group, the redistributive effects of discrimination are large in both relative and absolute terms. No average effects on redistribution are observed when men are discriminated against. Note that in Table 4, columns 5 and 6, we also control for earnings from the slider task to address concerns of possible endogeneity that may result from the fact that the slider task precedes the vote for redistribution in the experimental sequence. The results do not change much if we do not control for earnings from the slider task (see Appendix D).

Table 5: The impact of discrimination on productivity and redistributive preferences II

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Productivity: # of sliders</i>				<i>Demand for redistribution</i>	
	Actual	Actual	Guess	Guess	Tax rate	Tax rate
Lucky 2c, Unlucky 1c	-	-	-	-	-	-
Female 1c, Male 2c	0.06 (0.92)	-0.13 (0.80)	-0.59 (0.46)	-0.79 (0.30)	3.11** (0.01)	3.20*** (0.01)
Female 2c, Male 1c	0.67 (0.27)	0.72 (0.15)	-0.49 (0.53)	-0.45 (0.54)	-0.81 (0.50)	-0.75 (0.53)
Color 1c, White 2c	-0.49 (0.32)	-0.64 (0.12)	-1.42** (0.02)	-1.60*** (0.01)	1.10 (0.27)	1.24 (0.21)
Color 2c, White 1c	-0.22 (0.67)	-0.36 (0.38)	-1.34** (0.04)	-1.39** (0.02)	0.12 (0.90)	0.18 (0.86)
Slider task earnings					-9.19*** (0.00)	-9.36*** (0.00)
Mean in control group	43	43	38	38	28	28
Observables	No	Yes	No	Yes	No	Yes
Observations	5898	5898	5898	5898	5898	5898
Adjusted R-squared	-0.00	0.31	0.00	0.10	0.01	0.02

Notes: All the notes for Table 4 apply here, except that (1) control group is the Lucky 2c, Unlucky 1c condition, and (2) 1 cent and 2 cents conditions are not included in the regressions.

In a next step, we directly compare ethnic and gender discrimination to inequality of sheer luck (see Table 5). Ethnic discrimination leads to lower self-assessed productivity in comparison to self-

assessed productivity when sheer luck determines a lower or higher payment rate. However, no differences in actual productivity are detected when comparing the treatment groups of ethnic discrimination and inequality of luck. While there is barely a difference between the impact of ethnic discrimination and inequality of luck on redistributive preferences, discrimination against women leads to an increase of the preferred tax rate of 3.2 percentage points in comparison to inequality of luck. Overall, the results in Table 5 suggest that brute luck of gender or ethnicity occurring at birth is perceived as different from brute luck experienced later in life.

4.2. Subsample regressions: responses of whites and people of color to ethnic discrimination

Table 6 is a summary of the results of four subsample regressions reported in Appendix E. Columns 1 and 2 show the results for the sub-group of men, whereas columns 3 and 4 show the results for the sub-group of women. Columns 1 and 3 show the effect on productivity measured as the number of sliders correctly positioned. Columns 2 and 4 show the effect on redistributive preferences measured as the tax rate individuals vote for. The coefficients indicate the effect of being discriminated against (row 1), being favored (row 2), being unlucky (row 3) and being lucky (row 4) in comparison to a situation where everybody earns 1 or 2 cents, correspondingly. For example, the first coefficient estimate, 1.31, indicates that if men are discriminated against (with men earning 1 cent and women earning 2 cents), they on average correctly position 1.31 more sliders than men in the 1 cent condition (but it is only statistically significant at the 15% level).

Table 6: Responses of men and women to gender discrimination					
	(1)	(2)		(3)	(4)
Male subsample (N = 3637)	<i>Sliders</i>	<i>Tax rate</i>	Female subsample (N = 4476)	<i>Sliders</i>	<i>Tax rate</i>
Female 2c, Male 1c vs. 1c	1.31 (0.14)	-0.49 (0.79)	Female 1c, Male 2c vs. 1c	-1.11* (0.10)	7.70** (0.00)
Female 1c, Male 2c vs. 2c	-0.20 (0.82)	3.77** (0.04)	Female 2c, Male 1c vs. 2c	0.99 (0.12)	0.77 (0.65)
Unlucky 1c vs. 1c	-0.48 (0.58)	1.38 (0.46)	Unlucky 1c vs. 1c	-0.70 (0.29)	3.50** (0.04)
Lucky 2c vs. 2c	-0.94 (0.29)	0.67 (0.71)	Lucky 2c vs. 2c	1.40** (0.03)	1.42 (0.40)

Notes: The results shown in Table 6 are coefficient estimates obtained from subsample regressions shown in Appendix E. The first dependent variable is productivity, which is the number of *sliders* correctly positioned, as actually observed in the data. The second dependent variable is the preferred *tax rate* (%) participants vote for redistribution. P-values are in parentheses. ***, **, and * indicate that estimates are statistically significant at the 1%, 5%, and 10% levels, respectively.

Table 6 shows that women and men respond very differently to different forms of discrimination and inequality of luck. Men increase their productivity by 1.3 sliders (p-value: 0.14) when discriminated against and women decrease their productivity by 1.1 sliders (p-value: 0.10) when

discriminated against. These two estimates are statistically different from each other ($\chi^2(1) = 4.74$; $p = 0.03$). Women increase their demand for redistribution by as much as 7.7 percentage points when discriminated against; men do not. However, men demand more redistribution (an increase of the tax rate by 3.8 percentage points) in favor of women if they (men) are favored and women are discriminated against. In contrast, women do not ask for more redistribution when they (women) are favored and men are discriminated against. Whether men are on the lucky side of a payment scheme or not does not affect their productivity or redistributive preferences. Women are more productive when they have good luck, but not when they are favored. Women demand more redistribution when they are unlucky, but less so than when they are discriminated against based on their gender ($F(1, 4437) = 4.65$; $p = 0.03$).

4.3. Subsample regressions: responses of whites and people of color to ethnic discrimination

Table 7 is a summary of the results of four subsample regressions reported in Appendix F. Columns 1 and 2 show the results for the sub-group of whites, whereas columns 3 and 4 show the results for the sub-group of people of color. The coefficients indicate the effect of being discriminated against (row 1), being favored (row 2), being unlucky (row 3) and being lucky (row 4) in comparison to a situation where everybody earns 1 or 2 cents, correspondingly.

Table 7: Responses of whites and people of color to ethnic discrimination					
White subsample (N = 6259)			People of color subsample (N = 1854)		
	<i>Sliders</i>	<i>Tax rate</i>		<i>Sliders</i>	<i>Tax rate</i>
Color 2c, White 1c vs. 1c	-0.54 (0.28)	2.95* (0.02)	Color 1c, White 2c vs. 1c	-1.86* (0.06)	-0.12 (0.96)
Color 1c, White 2c vs. 2c	-0.63 (0.22)	4.51*** (0.00)	Color 2c, White 1c vs. 2c	0.20 (0.84)	-3.64* (0.10)
Unlucky 1c vs. 1c	0.11 (0.85)	3.82*** (0.01)	Unlucky 1c vs. 1c	-2.42** (0.04)	-1.87 (0.47)
Lucky 2c vs. 2c	0.44 (0.46)	2.30* (0.09)	Lucky 2c vs. 2c	-0.14 (0.91)	-2.60 (0.36)

Notes: The results shown in Table 7 are coefficient estimates obtained from subsample regressions shown in Appendix F. The first dependent variable is productivity, which is the number of *sliders* correctly positioned, as actually observed in the data. The second dependent variable is the preferred *tax rate* (%) participants vote for redistribution. P-values are in parentheses. ***, **, and * indicate that estimates are statistically significant at the 1%, 5%, and 10% levels, respectively.

Whites and people of color also respond differently to discrimination and luck. The productivity of whites is unaffected no matter if they are discriminated against or favored and no matter if they have bad or good luck. However, the demand for redistribution amongst whites is highly affected by all forms of inequality. The tax rate increases by 3 percentage points when whites are discriminated against, 4.5 percentage points when they are favored, 3.8 percentage points when they have bad luck, and 2.3 percentage points when they have good luck. All four effect sizes are

statistically not different from each other ($\chi^2(3) = 6.00$; $p = 0.11$). People of color react quite differently to discrimination. Interestingly, their productivity is negatively affected by discrimination and bad luck (productivity falls by about 2 sliders), whereas their redistributive preferences do not change.

4.4 Subsample regressions: gender and ethnic interactions

In a last step, we look at the interaction of gender and ethnicity, although we are aware that our study is slightly underpowered for such an analysis (power calculations are available from the authors upon request). We still estimate Equation 4, but this time restrict the sample to women of color only, white women only, men of color only, and white men only. The results of these subsample regressions are reported in Appendix G.

Some interesting findings are as follows. Table 6 shows men slightly increase their productivity when discriminated against, but our analysis in Appendix G shows that white men explain why men increase their productivity when discriminated against. White men increase their productivity by 2.2 sliders, on average, when discriminated against by gender. Note that white men do not increase their productivity if they, by chance, earn a lower rate (Unlucky 1c sub-treatment group). Men of color do not change their productivity when discriminated against based on their gender. However, men of color reduce their productivity by 3.6 sliders when discriminated against based on ethnicity. Both women of color (-1.5 sliders) and white women (-1.0 sliders) decrease their productivity if they are discriminated against, but only white women increase their productivity when favored by gender (1.5 sliders) or sheer luck (1.7 sliders).

Table 6 shows that men vote for higher tax rates even when women are discriminated against (or men are favored). White men again drive this result. The tax rate of white men increases by 4.8 percentage points, while the tax rate for men of color does not change. Note that white men do not vote for higher tax rates if they are, by chance, on the lucky side. Table 6 shows that women highly increase their tax rate when discriminated against. Appendix G shows that both women of color (8.1 percentage points) and white women (7.61 percentage points) ask for higher tax rates. If men are discriminated against, white women still vote for higher tax rates (3.6 percentage points), but women of color vote for lower tax rates (-10.3 percentage points). We do not find such effects if women, by chance, earn a higher rate (i.e., Lucky 2c sub-treatment groups).

5. Robustness checks and limitations

5.1 Perceptions of fairness

Our hypothesis is that the differences in productivity and redistributive differences across different types of discrimination and luck are mediated by participants' perceptions of the

fairness of the different payment schemes. At the end of the experiment, we ask participants whether they perceive the payment scheme to be fair or discriminatory. The results are shown in Figure 4 (the corresponding regression results are represented in Appendix H). Figure 4 shows that individuals indeed perceive the discriminatory payments as more discriminatory in comparison to the 1 cent and 2 cents conditions, and also in comparison to the Lucky 2c, Unlucky 1c condition.

