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Born That Way: Beliefs about Genetics' Importance and Redistribution Preferences

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Abstract

Meritocratic fairness justifies inequality when it stems from performance. Yet performance is influenced by one's genetics. I investigate whether individuals' redistribution preferences are affected by their beliefs about genetics' role in generating performance inequality. In an incentivized online experiment, impartial spectators can redistribute the earnings that two workers earned based on their performance in a mathematical task. Across two treatments, I modify beliefs about the importance of genetics in performing in the task by means of an information provision treatment. I find that spectators for whom genetics is framed to play a larger role compensate the worse performer more, compared to those for whom genetics is framed to play a smaller role. When comparing the spectators' decisions before and after the provision of information, I find that about 23% of spectators compensate the worse performer more whereas the majority does not change their allocation. This study highlights that individuals' redistribution preferences are affected by their beliefs about genetics' role in generating performance inequality.

JEL Classification: C90 C91 D63 D90 H23
Keywords: Meritocracy, Genetics, Beliefs, Fairness, Inequality

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1 Introduction

Social policies, like government subsidies and taxes, rely on individuals' support for redistribution (Lynch & Gollust, 2010). Several models stress the significance of fairness considerations in shaping people's redistribution preferences (Alesina & Angeletos, 2005; Benabou & Tirole, 2006). According to both lab and field studies, most individuals hold meritocratic fairness ideals (Cappelen, Konow, Sørensen, & Tungodden, 2013; Durante, Putterman, & Van der Weele, 2014). In the context of income distribution, meritocratic fairness implies that income disparities are acceptable if they are due to differences in performance or effort. At the same time, inequality arising from circumstances outside an individual's control, such as luck, is considered unfair (Almås, Cappelen, & Tungodden, 2020).

The distinction between performance and luck, however, is not always straightforward. This is the case as one's performance is also affected by unequal opportunities that make the starting playing field unequal. For example, many individuals do not have access to a good education or are raised in an environment that does not provide them with incentives to exert effort. Because of this, studies have started investigating how sensitive attributions of merit are to differences in opportunities, mostly focusing on scenarios that mimic inequalities in socio-economic circumstances (Andre, 2021; Bhattacharya & Mollerstrom, 2022; Dong, Huang, & Lien, 2022; Preuss, Reyes, Somerville, & Wu, 2022).

At the same time, socio-economic circumstances are not the only sources of inequality of opportunities. It can be argued that two lotteries take place during conception: a social lottery, which determines the wealth and environment of one's family, and a genetic lottery, that determines which genetics are inherited from one's parents (Burik, Kweon, & Koellinger, 2021). Particularly nowadays, the role of genetics is becoming more salient, due to advances in social genomics (Harden & Koellinger, 2020; Freese, 2018). Several studies have shown that traits or outcomes such as cognitive ability, educational attainment and income are all influenced, in different magnitudes, by genetics (Allegrini et al., 2019; Savage et al., 2018; Kweon et al., 2020; Papageorge & Thom, 2020). Whereas this has been the focus of attention in the philosophical and social science literature about inequality of opportunity (see Pereira, 2021, for a summary), the economics literature about fairness and redistribution preferences has not yet looked at genetics as a source of unequal opportunities. Given the accumulating evidence about the role of genetics as a source of inequality, it is crucial to understand how this information influences people's views on fairness.

In this study, I aim to fill this gap in the literature, by investigating individuals' redistribution preferences in settings in which genetics plays a role in determining outcome differentials. Specifically, I experimentally assess how beliefs about the importance of genetics in generating inequality affect individuals' redistribution decisions in the spectator game (Cappelen et al., 2013). In this game, two workers perform a certain task (in my case a task that requires mathematical ability) and an impartial spectator has the opportunity to redistribute their earnings. In my experiment, I modify the beliefs spectators hold about the importance of genetics in completing the task by means of an information provision treatment (Haaland, Roth, & Wohlfart, 2023). I do so in two ways. First, in a within-subjects design, I compare the redistribution decision of the spectators before and after receiving information about the heritability of mathematical ability (i.e., the proportion of variation within a population that can be attributed to genetic differences among individuals). I expect that, when informed and reminded about the heritability of mathematical ability, spectators compensate the worse performer more. Second, in a between-subjects design, I provide *different* estimates about the extent to which mathematical ability is heritable, exploiting the uncertainty about heritability estimates present in the literature. The approach of exploiting variations in the estimates to design information provision is similar to recent work in the literature, such as Settele (2022) and (Bottan & Perez-Truglia, 2022). In my design, I assign spectators to either a HighGen treatment, in which genetics is framed to play a major role in influencing the performance in the task, or a LowGen treatment, in which genetics is framed to play a minor role in influencing the performance in the task. I expected that when genetics is framed to play a larger role, spectators ascribe less control to the workers, and compensate the worse performer more than when genetics is framed to play a smaller role.

I document the following novel results. First, in the within-subjects design, I find that the redistribution decisions are affected by the information I provide. About 23% of the spectators compensates the worse performer more after receiving the information about genetics. Yet, the majority of spectators does not actually change their initial redistribution following the provision of information. This behavior can have different explanations. First, it might relate to the fact that the initial decision already reflects individuals' fundamental fairness ideals. This can be the case for egalitarians (who always redistribute) and performance meritocrats (who reward performance no matter its causes). Second, no change can be explained by the fact that some individuals downplay the importance of genetics in affecting worker's performance and, consequently, do not change their redistribution decision. Third, no update in behavior can be due to the fact that some spectators consider the information about genetics that I provide as insufficient, since they do not know how genetics impacted the two specific individuals in the task.

I also document differences between treatments in the between-subjects design. As hypothesized, redistribution preferences are sensitive to the different heritability estimates, with individuals compensating the worse performer more when genetics is framed to play a larger role. The results suggest that this could be driven by a treatment effect on beliefs. Spectators in HighGen report to believe that workers' performance was influenced more by genetics and less by effort compared to spectators in LowGen. Similarly, they think that workers had less control and responsibility over their performance, resulting in a lower perceived fairness of the difference in performance itself.

In light of these results, this paper contributes to various research strands. Firstly, it adds to the broad research on fairness and meritocracy, which explored redistribution preferences both through survey experiments (Alesina, Stantcheva, & Teso, 2018) and real incentive games, such as the spectator game I employ (Cappelen, Sørensen, & Tungodden, 2010; Cappelen et al., 2013; Akbaş, Ariely, & Yuksel, 2019). Within this field, my paper relates more closely to a new literature using variations of the spectator game to investigate how inequality of opportunities affect meritocratic judgements, by designing settings in which luck and performance are intertwined

(Andre, 2021; Bhattacharya & Mollerstrom, 2022; Dong et al., 2022; Preuss et al., 2022). This study is closely related to a paper by Drucker (2022), which is, to my knowledge, the only study that aimed to determine whether the presence of internal factors such as ability affect meritocratic judgements. In her paper, Drucker (2022) acknowledges possible shortcomings of her measurement of ability (which might be perceived as the resultant of past effort rather than innate talent) and concludes that future research should investigate situations in which innate talent matters to a higher extent. My paper is the first to estimate whether inequality deriving from ability is considered to be fair or unfair when clearly labelled as stemming from genetics. On this note, my paper complements other studies that looked at whether specific abilities are considered fair (Durante et al., 2014), by underlying the innate or genetic component of ability.

Next, this study also relates to the literature about individuals' beliefs about genetics and heritability. My contributions in this area are twofold. First, I complement research about the beliefs individuals hold about the heritability of different traits (Shostak, Freese, Link, & Phelan, 2009; Gericke et al., 2017; Willoughby et al., 2019) and examine how these beliefs can be changed (Peetz, Wohl, Wilson, & Dawson, 2021). In this regard, I show that information provision can significantly modify the heritability beliefs of more than one trait. Second, my paper relates to the literature that studies the relationship between beliefs about genetics and behaviors/attitudes. These studies can be divided in three groups, depending on which genetic beliefs they address. Some analyze beliefs about one's own genetic endowment (Dar-Nimrod & Lisandrelli, 2012; Matthews, Lebowitz, Ottman, & Appelbaum, 2021), some about the genetic endowment of others' (Matthews et al., 2021; Lebowitz, Tabb, & Appelbaum, 2019), some about the heritability of a certain trait (Peetz et al., 2021; Phelan, Cruz-Rojas, & Reiff, 2002; Dar-Nimrod, Cheung, Ruby, & Heine, 2014). Within the latter group, my paper is the first to exogenize beliefs by providing different heritability estimates instead of qualitative information. Whereas learning about one's own genetic endowment has been linked to detrimental effects on one's behavior (for example in preventive care, due to a reduction in perceived free will and control), biogenetic explanations are instead found to enhance empathy towards others. As a consequence, awareness of the role played by genetics tends to lessen the tendency to assign blame and increases the support for civil rights, when it comes to medical outcomes or sexual preferences (Garretson & Suhay, 2016; Harden, 2021; Kvaale, Haslam, & Gottdiener, 2013; Chandrashekar, 2020). I complement this literature by showing that this may hold also in the case of ability.

Finally, my study contributes to the general debate about meritocracy, fairness and genetics present in the social sciences. So far, the discourse has focused on the validity of meritocracy in light of inequality of opportunity, especially focusing on socio-economic inequalities (Trautmann, 2022; Sandel, 2020). The debate has also focused on inequality derived by genetics, but an agreement on whether genetics-based differences are a fair or unfair source of advantage is far from being reached (Harden, 2022; Trannoy, 2019; Lee & Seshadri, 2018; Hufe & Peichl, 2020). This poses the question of whether inequalities due to genetic differences are consistent with equality of opportunity (Pereira, 2021). My contribution to the debate relies not in finding an answer to this question, but rather in understanding the narratives that a sample of the (US) population holds about genetics in the context of inequality of opportunity.

The paper is structured as follows. Section 2 presents the experimental design and procedure. Section 3 presents the results of my study, analyzing treatment differences in beliefs and behaviors. Section 4 discusses the main findings, relates them to the literature and Section 5 concludes.

2 Experimental Design

2.1 Overview

To investigate redistribution preferences, I employ the spectator-worker design commonly used in the literature (Cappelen et al., 2013; Cappelen, Falch, & Tungodden, 2020). This design takes place in two phases. In the first phase, two subjects, called "workers" perform a certain task and are assigned initial rewards based on their performance. In the second phase, a third subject, called "spectator", is informed about the workers' task and initial reward allocation, then given an opportunity to reallocate the earnings between the two workers. The primary variable of interest is the spectator's redistribution decision, which serves to measure redistribution preferences.

To differentiate between luck and merit, previous studies have usually employed different treatment conditions, changing the allocation rule according to which the workers are initially rewarded. In merit treatments, the initial reward depends on the performance of the workers, while in luck treatments rewards are allocated randomly (Cappelen et al., 2013). To introduce the element of inequality of opportunities, previous literature created differences between workers by altering the playing field before the start of the task. This was achieved by providing some workers with additional material to study (Dong et al., 2022), by changing the incentives in the task itself (Andre, 2021; Preuss et al., 2022) and by unequally assigning the possibility of working (Bhattacharya & Mollerstrom, 2022).