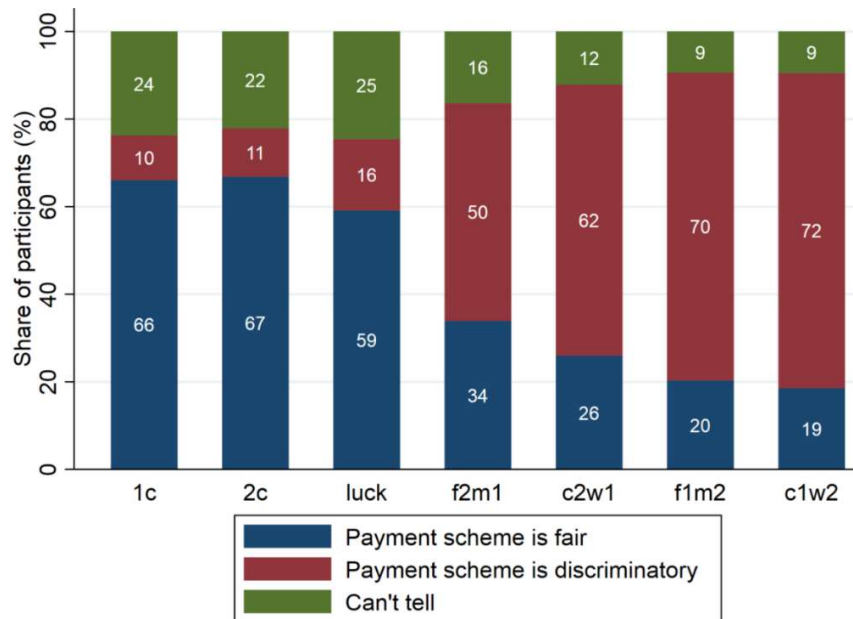


Figure 4: Fairness perceptions

Notes: 1c=1 cent condition; 2c=2cents condition; f2m1=female 2 cents, male 1 cent; f1m2=female 1 cent, male 2 cents; c2w1=color 2 cents, white 1 cent; c1w2=color 1 cent, white 2 cents.

Interestingly, discrimination against women and people of color is subjectively perceived as more discriminatory than discrimination against men and whites, even though the rate of discrimination is objectively the same.⁷ In fact, important results of the study are observed in response to discrimination against women and people of color. From the main regression results in Tables 4 and 5, the highest increase in the demand for redistribution is observed when women are discriminated against and actual productivity falls only in the condition in which people of color are discriminated against.

5.2 Time spent on payment information pages

We also track the time participants spend reading the payment information in the various treatments. The average time spent by participants is compared across experimental conditions

⁷ The observed shares are statistically different from each other.

to investigate whether or not participants read the information. The payment information varies slightly in the length of text that is provided before participants perform the slider task. It turns out that participants, on average, spend more time reading the payment information when the text is longer. The Lucky 2c, Unlucky 1c treatment has the highest word count (73), and the 1 cent and 2 cents treatments have the lowest word count (19). Participants in the former spend 72 more seconds reading the payment information than participants in the latter. See Appendix I for a complete set of results. The payment information that is provided to explain the vote for redistribution does not vary in length and content across treatment groups. This information has a word count of 518 and is provided to all participants in all experimental conditions. As expected, time spent on this page does not differ across experimental treatments (see Appendix I). If some participants hurriedly skim through the payment information, there is little or no concern that this influences our main results, since according to our tests (Appendix I) this behavior is expected to be random across experimental conditions.

5.3 Main and subsample regressions without Asians

The study categorizes African Americans / Africans, Asian Americans / Asians, and Hispanics into a “people of color” category. These ethnicities are highly heterogeneous, have very different experiences in the United States, and may respond differently to discrimination and luck. For example, African Americans / Africans have historically suffered the most discrimination in the United States, and they are often the target of affirmative action. Some Asian Americans / Asians consider themselves to be discriminated against or punished by affirmative action (Inouye, 2016; Lee, Park and Wong, 2017; Chang, 2018; Oppenheimer, 2018). The study does not differentiate between Asian Americans / Asians, African Americans / Africans and Hispanics, but these different sentiments from the real world may influence the behavior of participants in the study. Besides, Asian Americans / Asians currently out-earn whites as the highest-earning ethnic group in the United States, though whites are wealthier (Peter G. Peterson Foundation, 2018).

In view of the discussion above, the main and subsample regressions of the study in Tables 4 – 7 are estimated again, but without participants who indicate that they are Asian Americans / Asians. The results are reported in Appendix J. In general, the regression results in Appendix J are similar to the results already discussed, both qualitatively and quantitatively. However, the effects of discrimination on productivity and the demand for redistribution are slightly larger when Asian Americans / Asians are excluded. For example, when men are discriminated against, they increase their productivity by 1.8 sliders if Asians are excluded, or 1.3 sliders if Asians are included ($\chi^2(1) = 3.15$; $p = 0.076$). When people of color are favored, they decrease their tax rate by 6 percentage points if Asians are excluded, or 3.6 percentage points if Asians are included ($\chi^2(1) = 0.51$; $p = 0.48$).

5.4. Small monetary stakes

The payment scheme of either \$1.00 or \$2.00 per slider correctly positioned are quite low monetary values. Participants facing gender or ethnic discrimination of \$1.00 earnings differential could likely be less bothered, compared to a real-world discrimination in which monetary stakes can be substantial. While the monetary stakes are too low in absolute terms, the rate of discrimination in the experiment is too high, compared to the rate of discrimination in the United States. The payment ratio of 1:2 constitutes a higher rate of inequality than gender or ethnic inequality in earnings in the United States. According to the US Census Bureau, Current Population Survey, 1961 to 2017 Annual Social and Economic Supplements, the median earnings of females were about \$40,742 and the median earnings of males were about \$51,212 in the US in 2017. Thus, the female-to-male earnings ratio is about 8:10. The US Census Bureau also shows that the median household income for people of color was about \$56,516 and the median household income for whites was about \$62,950 in 2017. This income difference is equivalent to a ratio of 9:10. These ratios only reflect inequality and not discrimination as such. If one takes account of differences in preferences, skills, and experience, the rate of discrimination in the United States is expected to be even lower.

The monetary stakes of \$1.00 and \$2.00—whether discriminatory or not—have important implications for the external validity of the study. We investigate in Appendix K if, at least, the monetary stakes by themselves make a difference in terms of productivity and the demand for redistribution observed in the study. We run regressions in the form of our main specification in Equation (1) but restrict the data to the 1 cent and 2 cents conditions only; i.e., the control conditions in which equal, non-discriminatory pay rates are applied. The results reported in Appendix K show that the monetary stakes of \$1.00 and \$2.00 are effective in changing the redistributive, but not productive, behavior of participants. Participants who are paid \$2.00 vote about 4 percentage points higher tax rate than their counterparts who are paid \$1.00, even after controlling for slider task earnings. This result suggests that participants still respond to differences in small payouts, even in a non-discriminatory world.

5.5. Outliers

As common practice in empirical studies, we identified and dropped outliers in terms of productivity—the number of sliders correctly positioned—and/or preferred tax rate for redistribution. This step results in dropping 32 observations and another 200 observations, respectively (see Section 3.3). For example, we consider a tax vote greater than 90% as an outlier, because it is unrealistically too high. Such tax votes are plausible in our experimental setting,

where the monetary stakes are rather low, or where a few participants reported that they struggled to understand how the vote for redistribution worked.⁸

In principle, however, all observations in the distribution are important, especially for an inequality study. We investigate whether or not the main results of the study are any different if we do not drop outliers from the analysis of the experimental data. In Appendix L, we show the main results of the study again without excluding outliers **in terms of productivity and/or tax vote**. These results suggest that including outliers makes only little difference. Productivity barely changes and redistributive preferences are slightly more pronounced. For example, without outliers, the tax rate increases by 5 percentage points when women are discriminated against; and with outliers, the tax rate increases by 6 percentage points.

5.6. Multiple hypotheses testing

We test several hypotheses simultaneously from the same experimental data (see Section 2.3). Statistical theory shows that such multiple hypotheses testing increases the risk of false positive results (Fields, 2013; List, Shaikh and Xu, 2019). Type I error measures the rate of rejecting a null hypothesis when, in fact, it is true. For multiple tests that are mutually independent, the probability of making at least one Type I error is $1 - (1 - \alpha)^K$, where α is the Type I error for a single test, and K is the number of tests. As K increases, this “familywise error rate” increases substantially (List, Shaikh and Xu, 2019, p.3).

We account for multiple hypotheses testing in Appendix M by evaluating the statistical significance of observed treatment effects at more restrictive p-values (i.e., α/K), following the conservative Bonferroni approach (Kim, 2015). Table M1 shows that productivity does not respond to any of our treatments. However, the tax rate still increases by 5 and 3 percentage points in the treatments that discriminate against women and people of color, respectively. Table M2 shows that ethnic discrimination is still perceived as different from sheer luck, even after accounting for multiple hypotheses testing. Three treatment effects in the subsample analyses survive the adjustment made for multiple hypotheses testing (see Tables M3 and M4). These include the increase in women’s demand for redistribution when discriminated against, and in white’s demand for redistribution when favored or unlucky.

6. Discussion and conclusion

⁸ At the end of the experiment, we gave participants the chance to make remarks about the study, if they had any, and a few of them volunteered this information. We cannot tell exactly how many struggled with understanding the vote for redistribution, but one can safely assume that this is not an issue for the main results of the study, as randomization worked very well.

This study contributes to the scientific literature on the impact of inequality on the demand for redistribution and productivity in an incentivized experimental setting with a large sample that is similar in gender and ethnic makeup to the actual US population.⁹ The experiment distinguishes between different sources of inequality, namely discrimination based on gender and ethnicity and inequality driven by brute luck in a lottery. We would like to highlight four main results of the study.

First, Kuziemko *et al.*, (2015) report the puzzling result that US citizens in a large scale MTurk survey experiment do not demand higher redistribution in response to informational treatments on growing income inequality in the United States. In our study, we work with a very similar sample, but randomly confront participants with different types of gender and ethnic inequality. Moreover, unequal remuneration for participants' effort and votes on tax rates have a direct and immediate impact on participants' earnings. We find that discrimination increases the demand for redistribution. Hence, US citizens react to income inequalities, which are the result of discrimination, if their incomes are directly affected by such inequalities.