In the context of genetics, however, applying a similar modification is not possible, as a genetic advantage cannot be easily provided to a worker. For this reason, to introduce the element of genetics, I modify the beliefs spectators hold about the importance of genetics in completing the task. This is is done in two ways. First, in a within-subjects design, I have spectators complete the task twice, once without any information about genetics, and once after providing them with heritability estimates for the ability required in the task. Second, in a between-subjects design, I provide *different* heritability estimates to two groups. Specifically, I divide spectators between a HighGen treatment, in which genetics is framed to play a major role in influencing the outcome of the task, and a LowGen treatment, in which genetics is framed to play a minor role in influencing the outcome of the task.

Since this study focuses on genetics related to cognitive ability, the task that the workers are required to perform needs to (1) measure an ability to some degree (2) for which studies document genetic heritability (3) about which individuals' beliefs can be modified. For this purpose, I chose to use a task that measures mathematical ability, for which heritability has been documented (Docherty, Kovas, Petrill, & Plomin, 2010). Moreover, individuals from the US believe that innate ability influences mathematical achievement to a certain extent (Uttal, 1997), which might make them more susceptible to a change in belief. In the next sections, I first describe in detail the workers' questionnaire and then the spectators' questionnaire.

2.2 Workers' Questionnaire

The task workers completed to measure mathematical ability comprises a set of 10 questions from the Armed Services Vocational Aptitude Battery (ASVAB). This test is used to assess an individual's aptitude for various military occupations; I selected questions from the sections about Arithmetic Reasoning and Mathematics Knowledge for the purpose of this study. As done in previous online studies (Exley & Kessler, 2022), workers are presented each question on a separate page and are given up to 30 seconds to answer each question, so to limit the possibility of them seeking external help. From this task, the only information I obtain is the workers' performance, on a scale from 0 to 10. Workers are randomly matched in pairs ex-post, following the ad hoc constraint that only workers with different performance scores are eligible to be matched. The questionnaire is available in Appendix B.

2.3 Spectators' Questionnaire

An overview of the questionnaire for spectators can be found in Figure 1, each element of which is discussed in detail below. The questionnaire is available in Appendix B.

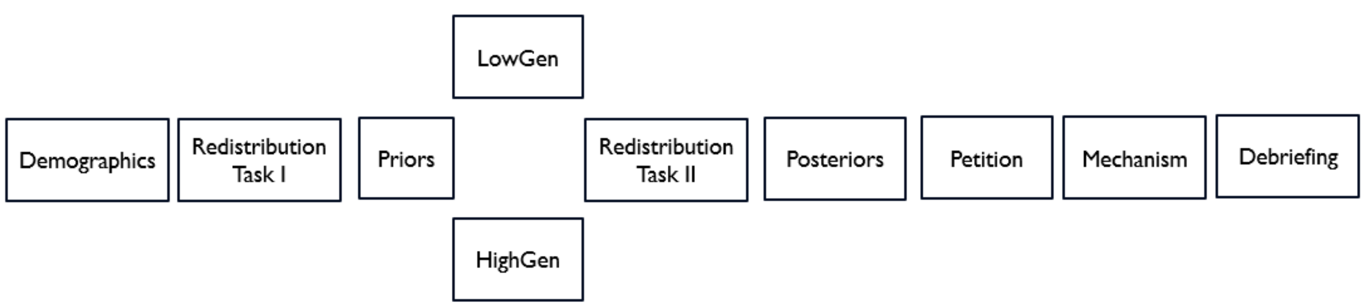

Figure 1: Experimental Flow

Part 1: Demographics After asking the consent to participate in the study, I collect spectators' demographic information, namely gender, age, income, education, political orientation and religion. The demographics are collected at the beginning of the survey to assess whether there is selective drop out from the survey.

Part 2: Redistribution Task I Spectators are informed about the fact that two persons, person A and person B, were recruited to perform a certain task on Prolific and that they received a fixed payment of 1.25USD. I inform them that the task turned out to require mathematical ability. Moreover, spectators are explained their role in determining the payoffs for the two workers and the fact that their decision might affect the payoffs of real people (it is indicated that for one worker out of three, one of their decisions will be implemented). Spectators fill in comprehension questions and then they are informed that person A performed better and was assigned a bonus of 6USD, while person B would receive no bonus. I ask them to redistribute the bonus or leave it as it is. This allows me to measure spectators' redistribution decision in a pure setting, where genetics is not hinted at. In this way, I have a benchmark to compare the redistribution decisions after the genetic information is provided. After redistribution task I, I ask spectators whether they took genetics into account when deciding how to redistribute. I also ask them to estimate how many of the other spectators did so (out of 100); this question is incentivized, as spectators obtained 0.25USD if they guessed correctly (exact estimate ± 5).

Part 3: Prior Beliefs Spectators are told that genetics can influence many outcomes in people's lives, including mathematical ability. They are asked to estimate which percentage of the difference in mathematical ability between people is due to genetics. In other words, they are asked their priors about heritability for this trait. Afterwards, they are also asked to guess what other spectators estimated on average for this question. This question is also incentivized, spectators obtained 0.25USD if they guessed correctly (exact estimate $\pm 5\%$).

Part 4: Information Treatment Spectators were randomly allocated to one of the two informational treatments: HighGen and LowGen. What crucially differed between these is the information about the heritability of mathematical ability. In HighGen, spectators were told that "As reported by a 2010 study by researchers at the King's College in London, as much as 90% of the difference in people's mathematical ability is due to genetics. In other words, genetics can explain as much as 90% of the differences in mathematical abilities between people". In LowGen, the statement was changed to "As reported by a 2010 study by researchers at the King's College in London, as little as 20% of the difference in people's mathematical ability is due to genetics. In other words, genetics can explain as little as 20% of the differences in mathematical abilities between people". The choice of wording is informed by a study by Madrid-Valero et al. (2021), who found that people might have incorrect beliefs about the meaning of the word "heritability". Moreover, both statements provided to the groups are factually correct, as the estimates are adapted by the paper of Docherty et al. (2010), which reports heritability scores for mathematical ability in the range of 0.2-0.9 from several twin studies. The approach of exploiting variations in the estimates to design information provision is similar to recent work in the literature, such as Settele (2022) and allows to create an active control group, without deceiving subjects (Stantcheva, 2022).

By providing different heritability estimates, I aim to change the beliefs spectators hold about the importance of genetics in successfully completing the task. Specifically, spectators in HighGen are expected to believe that genetics is really important in completing the mathematical assignment. On the other hand, spectators in LowGen are expected to believe that genetics is less important. It is necessary to specify that my treatment might change also the beliefs spectators hold about the importance of effort in completing the task. If they see genetics and effort as complementary, spectators in HighGen might think that effort played a smaller role for the mathematical assignment than spectators in LowGen. As such, it is possible to say that my treatments change the genetics-to-effort ratio spectators believe the task requires. In this light, my treatments place spectators in a setting with a high ratio (HighGen) or a low ratio (LowGen)[1].

Part 5: Redistribution Task II Spectators are asked to fill in two comprehension questions, one of which is about the heritability estimate they have seen (this question serves also as a reminder about the information provided). Afterwards, they complete the same redistribution decision as in Redistribution Task I for two different persons, person C and person D. Then, they are asked to explain their choice in an open text format, to indicate whether they took genetics into account when making their decision and to discuss why they did or did not do so (again in an open text format).

Part 6: Posterior Beliefs I elicited spectators' posterior beliefs about the performance of persons C and D in redistribution task II to assess whether the treatment manipulation had shifted the spectators' beliefs. I asked spectators how impactful genetics and effort were on the performance of person C and D on a 0-10 scale (0 meaning "not at all" and 10 meaning "completely"). By comparing how the posterior beliefs vary across treatments, I can assess how the spectators updated their beliefs based on the information they have received. To avoid anchoring effects, I quantified posterior beliefs using a distinct measurement scale from that employed for prior beliefs, as recommended by Haaland et al. (2023). I also asked spectators to indicate how much control the persons had over their performance, how responsible they were for their performance, and how fair it was that person C performed better. All these questions could be answered on a 0-10 scale (see Appendix B for the exact wording) and were used to measure if a change in beliefs about genetics also translated in a change in beliefs about responsibility and fairness. Finally, I asked spectators whether they took the environment workers grew up in into account when making the decision. This is done to check whether the treatment affects other beliefs apart from the genetics/effort ratio I intended to manipulate. Specifically, providing information about "nature" (genetics) might affect beliefs about the

[1]A thorough discussion about which beliefs I am changing with my treatment is present in Section 4.

importance of "nurture" (the environment), as spectators might see nature and nurture as complementary. For example, if spectators in LowGen believe that the small role played by genetics implies a substantial role played by the environment, they might redistribute more, contrary to my expectation.

Part 7: Petition As an additional outcome measure, I asked spectators to consider a statement about the fact that meritocracy might not be entirely fair and that policies to give everyone a chance, no matter their genetics, should be favored. Spectators are asked to state whether they agree with the statement and are informed that if a majority of them agrees, a petition will be started on change.org to push for such policies. A treatment effect can be expected if my treatment affected beliefs about the heritability of genetics in a broad sense, and not just for mathematical ability. To check for this, I asked spectators for their beliefs about the importance of genetics in influencing four other characteristics, namely personality, mental health, IQ and body mass index (BMI).

Part 8: Mechanism I also asked a battery of questions to explore the underlying mechanism behind the redistribution decision. More specifically, my aim was to identify why, despite spectators being told that genetics played a role, they could still consider the inequality fair and thus not redistribute. I considered three possible arguments, which reflect considerations expressed in the literature (Lippert-Rasmussen, 2004; Swift & Marshall, 1997). Each argument was summarized in a statement, to which spectators could agree on a 0-10 scale (0 meaning they completely disagreed and 10 that they completely agreed). The statements are the following:

- Compensation: Inequality coming from genetics is fair because everyone has some genetics that can make them successful.
- Nature: Inequality coming from genetics is fair because it is given by nature.
- Efficiency: Inequality coming from genetics is fair because it contributes to the efficiency of society.

Another possible channel that could explain a lack of redistribution is represented by self-serving bias. It could be the case that spectators, although having nothing at stake in this experiment, might still prefer to make a decision that would have favored them in case they had been the workers of the task. As such, people that consider themselves to have a high ability in mathematics might be less likely to redistribute, because they would not want to promote the idea that their personal success could be taken away from them. To test for this, I ask spectators to self report their mathematical ability from extremely below average to extremely above average. In the same block of questions, I include an attention check and a question to measure trust in the information provided in this study, as suggested by Haaland et al. (2023).

Part 9: Debriefing At the end of the survey, spectators were informed that research about the relationship between genetics and ability found estimates that range from 20% to 90%, depending on the study. They are provided the link to the study by Docherty et al. (2010). Additionally, they are informed that genetics do not necessarily determine one's fate and abilities can be influenced by environment and practice.

2.4 Experimental procedure

The data collection took place on January 15th and 16th 2024. A total of 850 individuals were recruited via Prolific, with 340 workers (creating 170 worker pairs) and 510 spectators (255 for each treatment). Workers received 1.25USD as a flat payment, plus the share allocated to them by the spectators in the redistribution task, which averaged to a payment of 3USD per worker. On average, they completed 5.47 problems out of 10 correctly.