Second, our results indicate that inequality that is linked to personal characteristics, i.e., discrimination, leads to a higher demand for distribution than inequality driven by sheer luck, i.e., a lottery. Our results show that this effect is mediated by differences in the perceived fairness of different forms of inequality. Previous studies have mostly analyzed the effect of inequality of luck on redistributive preferences (Fong, 2001; Esarey, Salmon and Barrilleaux, 2012; Lefgren, Sims and Stoddard, 2016; Gee, Migueis and Parsa, 2017; Karadja, Möllerström and Seim, 2017). We show that there is an effect size difference between brute luck at birth and brute luck later in life. Future empirical and theoretical studies might want to analyze these differences in more detail.

Third, the impacts of discrimination on the demand for redistribution are much larger than the impacts of discrimination on productivity. Our study, however, still finds some evidence to confirm the stereotype threat hypothesis. People of color and women somewhat decrease their productivity in a slider task when the payment scheme discriminates against them. Nguyen and Ryan (2008) conduct a meta-analysis that finds that race-based stereotypes have a larger effect than gender-based stereotypes on productivity, which is in line with our study. Accounting for multiple hypotheses testing, however, productivity does not change in response to any of our treatments. This finding is in contrast to the findings of related field studies with sizeable productivity effects of discrimination and sheer luck (e.g., Steele and Aronson, 1995; Breza, Kaur and Shamdasani, 2018; Dube, Giuliano and Leonard, 2019). The reasons might be related to the following. First, unlike in fieldwork, there is a lack of interaction between participants in our study,

⁹ MTurk participants are younger, more educated, more likely to be in the middle class, more likely to be white, and more liberal than the average US citizen (Sheehan and Pittman, 2016).

which could make discrimination less salient. Second, unlike in fieldwork, participants are likely to be new to the slider task and might focus less on the discriminatory payment scheme and more on having fun with the slider task, which takes the form of a computer game.¹⁰ Third, participants had limited time for the slider task, which leads to a large variance in performance even in the control group.¹¹

Fourth, our study finds important gender and ethnic differences in response to discrimination. This study was not set up to identify the psychological or societal factors that mediate these findings. We still discuss possible driving factors that may become the starting point for future research. Our results indicate that women are more concerned about (unfair) inequality and men are more concerned about poverty. Discrimination slightly decreases the productivity of women and substantially increases their demand for redistribution. When men are discriminated against, they slightly increase their productivity, maybe to make up for the loss of income, and do not increase their demand for redistribution. Interestingly, men do, however, ask for more redistribution when women are discriminated against, which might be the result of the recent #MeToo discussions. Whites demand higher redistribution when they are discriminated against and also when people of color are discriminated against. This response to discrimination may be driven by a sense of fair treatment for all or by a desire to act fairly while being observed (i.e., the Hawthorne effect). Interestingly, however, people of color do not vote for higher tax rates when they are discriminated against. Moreover, they vote for lower tax rates when they are favored based on their ethnicity. This preference may be explained by the willingness amongst people of color to accept compensation for discrimination they might be facing in real life. Overall, the responses of different gender and ethnic groups to discrimination seem to provide support for equal opportunity policies in the United States and can inform policymakers in improving anti-discrimination policies.

¹⁰ Some participants report that they had fun with the slider task. Some the relevant remarks are: “The sliders were fun!”, “That was a fun task,” and “Very fun task...”

¹¹ In the control group (i.e., 1 cent and 2 cents conditions), the average performance is 43 sliders with a standard deviation of 13.8 sliders. In comparison to tax rate, the variance in performance is quite large. When both performance and tax rate are standardized, performance has a wider spread. The z-scores of performance vary from a minimum of -2.84 to a maximum of 2.88, and the z-scores of tax rate vary from a minimum of -0.98 to a maximum of 2.42.