Spectators received a flat payment of 2.5USD, with the possibility of obtaining a bonus of up to 0.5USD depending on their answers to the incentivized questions described above. 35 spectators were removed from the sample due to failing the attention check. Most of the spectators spent 8 to 29 minutes to complete the experiment (10th and 90th percentiles), with an average of approximately 13 minutes.

The demographics for the spectators are available in Table A1, where it is also shown that the sample was balanced based on demographics and all other pre-randomization characteristics between the two treatments.

3 Results

3.1 Redistribution I and Prior Beliefs

Before the information treatment, the most frequent action among spectators was to not redistribute any bonus (36%). The next most common decisions were to redistribute 33.3% (2USD) of the bonus (29% of spectators) and 16.7% (1USD) of the bonus (22% of spectators). An equal redistribution (3USD each) was implemented by 11% of the spectators, as shown in Figure A1. The average share being redistributed was about 19.6%, equal to 1.17USD. These figures are very similar to the ones found by Dong et al. (2022) in their merit treatment, in a setting with identical payoffs structure (i.e. 6USD to the better performer, 0 to the worse performer).

When spectators are asked if took genetics into account, 8% of them declared to have done so while they estimated that on average about 18% of other spectators did so. Moreover, having taken genetics into account is associated with a higher redistribution. As for prior beliefs about heritability, there was a high heterogeneity in answers. The average belief was that heritability for mathematical ability is 31%, with the majority of estimates around 6% to 75% (10th and 90th percentiles). Moreover, spectators believed that other spectators tend to overestimate the importance of genetics, as reflected by the fact that the average guess about others' estimates of heritability was about 41%. The difference between spectators' own heritability estimates and their beliefs about others' estimates was statistically significant, indicating a distinct perception bias ($p\text{-value} < 0.01$, T-test).

3.2 Between-Subjects Design: LowGen vs HighGen

3.2.1 Posterior Beliefs

My treatment manipulation was successful at changing beliefs about the importance of genetics in affecting the performance of the workers. Posterior beliefs of spectators differed significantly between treatments (all differences described below had p-values < 0.01, Wilcoxon Rank-sum tests). First, spectators in HighGen reported that genetics impacted the performance of workers in the task with an average score of 6.2 (out of 10), whereas spectators in LowGen reported an average score of 2.8. This is shown also in Figure 2. Beliefs about control and responsibility were different between the two groups as well, with spectators in HighGen ascribing less control and responsibility to the workers (6.1 vs 7.1 and 7.1 vs 8 respectively). Spectators in HighGen also believed that effort was less important in influencing the task (6.8 vs 7.8), providing evidence that the treatment changed the genetics/effort ratio. Finally, when asked about how fair it was that a person performed better, spectators in HighGen believed there was less fairness (6.7 vs 7.6). Not surprisingly, beliefs about genetics are negatively correlated with all other beliefs, which are instead positively correlated among each other (see Table A3 in Appendix A). Linear regression analyses do not show any evidence that the treatment effect on such posterior beliefs depends on the prior beliefs the spectators had about the heritability of mathematical ability (see Table A5).

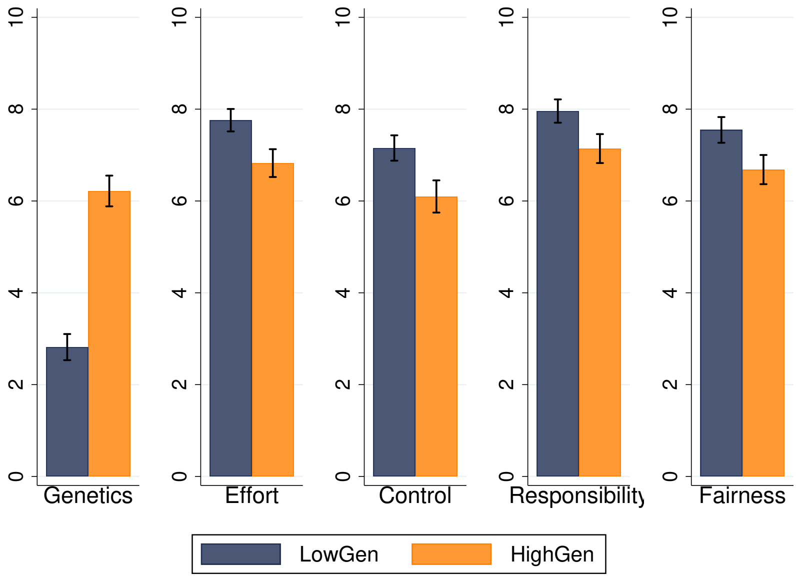

Figure 2: Posterior Beliefs

I also investigate if the treatment had an effect on beliefs about the role played by the environment the two persons grew up in. I find that about 23% of the spectators report having thought about the environment, but this does not significantly differ between HighGen and LowGen (Table A7).

3.2.2 Redistribution Decision II

The beliefs described above align with the second redistribution decision of the spectators. For HighGen spectators, the average share redistributed was 25.7%, and significantly different from the share of 21.8% of LowGen spectators (this difference is equivalent to about 0.24USD, Wilcoxon Rank-sum test p-value < 0.01). The number of spectators that did not redistribute is lower in HighGen (LowGen: 26.1% vs HighGen. 30.3%, see Figure 3) as well as the number of spectators that only redistribute 16.7% of the bonus (LowGen: 15.0% vs HighGen: 24.5%), as shown in Figure 3. On the other hand, HighGen presents a higher number of spectators that equally distributed (LowGen: 21.8% vs HighGen: 14.1%) or shared 33.3% of the bonus (LowGen: 35.9% vs HighGen: 27.0%).

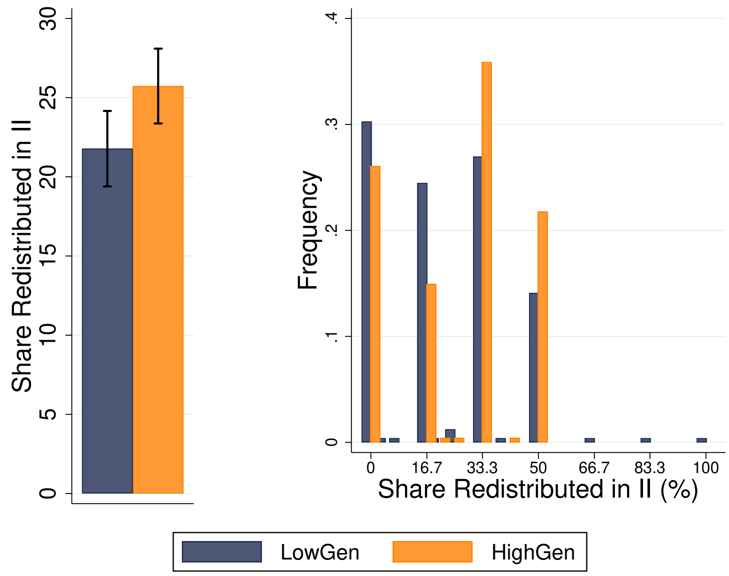

Figure 3: Share Redistributed in II

The treatments difference persists when controlling for demographics, priors and self reported mathematical ability, as shown in the linear regression analyses in Table 1. However, the treatment manipulation does not interact with any of these variables (see Table A2 in Appendix A). Independents, Republicans and spectators with high income tend to redistribute less to the worse performer; this is in line with the findings of previous literature (Dong et al., 2022). Moreover, spectators with education higher than bachelor's level seem to compensate the worse performer more.

The share redistributed is also significantly and positively associated with the posterior beliefs about genetics, while it is negatively associated with all other posterior beliefs (control, responsibility, effort, fairness, see Table A3). Additionally, I find that having thought about the environment does not correlate with the share redistributed differently by treatment (Table A6). This provides further evidence that my treatments did not change beliefs about the environment differently in HighGen and LowGen. Finally, the share redistributed significantly correlates with the score spectators assigned to two out of the three statements, compensation and nature, I included to study the mechanism (as shown in Table A4). Spectators that agree more with the arguments presented in these two statements (and therefore justify inequality deriving from genetics because of nature or compensation) tend to transfer a lower share to the worse performer. Specifically, an increase in agreement of 1 point on a 10-point scale with the compensation (nature) statement was associated with a decrease in redistribution of 1.12 (1.25) percentage points. On the other hand, I found no significant correlation for the third statement, which justified inequality based on efficiency motives.

	Share Redistributed in II			
HighGen	3.956**	3.611**	3.616**	3.777**
	(1.704)	(1.673)	(1.675)	(1.652)
Income: Middle		-1.475	-1.470	-1.264
		(2.136)	(2.145)	(2.089)
Income: High		-7.190***	-7.206***	-7.358***
		(2.570)	(2.568)	(2.576)
Education: Bachelor's		1.782	1.775	1.297
		(1.978)	(1.991)	(1.969)
Education: Higher than Bachelor's		7.480***	7.463***	6.070**
		(2.682)	(2.712)	(2.676)
Religious		-2.040	-2.049	-3.255
		(2.086)	(2.105)	(2.042)
Female		0.545	0.567	0.720
		(1.747)	(1.793)	(1.735)
Politics: Independent		-5.089**	-5.085**	-4.995**
		(2.006)	(2.009)	(2.005)
Politics: Republican		-7.078***	-7.078***	-6.486***
		(2.397)	(2.399)	(2.367)
Age		0.0807	0.0809	0.0614
		(0.0601)	(0.0601)	(0.0600)
High Math Ability			0.0916	
			(1.870)	
Prior Beliefs about Heritability				0.118***
				(0.0411)
Constant	21.77***	21.02***	20.98***	18.63***
	(1.210)	(3.302)	(3.393)	(3.343)
Observations	475	475	475	475
R-squared	0.011	0.068	0.068	0.085

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 1: Regression Analysis of Share Redistributed in II

3.2.3 Petition

In addition to the redistribution decision, I studied whether spectators agreed to a statement about the fact that meritocracy might not be entirely fair, and that policies should give everyone a chance to succeed, no matter their genetics. Spectators were informed that if the majority would agree, a petition would be started to push for such policy changes. I find no significant treatment differences in the support for this statement, although spectators in HighGen are slightly more likely to agree than spectators in LowGen (53.4% vs 49.0%). Since a majority of the spectators agreed with the statement, a petition was started on Change.org (Figure A2).

A possible explanation for the lack of a treatment difference on this outcome could be that my treatment affected only beliefs about the heritability of mathematical ability and not beliefs about heritability in general. This could explain why spectators in LowGen and HighGen would not react differently to a policy aimed at compensating the impact of genetics in a broader sense. Yet, the data do not support this interpretation because I find that heritability estimates in HighGen are significantly higher than in LowGen for all traits, with an average of 10 percentage points (see Table A7 in Appendix A). Finally, it is worth noticing that support for the statement significantly correlates with the share redistributed in II ($\rho = 0.3$), supporting the external validity of the spectator game.

3.3 Within-Subjects Design: Redistribution I vs Redistribution II

In the previous subsection I found that the treatment had an effect on average on the share redistributed. In this section, I aim to look at the change in redistribution decision within spectators to identify how many of them change their decision and in which direction. The majority of spectators (71.6%) did not change their redistribution decision after the treatment, this behavior being more common in the LowGen group than in the HighGen group (76.8% vs 66.2%, see Figure 4). The number of spectators that increased their redistribution was 22.5%, with 29.5% of spectators in HighGen increasing the share allocated to the worse performer compared to 15.8% in

LowGen. Finally, 5.9% decreased their redistributed share. The average difference was an increase of 4 percentage points, with the effect being driven by an increase of 6 pps for HighGen and of 2 pps for LowGen.