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Appendix A: Outliers

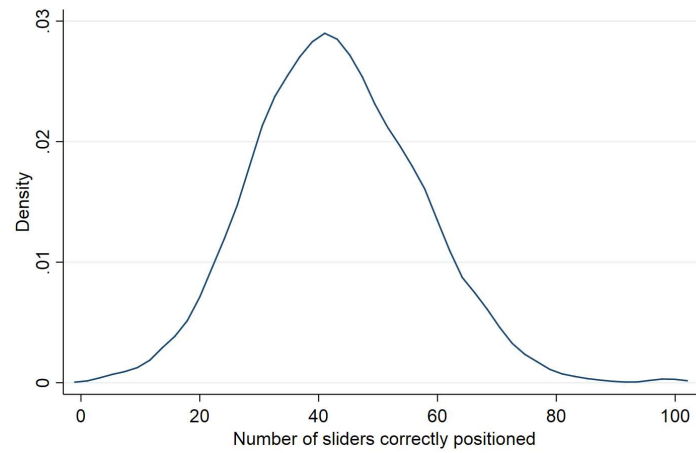


Fig. A1: Distribution of productivity *before* dropping outliers

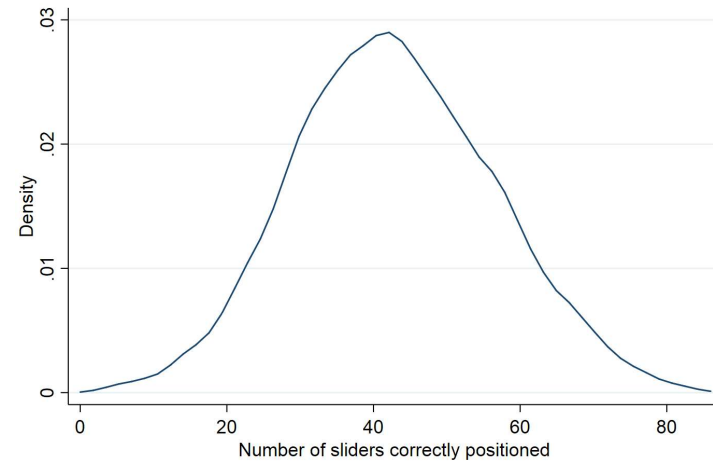


Fig. A2: Distribution of productivity *after* dropping outliers

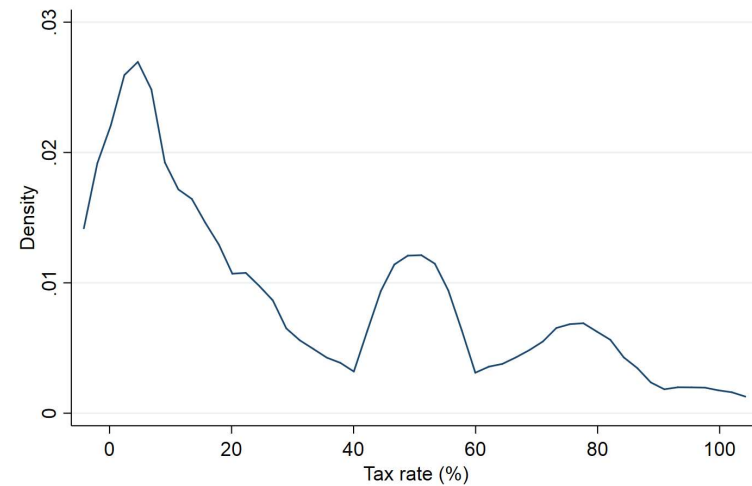


Fig. A3: Distribution of tax vote *before* dropping outliers

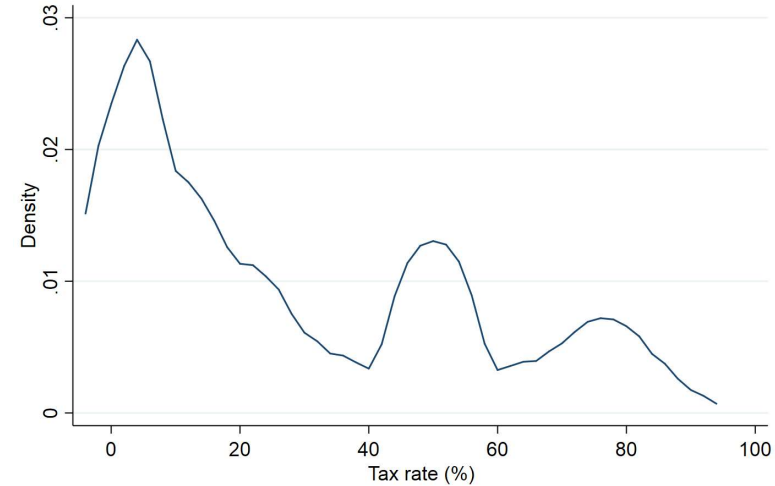
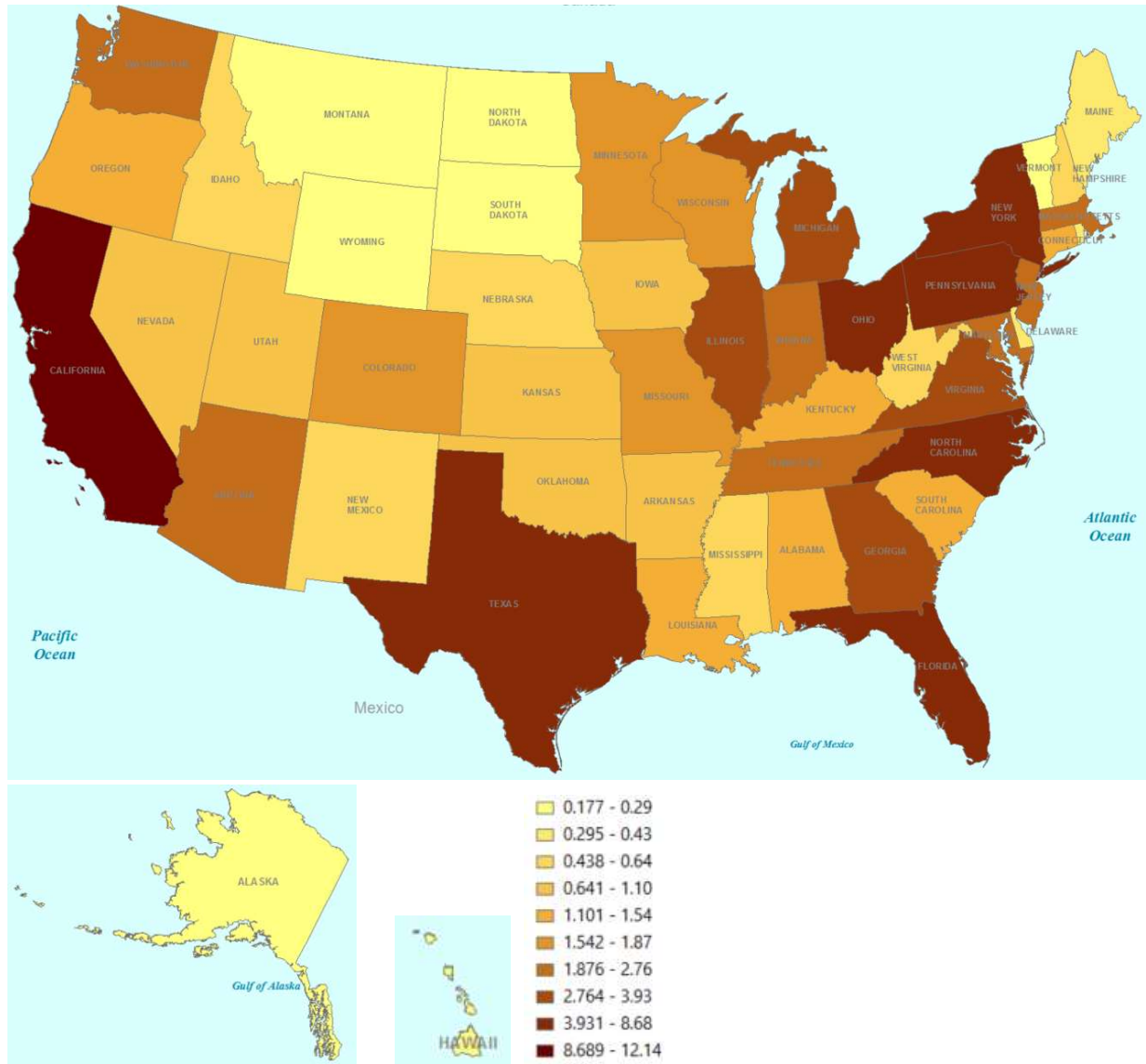
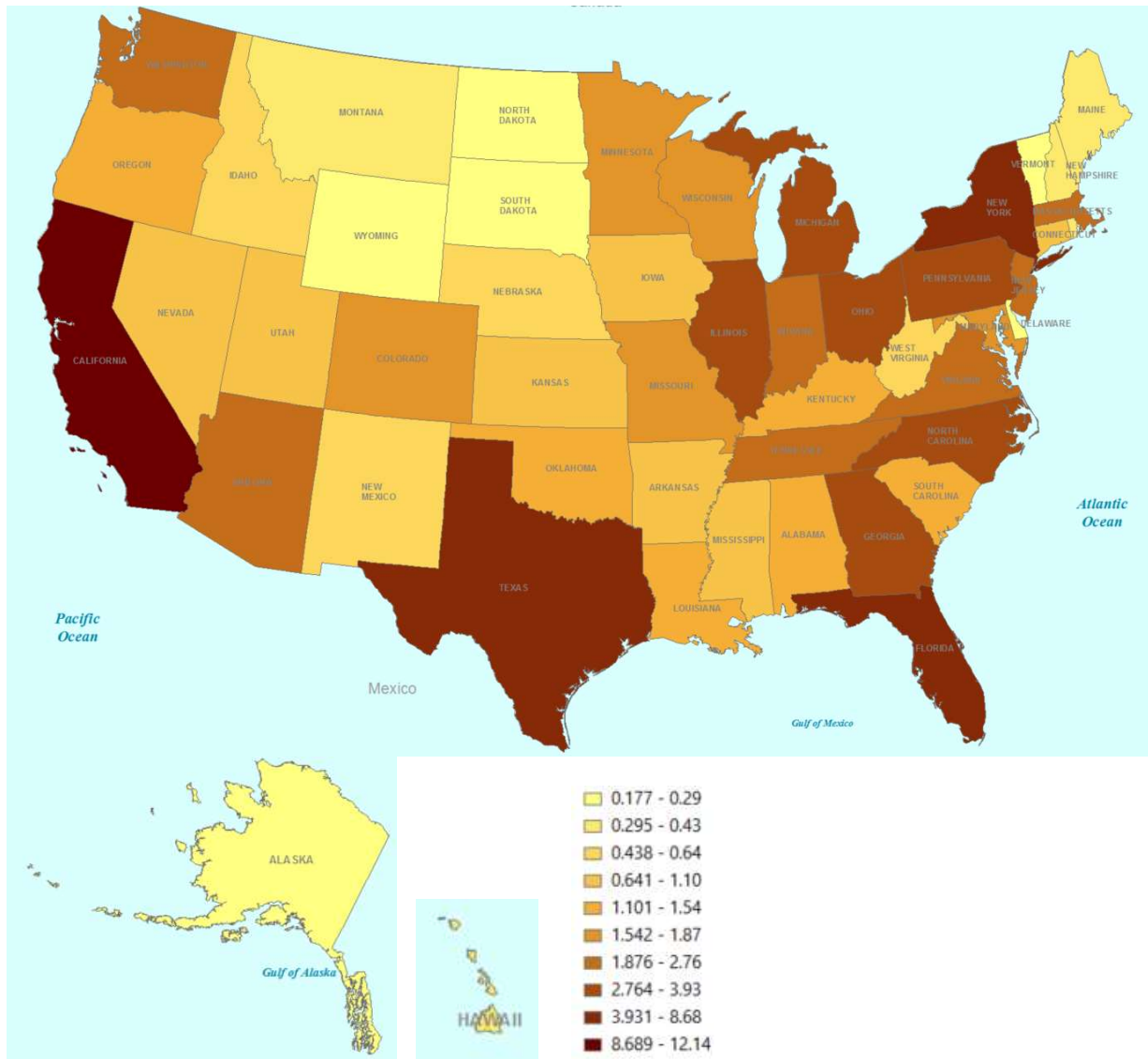


Fig. A4: Distribution of tax vote *after* dropping outliers

Appendix B: Geographical representation of MTurk data



Map 1: Population shares (%) of states – MTurk data



Appendix C: Summary statistics & balance tests (Additional variables)

Observables	Mean	F-statistic	p-value
<i>What device are you using to take the survey?</i>			
Computer	0.89	0.27	0.95
Smartphone	0.07	0.32	0.93
Tablet	0.03	0.79	0.58
Other device	0.01	0.80	0.57
<i>How often do you trust in the government to do what is right?</i>			
Never	0.04	0.89	0.50
Rarely	0.27	0.78	0.59
Only some of the time	0.53	0.75	0.61
Most of the time	0.16	1.45	0.19
All the time	0.01	0.53	0.79
<i>Why are some people poor in the US?</i>			
Circumstances beyond their control	0.57	0.90	0.49
Lack of any particular talent	0.11	2.20	0.04
Lack of effort on their part	0.32	1.12	0.35
<i>Why are some people rich in the US?</i>			
Circumstances beyond their control	0.47	0.73	0.63
They have more talents	0.18	0.51	0.80
They worked harder than others	0.35	0.76	0.60
<i>Where do you see yourself on the liberal/conservative spectrum?</i>			
Very conservative	0.04	0.67	0.67
Conservative	0.21	0.21	0.97
Moderate	0.31	0.18	0.98
Liberal	0.32	0.67	0.68
Very liberal	0.12	0.60	0.73

Appendix D: Tax rate regressions with and without earnings from slider task

Table D1: Tax rate regressions I

	(1)	(2)	(3)	(4)
1 cent & 2 cents	-	-	-	-
Female 1c, Male 2c	5.10*** (1.17)	5.18*** (1.19)	5.01*** (1.17)	5.08*** (1.18)
Female 2c, Male 1c	1.20 (1.12)	1.02 (1.12)	1.06 (1.11)	0.86 (1.12)
Color 1c, White 2c	3.13*** (0.90)	2.17** (0.90)	3.08*** (0.90)	2.13** (0.90)
Color 2c, White 1c	2.08** (0.91)	3.16*** (0.91)	1.97** (0.91)	3.03*** (0.91)
Lucky/Unlucky	2.00** (0.88)	2.02** (0.89)	1.83** (0.88)	1.84** (0.89)
Earnings from slider task	-9.55*** (0.97)		-9.41*** (1.05)	
Mean in control group	26	26	26	26
Observables	No	No	Yes	Yes
Observations	8113	8113	8113	8113
Adjusted R-squared	0.01	0.00	0.02	0.01

Notes: Dependent variable is tax rate (%) participants vote for redistribution. Control variable is 1 cent condition together with 2 cents condition.

Table D2: Tax rate regressions II

	(1)	(2)	(3)	(4)
Lucky/Unlucky	-	-	-	-
Female 1c, Male 2c	3.11** (1.24)	3.16** (1.25)	3.20*** (1.24)	3.27*** (1.25)
Female 2c, Male 1c	-0.81 (1.19)	-1.00 (1.19)	-0.75 (1.18)	-0.95 (1.19)
Color 1c, White 2c	1.10 (0.99)	0.15 (0.99)	1.24 (0.99)	0.30 (0.99)
Color 2c, White 1c	0.12 (1.00)	1.14 (0.99)	0.18 (1.00)	1.24 (0.99)
Earnings from slider task	-9.19*** (1.17)		-9.36*** (1.28)	
Mean in control group	28	28	28	28
Observables	No	No	Yes	Yes
Observations	5898	5898	5898	5898
Adjusted R-squared	0.01	0.00	0.02	0.01

Notes: Dependent variable is tax rate (%) participants vote for redistribution. Control variable is the Lucky/Unlucky condition.