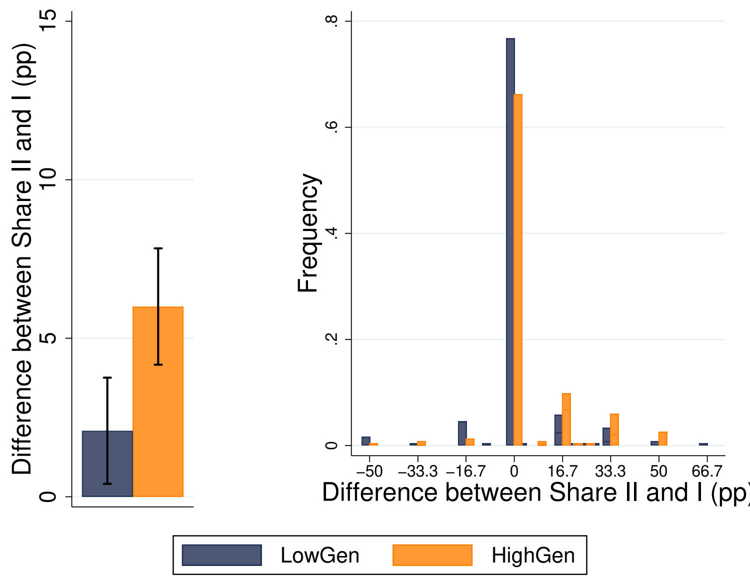

Figure 4: Difference between Share Redistributed in II and I

I now discuss these figures in light of the open-text answers the spectators provided[2] (asking them to explain the motivation for their redistribution decision and why they did or did not take the information about genetics into account in their decision).

Among the spectators that changed their redistribution, the majority increased the share assigned to the worse performer. The reason for this can be found in spectators' acknowledging the possibility of unequal opportunities deriving from genetics. About 18% of the spectators (28% in HighGen and 10% in LowGen) explained that the performance was not under the workers' control and that the information made them understand how one worker had a (dis)advantage. I also register that some

[2]The two open-text answers were hand-coded based on the most recurring motivation provided, see Table A8 in the Appendix for a summary. Validation of the categorization by other coders is upcoming.

spectators in LowGen decreased their redistribution after the decision. This can be explained by the fact that, for them, the genetic/effort ratio actually decreased after the provision of information. There is evidence for this in the texts, with spectators illustrating that they "gave the person who did better more of a bonus because it seemed like a stronger reflection of purely their effort and not just innately better math ability".

Approximately 72% of the spectators maintained their initial decision despite receiving additional information. This pattern aligns with behaviors identified in two distinct groups within the existing literature: egalitarians and performance meritocrats. Egalitarians are those that redistribute equally between the two workers. Having already fully redistributed in Task I, a further redistribution to promote equality is not possible. I find that about 7% (based on the open text categorization) to 11% (based on share equalization) of the spectators can qualify as egalitarian, which is in line with findings from other studies (Andre, 2021). Performance meritocrats argue instead that the distribution of the bonus should be based solely on performance, irrespective of any inherent disadvantages or advantages. Thus, in my experiment, some spectators (about 17%) disregarded genetics even though it could have influenced the workers' performances. They indicated that the bonus should be given to the winner no matter the reasons behind the superior performance and regardless of any advantage the winner might have had.

Aside from these two groups, there were some other explanations why people might not change their redistribution decision following the genetics information. I list the main ones in order of frequency. First, many spectators (15%, 26% in LowGen and 5% in HighGen) downplayed the role played by genetics in affecting ability and performance. These spectators mentioned that other factors (hard work, effort, practice, perseverance, learning, educational and family background) are more important in determining ability and that "human will can overpower genetic predispositions". The fact that this attitude is not equally spread between HighGen and LowGen can help explain the treatment difference that I find. Second, some spectators (8%) mentioned that they do not have information about the genetics of the two workers presented in this scenario and, therefore, cannot actually tell whether someone was genetically advantaged. Third, some other spectators (4%) distrusted the information about genetics altogether, questioning the validity of the study provided. A final explanation is that some spectators already had taken genetics into account and the information provision aligned with their prior beliefs, but I find little evidence for this.

4 Discussion

In discussions about social inequality, performance-based differences are often viewed as more acceptable than those attributed to luck (Cappelen et al., 2013). This perspective aligns with meritocratic principles, where disparities are justified if they result from personal effort and success. However, this viewpoint overlooks the fact that not everyone has an equal chance to achieve high performance, largely due to varying opportunities and circumstances that are outside of their control. An example of such uncontrollable factors is the genetic lottery. This refers to the random distribution of genetic traits among individuals, which can lead to certain advantages or disadvantages. Research shows that these genetic differences can influence a range of abilities and potential outcomes in life, such as cognitive ability, education and even income (Allegrini et al., 2019; Kweon et al., 2020).

In this study, I investigate how individuals' redistribution preferences change when the role of the genetics in affecting performance is made salient to them. To do so I combine the spectators design by Cappelen et al. (2013) with an information provision treatment (Haaland et al., 2023). In my experiment, impartial spectators could redistribute the earnings that two workers obtained based on their performance in a mathematical task. Using experimental data from over 400 US citizens, I find that informing individuals about the genetics of mathematical ability results in a higher compensation to the worse performer of the mathematical task. This evidence is in line with studies that find higher redistribution when inequality of opportunity is made salient (Dong et al., 2022) and showcases that readily available information can substantially impact people's redistribution decisions (Preuss et al., 2022). At the same time, it sheds a new light on the findings by Drucker (2022), who found that ability is not considered an unfair circumstance. Here, I show that ability can also be considered an unfair source of advantage, if its genetic randomness is made explicit.