Appendix E: Subsample regressions – by gender

Table E1: Male sub-sampe I (disadvantaged)

	(1)	(2)	(3)	(4)
	Sliders	Sliders	Tax rate (%)	Tax rate (%)
1 cent	-	-	-	-
Female 2c, Male 1c	1.57 (0.124)	1.31 (0.140)	-0.48 (0.797)	-0.49 (0.791)
Unlucky 1c	-0.05 (0.960)	-0.48 (0.578)	1.66 (0.374)	1.38 (0.463)
Mean in control group	46	46	27	27
Observables	No	Yes	No	Yes
Observations	3637	3637	3637	3637
Adjusted R-squared	-0.00	0.26	0.02	0.02

Notes: Control group is 1 cent condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Table E2: Male subsample II (advantaged)

	(1)	(2)	(3)	(4)
	Sliders	Sliders	Tax rate (%)	Tax rate (%)
2 cents	-	-	-	-
Female 1c, Male 2c	-0.36 (0.728)	-0.20 (0.818)	3.66** (0.047)	3.77** (0.041)
Lucky 2c	-1.14 (0.270)	-0.94 (0.287)	0.56 (0.753)	0.67 (0.709)
Mean in control group	47	47	22	22
Observables	No	Yes	No	Yes
Observations	3637	3637	3637	3637
Adjusted R-squared	-0.00	0.26	0.02	0.02

Notes: Control group is 2 cents condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Table E3: Female subsample (disadvantaged)				
	(1) Sliders	(2) Sliders	(3) Tax rate (%)	(4) Tax rate (%)
1 cent	-	-	-	-
Female 1c, Male 2c	-1.10 (0.162)	-1.11 (0.102)	7.92*** (0.000)	7.70*** (0.000)
Unlucky 1c	-1.03 (0.190)	-0.70 (0.286)	3.76** (0.030)	3.50** (0.043)
Mean in control group	41	41	27	27
Observables	No	Yes	No	Yes
Observations	4476	4476	4476	4476
Adjusted R-squared	0.00	0.30	0.01	0.01

Notes: Control group is 1 cent condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Table E4: Female subsample (advantaged)				
	(1) Sliders	(2) Sliders	(3) Tax rate (%)	(4) Tax rate (%)
2 cents	-	-	-	-
Female 2c, Male 1c	0.93 (0.228)	0.99 (0.125)	0.69 (0.682)	0.77 (0.649)
Lucky 2c	1.62** (0.039)	1.40** (0.034)	1.25 (0.457)	1.42 (0.400)
Mean in control group	39	39	27	27
Observables	No	Yes	No	Yes
Observations	4476	4476	4476	4476
Adjusted R-squared	0.00	0.30	0.01	0.01

Notes: Control group is 2 cents condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Appendix F: Subsample regressions – by ethnicity

Table F1: White subsample I (disadvantaged)

	(1) Sliders	(2) Sliders	(3) Tax rate (%)	(4) Tax rate (%)
1 cent	-	-	-	-
Color 2c, White 1c	-0.97 (0.109)	-0.54 (0.283)	3.13** (0.011)	2.95** (0.016)
Unlucky 1c	-0.39 (0.582)	0.11 (0.849)	4.10*** (0.005)	3.82*** (0.009)
Mean in control group	43	43	27	27
Observables	No	Yes	No	Yes
Observations	6259	6259	6259	6259
Adjusted R-squared	0.00	0.31	0.02	0.03

Notes: Control group is 1 cent condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Table F2: White subsample II (advantaged)

	(1) Sliders	(2) Sliders	(3) Tax rate (%)	(4) Tax rate (%)
2 cents	-	-	-	-
Color 1c, White 2c	-0.58 (0.336)	-0.63 (0.217)	4.49*** (0.000)	4.51*** (0.000)
Lucky 2c	0.60 (0.407)	0.44 (0.462)	2.21 (0.105)	2.30* (0.092)
Mean in control group	43	43	23	23
Observables	No	Yes	No	Yes
Observations	6259	6259	6259	6259
Adjusted R-squared	0.00	0.31	0.02	0.03

Notes: Control group is 2 cents condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Table F3: People of color subsample I (disadvantaged)				
	(1) Sliders	(2) Sliders	(3) Tax rate (%)	(4) Tax rate (%)
1 cent	-	-	-	-
Color 1c, White 2c	-1.08 (0.369)	-1.86* (0.062)	0.11 (0.960)	-0.12 (0.957)
Unlucky 1c	-2.33 (0.101)	-2.42** (0.036)	-1.54 (0.554)	-1.87 (0.472)
Mean in control group	44	44	28	28
Observables	No	Yes	No	Yes
Observations	1854	1854	1854	1854
Adjusted R-squared	0.00	0.33	0.01	0.01

Notes: Control group is 1 cent condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Table F4: People of color subsample II (advantaged)				
	(1) Sliders	(2) Sliders	(3) Tax rate (%)	(4) Tax rate (%)
2 cents	-	-	-	-
Color 2c, White 1c	0.35 (0.776)	0.20 (0.842)	-3.20 (0.146)	-3.64 (0.104)
Lucky 2c	-1.41 (0.343)	-0.14 (0.910)	-1.94 (0.490)	-2.60 (0.359)
Mean in control group	43	43	30	30
Observables	No	Yes	No	Yes
Observations	1854	1854	1854	1854
Adjusted R-squared	0.00	0.33	0.01	0.01

Notes: Control group is 2 cents condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Appendix G: Subsample regressions – gender and ethnicity interactions

Table G1: White men subsample I (disadvantaged)				
	(1) Sliders	(2) Sliders	(3) Tax rate (%)	(4) Tax rate (%)
1 cent	-	-	-	-
Female 2c, Male 1c	2.57** (0.025)	2.20** (0.028)	-0.28 (0.894)	-0.47 (0.824)
Color 2c, White 1c	0.16 (0.858)	-0.21 (0.789)	3.04* (0.093)	2.94 (0.107)
Unlucky 1c	0.95 (0.397)	0.07 (0.946)	4.14* (0.058)	3.64* (0.099)
Mean in control group	46	46	26	26
Observables	No	Yes	No	Yes
Observations	2718	2718	2718	2718
Adjusted R-squared	0.00	0.25	0.02	0.03

Notes: Control group is 1 cent condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Table G2: White men subsample II (advantaged)				
	(1) Sliders	(2) Sliders	(3) Tax rate (%)	(4) Tax rate (%)
2 cents	-	-	-	-
Female 1c, Male 2c	0.73 (0.524)	0.43 (0.670)	4.83** (0.021)	4.81** (0.021)
Color 1c, White 2c	-0.44 (0.656)	-0.67 (0.435)	4.54*** (0.009)	4.75*** (0.006)
Lucky 2c	-0.95 (0.417)	-1.18 (0.237)	2.44 (0.223)	2.40 (0.229)
Mean in control group	47	47	21	21
Observables	No	Yes	No	Yes
Observations	2718	2718	2718	2718
Adjusted R-squared	0.00	0.25	0.02	0.03

Notes: Control group is 2 cents condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Table G3: White women subsample I (disadvantaged)				
	(1) Sliders	(2) Sliders	(3) Tax rate (%)	(4) Tax rate (%)
1 cent	-	-	-	-
Female 1c, Male 2c	-1.13 (0.204)	-1.05 (0.160)	7.72*** (0.000)	7.61*** (0.000)
Color 2c, White 1c	-1.36* (0.080)	-0.92 (0.155)	3.09* (0.065)	2.95* (0.078)
Unlucky 1c	-0.89 (0.315)	-0.07 (0.924)	3.96** (0.043)	3.87** (0.047)
Mean in control group	41	41	27	27
Observables	No	Yes	No	Yes
Observations	3541	3541	3541	3541
Adjusted R-squared	0.00	0.30	0.01	0.02

Notes: Control group is 1 cent condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Table G4: White women subsample II (advantaged)				
	(1) Sliders	(2) Sliders	(3) Tax rate (%)	(4) Tax rate (%)
2 cents	-	-	-	-
Female 2c, Male 1c	1.41* (0.096)	1.50** (0.034)	3.59* (0.055)	3.69** (0.049)
Color 1c, White 2c	-0.64 (0.370)	-0.54 (0.377)	4.46*** (0.006)	4.58*** (0.005)
Lucky 2c	1.86** (0.032)	1.73** (0.016)	1.82 (0.327)	2.15 (0.249)
Mean in control group	40	40	26	26
Observables	No	Yes	No	Yes
Observations	3541	3541	3541	3541
Adjusted R-squared	0.00	0.30	0.01	0.02

Notes: Control group is 2 cents condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Table G5: Men of color subsample I (disadvantaged)				
	(1) Sliders	(2) Sliders	(3) Tax rate (%)	(4) Tax rate (%)
1 cent	-	-	-	-
Female 2c, Male 1c	-1.56 (0.481)	-1.59 (0.406)	-1.51 (0.704)	-1.19 (0.763)
Color 1c, White 2c	-3.10* (0.086)	-3.60** (0.020)	-3.52 (0.263)	-4.34 (0.174)
Unlucky 1c	-3.16 (0.147)	-1.53 (0.400)	-6.14* (0.086)	-6.90* (0.061)
Mean in control group	48	48	30	30
Observables	No	Yes	No	Yes
Observations	919	919	919	919
Adjusted R-squared	0.00	0.31	0.01	0.01

Notes: Control group is 1 cent condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Table G6: Men of color subsample II (advantaged)				
	(1) Sliders	(2) Sliders	(3) Tax rate (%)	(4) Tax rate (%)
2 cents	-	-	-	-
Female 1c, Male 2c	-3.90* (0.079)	-2.27 (0.214)	0.77 (0.842)	1.36 (0.729)
Color 2c, White 1c	-0.36 (0.836)	-0.78 (0.598)	-0.34 (0.910)	-0.52 (0.866)
Lucky 2c	-1.85 (0.422)	-0.12 (0.950)	-5.14 (0.188)	-6.05 (0.132)
Mean in control group	47	47	27	27
Observables	No	Yes	No	Yes
Observations	919	919	919	919
Adjusted R-squared	0.00	0.31	0.01	0.01

Notes: Control group is 2 cents condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Table G7: Women of color subsample I (disadvantaged)				
	(1) Sliders	(2) Sliders	(3) Tax rate (%)	(4) Tax rate (%)
1 cent	-	-	-	-
Female 1c, Male 2c	-1.08 (0.525)	-1.55 (0.325)	8.58** (0.033)	8.14** (0.041)
Color 1c, White 2c	0.52 (0.734)	0.21 (0.872)	3.49 (0.265)	3.21 (0.308)
Unlucky 1c	-1.72 (0.320)	-2.73* (0.058)	2.89 (0.443)	1.21 (0.753)
Mean in control group	40	40	27	27
Observables	No	Yes	No	Yes
Observations	935	935	935	935
Adjusted R-squared	-0.00	0.29	0.01	0.01

Notes: Control group is 1 cent condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Table G8: Women of color subsample II (advantaged)				
	(1) Sliders	(2) Sliders	(3) Tax rate (%)	(4) Tax rate (%)
2 cents	-	-	-	-
Female 2c, Male 1c	-0.89 (0.630)	-0.76 (0.622)	-10.62*** (0.004)	-10.36*** (0.006)
Color 2c, White 1c	1.64 (0.299)	1.25 (0.364)	-6.76** (0.035)	-6.66** (0.045)
Lucky 2c	0.71 (0.699)	0.39 (0.811)	-0.94 (0.810)	-1.43 (0.720)
Mean in control group	40	40	34	34
Observables	No	Yes	No	Yes
Observations	935	935	935	935
Adjusted R-squared	-0.00	0.29	0.01	0.01

Notes: Control group is 2 cents condition. All other notes from Table 5 in the paper apply here. All other treatment dummies are included in the regressions but not displayed.

Appendix H: Fairness perceptions about payment schemes for the slider task

Table H1: Discriminatory payment scheme - main regressions

	(1)	(2)	(3)	(4)
1 cent & 2 cents	-	-	-	-
Female 1c, Male 2c	0.60*** (0.02)	0.60*** (0.02)	0.60*** (0.02)	0.60*** (0.02)
Female 2c, Male 1c	0.40*** (0.02)	0.40*** (0.02)	0.40*** (0.02)	0.40*** (0.02)
Color 1c, White 2c	0.61*** (0.01)	0.61*** (0.01)	0.61*** (0.01)	0.61*** (0.01)
Color 2c, White 1c	0.51*** (0.01)	0.51*** (0.01)	0.52*** (0.01)	0.52*** (0.01)
Lucky/Unlucky	0.06*** (0.01)	0.06*** (0.01)	0.06*** (0.01)	0.06*** (0.01)
Earnings from slider task			0.01 (0.02)	0.01 (0.02)
Mean in control group	0.11	0.11	0.11	0.11
Observables	No	Yes	No	Yes
Observations	8113	8113	8113	8113
Adjusted R-squared	0.29	0.30	0.29	0.30

Notes: Dependent variable is a dummy that indicates 1 if a participant says the payment scheme is discriminatory, or 0 if a participant says the payment scheme is fair or they can't tell. Control group is 1 cent together with 2 cents condition. All corresponding notes for Table 5 in the paper apply here.

Appendix I: Time spent on treatment/payment information pages

Table I1: Comparing the time spent on treatment/payment information pages		
	(1)	(2)
1 cent & 2 cents (19)	-	-
Female 1c, Male 2c (36/43)	0.44*** (0.03)	0.02 (0.02)
Female 2c, Male 1c (36/43)	0.40*** (0.03)	-0.02 (0.02)
Non-white 1c, White 2c (44/53)	0.61*** (0.02)	0.03* (0.02)
Non-white 2c, White 1c (44/53)	0.57*** (0.02)	-0.01 (0.02)
Lucky/Unlucky (73)	0.71*** (0.02)	-0.01 (0.01)
Earnings from slider task		-0.06*** (0.02)
Observables	Yes	Yes
Observations	8113	8113
Adjusted R-squared	0.18	0.07

Notes: Control group is 1 cent together with 2 cents condition. The dependent variable is the natural logarithm of time spent on the treatment/payment information page (in seconds). The observables controlled for in previous regressions in the study apply here. For column 1 – The word count for the payment information provided to participants prior to the slider task is in parentheses. In the first round of the experiment, the word count for gender and ethnicity conditions are 36 and 44, respectively. In the second round when gender and ethnicity are made more salient, the word counts increase to 43 to 53, respectively. For column 2 – the information provided to explain the vote for redistribution to participants is the same across all conditions (518 words). See Supplemental Appendix A.

Appendix J: Main and sub-sample regressions without Asians

**Table J1: The impact of discrimination on productivity and redistributive preferences I
(without Asians)**

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Productivity: # of slider</i>				<i>Demand for redistribution</i>	
	Actual	Actual	Guess	Guess	Tax rate	Tax rate
1 cent & 2 cents	-	-	-	-	-	-
Female 1c, Male 2c	-0.07 (0.60)	-0.10 (0.50)	0.13 (0.78)	0.12 (0.75)	5.62*** (1.22)	5.56*** (1.21)
Female 2c, Male 1c	0.44 (0.60)	0.74 (0.49)	-0.11 (0.74)	0.19 (0.71)	1.09 (1.16)	1.00 (1.15)
Color 1c, White 2c	-1.08** (0.47)	-0.86** (0.39)	-1.24** (0.59)	-1.08* (0.56)	3.66*** (0.95)	3.61*** (0.95)
Color 2c, White 1c	-0.87* (0.47)	-0.64 (0.39)	-1.15* (0.60)	-0.87 (0.57)	1.91** (0.96)	1.84* (0.96)
Lucky/Unlucky	-0.29 (0.47)	-0.05 (0.39)	0.35 (0.60)	0.61 (0.57)	2.05** (0.91)	1.93** (0.91)
Slider task earnings					-10.07*** (1.04)	-10.03*** (1.13)
Mean in control group	43	43	38	38	26	26
Observables	No	Yes	No	Yes	No	Yes
Observations	7484	7484	7484	7484	7484	7484
Adjusted R-squared	0.00	0.31	0.00	0.10	0.01	0.02

Note: All notes for Table 4 apply here as well.

**Table J2: The impact of discrimination on productivity and redistributive preferences II
(without Asians)**

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Productivity: # of sliders</i>				<i>Demand for redistribution</i>	
	Actual	Actual	Guess	Guess	Tax rate	Tax rate
Lucky/Unlucky	-	-	-	-	-	-
Female 1c, Male 2c	0.22 (0.63)	-0.06 (0.53)	-0.22 (0.83)	-0.49 (0.79)	3.57*** (1.28)	3.65*** (1.28)
Female 2c, Male 1c	0.73 (0.63)	0.82 (0.52)	-0.47 (0.79)	-0.41 (0.76)	-0.95 (1.23)	-0.87 (1.22)
Color 1c, White 2c	-0.79 (0.51)	-0.79* (0.42)	-1.60** (0.65)	-1.69*** (0.62)	1.62 (1.04)	1.76* (1.04)
Color 2c, White 1c	-0.58 (0.51)	-0.57 (0.42)	-1.51** (0.66)	-1.46** (0.63)	-0.15 (1.04)	-0.12 (1.05)
Slider task earnings					-10.16*** (1.26)	-10.59*** (1.37)
Mean in control group	43	43	38	38	28	28
Observables	No	Yes	No	Yes	No	Yes
Observations	5428	5428	5428	5428	5428	5428
Adjusted R-squared	0.00	0.31	0.00	0.10	0.01	0.02

Note: All notes for Table 5 apply here as well.

**Table J3: Reactions of men and women to gender discrimination
(without Asians)**

Male sub-sample (N = 3277)			Female sub-sample (N = 4207)		
	<i>Sliders</i>	<i>Tax rate</i>		<i>Sliders</i>	<i>Tax rate</i>
Female 2c, Male 1c vs. 1c	1.80* (0.06)	-0.37 (0.85)	Female 1c, Male 2c vs. 1c	-1.02 (0.14)	8.20*** (0.00)
Female 1c, Male 2c vs. 2c	-0.25 (0.78)	4.06** (0.03)	Female 2c, Male 2c vs. 2c	0.99 (0.13)	0.66 (0.70)
Unlucky vs. 1c	-0.08 (0.93)	1.68 (0.39)	Unlucky vs. 1c	-0.56 (0.40)	3.15* (0.08)
Lucky vs. 2c	-1.35 (0.14)	1.35 (0.47)	Lucky vs. 2c	1.41** (0.04)	1.12 (0.52)

Note: All the notes for the tables in Appendix E and Table 6 apply here.

**Table J4: Reactions of whites and people of color to ethnic discrimination
(without Asians)**

White sub-sample (N = 6259)			Non-white sub-sample (N = 1225)		
	<i>Sliders</i>	<i>Tax rate</i>		<i>Sliders</i>	<i>Tax rate</i>
Color 2c, White 1c vs. 1c	-0.54 (0.28)	2.95** (0.02)	2c vs. c2w1	-0.67 (0.57)	-5.94** (0.03)
Color 1c, White 2c vs. 2c	-0.63 (0.22)	4.51*** (0.00)	1c vs. c1w2	-2.10** (0.08)	1.06 (0.70)
Unlucky vs. 1c	0.11 (0.85)	3.82*** (0.009)	Unlucky vs. 1c	-1.86 (0.17)	-3.60 (0.23)
Lucky vs. 2c	0.44 (0.46)	2.30* (0.09)	Lucky vs. 2c	-0.80 (0.59)	-3.40 (0.34)

Note: All the notes for the tables in Appendix F and Table 7 apply here.

Appendix K: Small monetary stakes

Table K: Small monetary stakes						
	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Productivity: # of sliders</i>				<i>Demand for redistribution</i>	
	Actual	Actual	Guess	Guess	Tax rate	Tax rate
1 cent	-	-	-	-	-	-
2 cents	-0.45	-0.28	-0.68	-0.48	4.09***	3.68**
	(0.44)	(0.57)	(0.35)	(0.49)	(0.01)	(0.03)
Slider task earnings					-15.11***	-14.54***
					(0.00)	(0.00)
Observables	No	Yes	No	Yes	No	Yes
Observations	2215	2215	2215	2215	2215	2215
Adjusted R-squared	-0.00	0.31	-0.00	0.10	0.02	0.02

Note: All notes for Table 4 apply here as well. The regressions are restricted to only the 1 cent and 2 cents conditions.

Appendix L: Main regressions with outliers

Table L1: The impact of discrimination on productivity and redistributive preferences I (with outliers)						
	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Productivity: # of sliders</i>				<i>Demand for redistribution</i>	
	Actual	Actual	Guess	Guess	Tax rate	Tax rate
1 cent & 2 cents	-	-	-	-	-	-
Female 1c, Male 2c	-0.29 (0.62)	-0.20 (0.68)	-0.07 (0.93)	-0.01 (0.99)	6.02*** (0.00)	5.96*** (0.00)
Female 2c, Male 1c	0.34 (0.56)	0.52 (0.28)	-0.02 (0.98)	0.18 (0.79)	1.93 (0.10)	1.83 (0.12)
Color 1c, White 2c	-0.73 (0.11)	-0.71* (0.07)	-1.09* (0.06)	-1.06** (0.05)	4.10*** (0.00)	4.08*** (0.00)
Color 2c, White 1c	-0.48 (0.30)	-0.49 (0.21)	-0.72 (0.21)	-0.63 (0.26)	3.03*** (0.00)	2.93*** (0.00)
Lucky 2c, Unlucky 1c	-0.23 (0.62)	-0.10 (0.81)	0.41 (0.48)	0.59 (0.28)	2.22** (0.02)	2.08** (0.02)
Slider task earnings					-10.69*** (0.00)	-10.70*** (0.00)
Mean in control group	43	43	39	39	27	27
Observables	No	Yes	No	Yes	No	Yes
Observations	8335	8335	8335	8335	8335	8335
Adjusted R-squared	-0.00	0.30	0.00	0.09	0.02	0.02

Note: All notes for Table 4 apply here as well.

**Table L2: The impact of discrimination on productivity and redistributive preferences I
(with outliers)**

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Productivity: # of sliders</i>				<i>Demand for redistribution</i>	
	Actual	Actual	Guess	Guess	Tax rate	Tax rate
Lucky 2c, Unlucky 1c	-	-	-	-	-	-
Female 1c, Male 2c	-0.06 (0.93)	-0.12 (0.82)	-0.48 (0.55)	-0.61 (0.42)	3.80*** (0.00)	3.89*** (0.00)
Female 2c, Male 1c	0.57 (0.35)	0.64 (0.21)	-0.43 (0.58)	-0.40 (0.58)	-0.30 (0.81)	-0.22 (0.86)
Color 1c, White 2c	-0.50 (0.31)	-0.60 (0.15)	-1.50** (0.02)	-1.64*** (0.01)	1.83* (0.08)	2.00* (0.05)
Color 2c, White 1c	-0.25 (0.62)	-0.39 (0.36)	-1.13* (0.08)	-1.20** (0.05)	0.87 (0.41)	0.88 (0.41)
Slider task earnings					-10.18*** (0.00)	-10.62*** (0.00)
Mean in control group	43	43	38	38	29	29
Observables	No	Yes	No	Yes	No	Yes
Observations	6076	6076	6076	6076	6076	6076
Adjusted R-squared	-0.00	0.30	0.00	0.09	0.01	0.02

Note: All notes for Table 4 apply here as well.

**Table M1: The impact of discrimination on productivity and redistributive preferences I
(accounting for multiple hypotheses testing)**

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Productivity: # of sliders</i>				<i>Demand for redistribution</i>	
	Actual	Actual	Guess	Guess	Tax rate	Tax rate
1 cent & 2 cents	-	-	-	-	-	-
Female 1c, Male 2c	-0.25 (0.66)	-0.23 (0.63)	-0.21 (0.78)	-0.18 (0.80)	5.10*** (0.00)	5.01*** (0.00)
Female 2c, Male 1c	0.35 (0.55)	0.59 (0.22)	-0.11 (0.88)	0.15 (0.82)	1.20 (0.28)	1.06 (0.34)
Color 1c, White 2c	-0.81 (0.08)	-0.77 (0.05)	-1.03 (0.07)	-1.00 (0.07)	3.13*** (0.00)	3.08*** (0.00)
Color 2c, White 1c	-0.53 (0.25)	-0.49 (0.20)	-0.95 (0.10)	-0.80 (0.15)	2.08 (0.02)	1.97 (0.03)
Lucky 2c, Unlucky 1c	-0.32 (0.48)	-0.12 (0.76)	0.38 (0.51)	0.61 (0.27)	2.00 (0.02)	1.83 (0.04)
Slider task earnings					-9.55*** (0.00)	-9.41*** (0.00)
Mean in control group	43	43	38	38	28	28
Observables	No	Yes	No	Yes	No	Yes
Observations	8113	8113	8113	8113	8113	8113
Adjusted R-squared	0.00	0.31	0.00	0.10	0.01	0.02

Note: All notes for Table 4 apply here, except that * indicates 10% level of statistical significance evaluated at $p < 0.02$, ** indicates 5% level of statistical significance evaluated at $p < 0.01$, and *** indicates 1% level of statistical significance evaluated at $p < 0.002$.

**Table M2: The impact of discrimination on productivity and redistributive preferences II
(accounting for multiple hypotheses testing)**

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Productivity: # of sliders</i>				<i>Demand for redistribution</i>	
	Actual	Actual	Guess	Guess	Tax rate	Tax rate
Lucky 2c, Unlucky 1c	-	-	-	-	-	-
Female 1c, Male 2c	0.06 (0.92)	-0.13 (0.80)	-0.59 (0.46)	-0.79 (0.30)	3.11** (0.01)	3.20** (0.01)
Female 2c, Male 1c	0.67 (0.27)	0.72 (0.15)	-0.49 (0.53)	-0.45 (0.54)	-0.81 (0.50)	-0.75 (0.53)
Color 1c, White 2c	-0.49 (0.32)	-0.64 (0.12)	-1.42* (0.02)	-1.60** (0.01)	1.10 (0.27)	1.24 (0.21)
Color 2c, White 1c	-0.22 (0.67)	-0.36 (0.38)	-1.34 (0.04)	-1.39* (0.02)	0.12 (0.90)	0.18 (0.86)
Slider task earnings					-9.19*** (0.00)	-9.36*** (0.00)
Mean in control group	43	43	38	38	28	28
Observables	No	Yes	No	Yes	No	Yes
Observations	5898	5898	5898	5898	5898	5898
Adjusted R-squared	-0.00	0.31	0.00	0.10	0.01	0.02

Note: All notes for Table 4 apply here, except that * indicates 10% level of statistical significance evaluated at $p < 0.025$, ** indicates 5% level of statistical significance evaluated at $p < 0.0125$, and *** indicates 1% level of statistical significance evaluated at $p < 0.0025$.

**Table M3: Responses of men and women to gender discrimination
(accounting for multiple hypotheses testing)**

Male subsample (N = 3637)			Female subsample (N = 4476)		
	<i>Sliders</i>	<i>Tax rate</i>		<i>Sliders</i>	<i>Tax rate</i>
Female 2c, Male 1c vs. 1c	1.31 (0.14)	-0.49 (0.79)	Female 1c, Male 2c vs. 1c	-1.11 (0.10)	7.70*** (0.00)
Female 1c, Male 2c vs. 2c	-0.20 (0.82)	3.77 (0.04)	Female 2c, Male 1c vs. 2c	0.99 (0.12)	0.77 (0.65)
Unlucky 1c vs. 1c	-0.48 (0.58)	1.38 (0.46)	Unlucky 1c vs. 1c	-0.70 (0.29)	3.50 (0.04)
Lucky 2c vs. 2c	-0.94 (0.29)	0.67 (0.71)	Lucky 2c vs. 2c	1.40 (0.03)	1.42 (0.40)

Note: All notes for Table 6 apply here, except that * indicates 10% level of statistical significance evaluated at $p < 0.0143$, ** indicates 5% level of statistical significance evaluated at $p < 0.0071$, and *** indicates 1% level of statistical significance evaluated at $p < 0.0014$.

**Table M4: Responses of whites and people of color to ethnic discrimination
(accounting for multiple hypotheses testing)**

White subsample (N = 6259)			People of color subsample (N = 1854)		
	<i>Sliders</i>	<i>Tax rate</i>		<i>Sliders</i>	<i>Tax rate</i>
Color 2c, White 1c vs. 1c	-0.54 (0.28)	2.95 (0.02)	Color 1c, White 2c vs. 1c	-1.86 (0.06)	-0.12 (0.96)
Color 1c, White 2c vs. 2c	-0.63 (0.22)	4.51*** (0.00)	Color 2c, White 1c vs. 2c	0.20 (0.84)	-3.64 (0.10)
Unlucky 1c vs. 1c	0.11 (0.85)	3.82* (0.008)	Unlucky 1c vs. 1c	-2.42 (0.04)	-1.87 (0.47)
Lucky 2c vs. 2c	0.44 (0.46)	2.30 (0.09)	Lucky 2c vs. 2c	-0.14 (0.91)	-2.60 (0.36)

Note: All notes for Table 7 apply here, except that * indicates 10% level of statistical significance evaluated at $p < 0.0143$, ** indicates 5% level of statistical significance evaluated at $p < 0.0071$, and *** indicates 1% level of statistical significance evaluated at $p < 0.0014$.

Supplemental Appendix A: Full questionnaire

Welcome!

This scientific study is conducted by the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland.

About This Study

The study will take you about 10 minutes but you are of course free to stop answering questions at any time.

Confidentiality

The data collected in this study do not include any personally identifiable information about you. Your data will be kept separate from your MTurk ID. By participating, you understand and agree that the research data gathered during this study will be used by ETH Zurich and aggregated results will be published.

Contact Information

If you have any questions concerning this study, please write to descil@ethz.ch.

Participant Requirements

Participation in this study is limited to US residents aged 18 or older.

☐ Yes, I would like to participate in the study, and confirm that I am a US resident and 18 years or older.

☐ No, I would not like to participate in the study.

Payment Instructions (1)

You are part of a **group of 100 MTurkers**. Everybody receives a flat rate of \$1.00 for answering a couple of questions about themselves. Please be reminded that your answers are treated anonymously.

You can earn additional money which is based on your performance in a slider task, which will be explained later. At the end of this study, your group will have the chance to make earnings more equal by **voting on a tax rate** to redistribute some of the money earned in the slider task.

Payment Instructions (2)

You are part of a **group of 100 MTurkers**. Everybody receives a flat rate of \$1.00 for answering a couple of questions about themselves. Please be reminded that your answers are treated anonymously. **You can earn additional money** which is based on your performance in a slider task, which will be explained later.

Demographics

What is your age (in completed years)?

▼ Prefer not to tell ... 70

Were you born in the US?

☐ Yes

☐ No

☐ Prefer not to tell

Which state do you live in today?

▼ Prefer not to tell ... WY

Do you have children?

☐ Yes

☐ No

☐ Prefer not to tell

Please indicate your civil status.

☐ Single and not in a relationship

☐ In a relationship

☐ Married

☐ Widowed

☐ Prefer not to tell

What is your gender?

☐ Male

☐ Female

☐ Other / Prefer not to tell

How would you describe your ethnicity/race?

☐ European American / White

☐ African American / African

☐ Hispanic / Latino

☐ Asian American / Asian

☐ Other / Prefer not to tell

What is your current employment status?

☐ Full-time employee

☐ Part-time employee

☐ Self-employed or small business owner

☐ Unemployed and looking for a job

☐ Student

☐ Not in labor force (for example: retired, or full-time parent)

☐ Prefer not to tell

How many people live in your household, including you (i.e., adults and children)?

▼ Prefer not to tell ... 20

What was your TOTAL household income, before taxes, last year (2017)?

☐ Less than \$10,000

☐ \$10,000 - \$19,999

☐ \$20,000 - \$29,999

☐ \$30,000 - \$39,999

☐ \$40,000 - \$49,999

☐ \$50,000 - \$59,999

☐ \$60,000 - \$69,999

☐ \$70,000 - \$79,999

☐ \$80,000 - \$89,999

☐ \$90,000 - \$99,999

☐ \$100,000 - \$149,999

☐ \$150,000+

☐ Prefer not to tell

What is your highest educational attainment?

☐ Some high school, no degree

☐ High school diploma

☐ Some college, no degree

☐ Bachelor's Degree

☐ Graduate Degree (Master's, Ph.D.)

☐ Other, please specify: _____

☐ Prefer not to tell

What is your total number of "HITs approved"? If you don't know this number you can find it on <https://worker.mturk.com/dashboard>.

Enter 0 if this is your first HIT on MTurk.

Enter 999 if you prefer not to tell.

Your task!

In a so-called "slider task", you are presented with **100 sliders**. You are asked to drag as many sliders as possible to a pre-defined position. You can adjust the sliders by **using your mouse to drag the sliders to the target position**.

You have **3 minutes** for the task.

Once the time is up, the task ends automatically and you will proceed to the next page.

Your performance and earnings will be displayed to you afterwards.

On the next page, you can practice a shorter version of the slider task. It lasts for 20 seconds.

This does NOT affect your final performance and earnings.

Slider Task (Trial)

0 10 20 30 40 50 60 70 80 90 100

Drag the slider to 67



Drag the slider to 17



Drag the slider to 89



Drag the slider to 34



Drag the slider to 67



Comprehension Questions!

You will now be presented with a couple of questions to see if you fully understand the slider task. You can only proceed to the real slider task once you get all the answers right.

If you answer a question wrongly, you can try again.

You are in a group of how many participants?

☐ 100

☐ 150

You are presented with how many sliders in the slider task?

☐ 12

☐ 100

How much time do you have to perform the slider task?

☐ 4 minutes

☐ 3 minutes

☐ 2 minutes

You're all set!

Now you are ready to start with the slider task! **All 100 MTurkers in your group are performing the same slider task with the same level of difficulty.** On the next page you will receive additional information about the money you earn per slider correctly positioned.

Payment information

Information on earnings!

Every participant earns 1 cent for each slider correctly positioned, which means a maximum of $100 \times 1 \text{ cent} = \1.00 .

Information on earnings!

Every participant earns 2 cents for each slider correctly positioned, which means a maximum of $100 \times 2 \text{ cents} = \2.00 .

Information on earnings!

Men earn 2 cents for each slider correctly positioned, which means a maximum of $100 \times 2 \text{ cents} = \2.00 .

Women earn 1 cent for each slider correctly positioned, which means a maximum of $100 \times 1 \text{ cent} = \1.00 .

You indicated that you are a **man [woman]**.

Information on earnings!

Women earn 2 cents for each slider correctly positioned, which means a maximum of 100×2 cents = \$2.00.

Men earn 1 cent for each slider correctly positioned, which means a maximum of 100×1 cent = \$1.00.

You indicated that you are a **man** [woman].

Information on earnings!

European Americans / Whites earn 2 cents for each slider correctly positioned, which means a maximum of 100×2 cents = \$2.00.

All other ethnic or racial groups earn 1 cent for each slider correctly positioned, which means a maximum of 100×1 cents = \$1.00.

You indicated that you are **European American / White** [NOT European American / White].

Information on earnings!

European Americans / Whites earn 1 cent for each slider correctly positioned, which means a maximum of 100×1 cent = \$1.00.

All other ethnic or racial groups earn 2 cents for each slider correctly positioned, which means a maximum of 100×2 cents = \$2.00.

You indicated that you are **European American / White** [NOT European American / White].

Information on earnings!

50 of the 100 participants are randomly allocated to a group (called **Unlucky Group**) that earns **1 cent** per slider correctly positioned, and the other half (remaining 50 participants) are randomly allocated to a group (called **Lucky Group**) that earns **2 cents** per slider correctly positioned.

By chance, you are in the sub-group (called "**Unlucky Group**") that earns 1 cent per slider correctly positioned, which means a maximum of 100×1 cent = \$1.00.

Information on earnings!

50 of the 100 participants are randomly allocated to a group (called **Unlucky Group**) that earns **1 cent** per slider correctly positioned, and the other half (remaining 50 participants) are Randomly allocated to a group (called **Lucky Group**) that earns **2 cents** per slider correctly positioned.

By chance, you are in the sub-group (called "**Lucky Group**") that earns **2 cents** per slider correctly positioned, which means a maximum of $100 \times 2 \text{ cents} = \2.00 .

Slider task

The slider task begins now. You have 3 minutes to drag as many sliders as possible to the right position. When the 3 minutes are over, the survey will automatically advance.

0 10 20 30 40 50 60 70 80 90 100

Drag the slider to 34

34



Drag the slider to 73



Drag the slider to 22



Drag the slider to 65



Drag the slider to 40



Performance guess

Have a guess!

Before displaying your performance and earnings to you, we would like you to have a guess on the following.

How many sliders do you think you positioned correctly (1-100)?

Your performance

▼ 1 ... 100

How many sliders do you think the best performer positioned correctly (1-100)?
Best performance

▼ 1 ... 100

How many sliders do you think the worst performer positioned correctly (1-100)?
Worst performance

▼ 1 ... 100

How many sliders do you think participants on average positioned correctly (1-100)?
Average performance

▼ 1 ... 100

Have a guess!

How much do you think you performed in comparison with other participants?

- ☐ Far below average
- ☐ Below average
- ☐ About average
- ☐ Above average
- ☐ Far above average

Your performance!

You correctly positioned ___ out of 100 sliders.


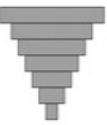


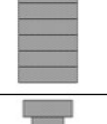
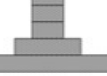
Your earnings!

You've earned the amount of \$___.__cents from the slider task!

Guess about the distribution

Have a guess about the earnings of 100 participants!

The diagrams below show six different types of possible earnings distributions. Which of the earnings distributions, do you think, comes closest to the earnings distribution that is a result of 100 Mturkers taking part in the slider task?

	Type A: Most participants have relatively low earnings, and only a few have high earnings.
	Type B: Most participants have relatively high earnings, and only a few have low earnings.
	Type C: About half of the participants have relatively high earnings, and about half of the participants have relatively low earnings.
	Type D: Most participants are in the middle.
	Type E: There is about an equal share of participant in each earning group.
	Type F: A small elite at the top have high earnings and the mass of participants have very low earnings.

- ☐ Type A
- ☐ Type B
- ☐ Type C
- ☐ Type D
- ☐ Type E
- ☐ Type F
- ☐ I don't understand the diagrams.
- ☐ It's difficult for me to guess.

Redistribution plan!

Now, we will provide an opportunity for you and the other participants to vote on an income redistribution plan for the group.

Under the redistribution plan, some percentage of every participant's earnings from the slider task will be collected as tax and put into a group account. At the end of the study, every participant will receive an equal share of the group account. Final earnings are therefore one's flat rate of \$1.00 that goes to everyone for answering questions, plus one's earnings from the slider task, minus tax payment, plus one's equal share of the group account. Hence your final earnings will be: $\$1.00 + \$ _ - (\text{Tax rate} * \$ _) + (\text{Total Tax Revenues}/100)$

Final earnings - example!

Let's do an example of the redistribution process. Suppose that in a group of 100:

- your earnings were 100 cents (\$1.00) from the slider task,
- 49 participants had earnings of 100 cents (\$1.00) from the slider task just like you,
- the other 50 participants had earnings of 50 cents (\$0.50) from the slider task, and
- the tax rate voted on was 80%.

Your earnings before redistribution would be $1 + 1 = \$2.00$.

Your **final earnings** would be: $1 + 1 - 0.8 * 1 + (0.8 * 1 * 50 + 0.8 * 0.5 * 50) / 100 = \1.80 . Thus, you gave support of **20 cents** to participants who earned less (50 cents) in the slider task.

Suppose you were one of the participants earning 50 cents from the slider task.

Your earnings before redistribution would be $1 + 0.5 = \$1.50$.

Your **final earnings** would be: $1 + 0.5 - 0.8 * 0.5 + (0.8 * 1 * 50 + 0.4 * 0.8 * 50) / 100 = \1.70 .

Thus, you received support of **20 cents** from those who earned more (100 cents) in the slider task.

A higher (lower) tax rate would imply greater (less) support to participants with relatively low earnings.

Now, determine a tax rate!

The tax rate placed on the entire group will be chosen by **voting**. Every person will vote on the tax rate they want to apply to the group. The median vote (that is, the vote with an equal number of votes higher and lower) will be chosen as the effective tax rate.

Imagine a group of 10 participants voted for the following tax rates: {50, 50, 50, 65, 75, 80, 80, 80, 85, 90}. The median tax rate would be: $(75 + 80)/2 = 77.5\%$. The median tax rate falls exactly between 75 and 80, or is the cutoff that divides the group into two equal halves. For another group with the following votes {6, 25, 50, 60, 85, 85, 85, 86, 90, 90}, the median tax rate would be $(85 + 85)/2 = 85\%$.

Now, imagine that your tax rate would be selected as the effective median tax rate. How much

tax would you allow on your earnings from the slider task? Remember that a higher (lower) tax rate would imply greater (less) support to participants with relatively low earnings.

Preferred tax rate (0 - 100%)

▼ 0 ... 100

Inequality beliefs

Before you end the study, could you tell us your opinion on the following?

Which has more to do with why a person is poor in the US?

- ☐ Lack of effort on his or her part.
- ☐ Lack of any particular talent.
- ☐ Circumstances beyond his or her control.

Which has more to do with why a person is rich in the US?

- ☐ He or she worked harder than others.
- ☐ He or she has more talents.
- ☐ Circumstances beyond his or her control.

Political orientation

On economic policy matters, where do you see yourself on the liberal/conservative spectrum?

- ☐ Very liberal
- ☐ Liberal
- ☐ Moderate
- ☐ Conservative
- ☐ Very conservative

How much of the time do you think can you trust the government to do what is right?

- ☐ All the time
- ☐ Most of the time
- ☐ Only some of the time
- ☐ Rarely
- ☐ Never

Your feedback!

Do you think the payment scheme for the slider task was fair or discriminatory?

- ☐ Fair
- ☐ Discriminatory
- ☐ Can't tell

For your information!

In the US, earnings differ by gender. Currently, the median earnings of females is about \$41,554 and the median earnings of men is about \$51,640. This means the females-to-male earnings ratio is about 0.8. A typical woman earns only about 80% of the earnings of a typical man in the US.

Source: U.S. Census Bureau, Current Population Survey, 1961 to 2017 Annual Social and Economic Supplements

For your information!

In the US, household incomes differ by ethnicity or race. Currently, the median household income of whites is about \$65,041 and, for all other ethnic groups, it is about \$59,039. This accounts for a non-white-to-white household income ratio of about 0.91. In general, non-whites have only about 91% of the household income of whites.

Source: U.S. Census Bureau, Current Population Survey, 1968 to 2017 Annual Social and Economic Supplements

What device are you using to take the survey?

- ☐ Tablet
- ☐ Smartphone
- ☐ Computer
- ☐ Other (please specify) _____

Any remarks?

Please write down any remarks you might have about this study. What could we improve?
Many thanks for your feedback!

Your earnings before redistribution!

You've earned the amount of \$ _____. Depending on the outcome of the group's vote for redistribution, your final earnings will be determined and paid into your account within the shortest possible time.