While my findings indicate that some individuals adjusted their decisions after receiving information about the role played by genetics, the majority of the sample remained unchanged in their redistribution. This could be partially explained by the fact that some individuals consider inequality coming from genetics as fair. I find suggestive evidence that these individuals seem to justify inequality by claiming that genetics is given by nature and that everyone has some genetics that can lead to success (Lippert-Rasmussen, 2004).

Another explanation why individuals may not change their redistribution decision relies in the fact that, in my experiment, genetics interacts with effort to determine the performance in the mathematical task. This makes it hard for the individuals to disentangle the role played by effort and genetics. In turn, this might prevent them from taking the information about genetics into account when deciding on the redistribution. This observation aligns with the conclusions drawn by Preuss et al. (2022) and Andre (2021), who demonstrate that redistribution is less sensitive to luck when luck interacts with effort. Additionally, this finding fits well with the concept of the "American Dream", which is the idea that success is achievable for anyone, regardless of their starting point in life, through sufficient hard work and determination (Preuss et al., 2022). In my experiment, this view is reflected by some spectators saying that hard work can overpower genetics.

Another reason why individuals did not change their decision after receiving the information could be the lack of information about the role genetics played in generating inequality *specifically* in the scenario at hand. This was due to the impossibility of providing information about the genetics of the two workers without using deception. Lack of information as a deterrent for redistribution reminds of the opportunity neglect found by Andre (2021), which derives from the absence of a counterfactual to show the exact role of inequality of opportunity.

In my study, I also find that the extent to which genetics is believed to impact the performance of the workers does matter. Increasing the genetic/effort ratio makes spectators less likely to believe that genetics can be neglected in favor of other factors such as hard work or effort. In this sense, my results do not align with the findings of Cappelen, Moene, Skjelbred, and Tungodden (2023), who find that individuals' merit judgements are insensitive to changes in the luck/merit ratio. Cappelen et al. (2023) explained their findings by suggesting the existence of a "merit primacy effect", where information about merit overshadows information about luck. I suggest that a primacy effect could be present, but it is not exclusive to merit, and depends on the information that spectators mostly focus on.

Drawing from these results, my paper complements the literature that challenges to the original definition of meritocratic fairness (Cappelen et al., 2020), by introducing "compensating meritocrats", i.e. meritocrats that compensate for the disadvantages derived from unequal opportunities (Andre, 2021; Drucker, 2022). I provide evidence for the existence of *genetic* compensating meritocrats, who acknowledge the role played by genetics and redistribute accordingly. In terms of policy, this suggests that some individuals may support more redistribution, if the genetic component of inequality is revealed to them. Moreover, both the nature of the information (population level/individual) and the margin of the information (the "extent" to which genetics is perceived to matter) play a key role in determining support for redistribution.

The paper still comes with some limitations. The first limitation is of conceptual nature. To modify beliefs about the importance of genetics, I have provided information about heritability, which explains genetic differences in a trait at the population level. This concept should not be confused with belief in genetic determinism, that is the belief that genetics rigidly determines or dictates one trait. For the scope of my paper, I did not draw a line between these two concepts, as my interest was to change beliefs about the importance of genetics broadly. Given that the general public might have misconceptions about heritability (Madrid-Valero et al., 2021; Visscher, Hill, & Wray, 2008), my treatments might have changed either their heritability beliefs or their beliefs in determinism. Further research could analyze how the distinction between these two beliefs might affect redistribution preferences and determine the optimal way to convey genetic information in this setting. Yet, as I did not want to spread incorrect deterministic theories, I debriefed spectators at the end of my study, reminding that other factors play a role as well in influencing abilities.

Another limitation of my treatments is the fact that they might have changed other beliefs than the ones about the genetic/effort ratio I intended to manipulate. Specifically, providing information about "nature" (genetics) might affect beliefs about the importance of "nurture" (the environment). This could be problematic because, if individuals believe that the environment is really important, they might redistribute more, even when genetic factors are minimal. This could lead to a smaller treatment difference, as the importance of the environment could balance out the importance of genetics. Although I cannot completely exclude that this happened, I find no evidence of this in my study.

Lastly, this research might have been subject to experimenter demand effects, a common issue in experiments involving information provision (Haaland et al., 2023). Nevertheless, in the context of the spectator game, demand effects should be lower as it presents a task in which real money is at stake (Andre, 2021; Haaland et al., 2023). Still, I tried to minimize its importance, by phrasing the information provision as feedback to the respondents' previous estimation about heritability and by including additional unrelated questions, as suggested by Haaland et al. (2023).

This study opens avenues for further research. Firstly, it would be valuable to explore whether my findings about genetics for mathematical ability also apply to other domains. For example, future studies could investigate how providing information about the heritability of education and income affect individuals' preferences for redistribution in these contexts. Alternatively, future research might explore beliefs towards genetics for health outcomes and preferences for redistribution in the health domain. Another area of interest is to examine how views on genetics might shift in scenarios where self-interest is a factor. In my study, I intentionally avoided this to avoid a confounder and I also documented no self-serving bias when considering self-reported mathematical ability. However, the results may change if the personal stakes of the redistributors are involved. Previous research suggests that winning, even in a situation like a lottery, can lead to less willingness to redistribute wealth (Hansson & Sund, 2023). As such, exploring how individuals' beliefs about their own genetic predispositions influence their decisions about redistribution could provide interesting insights.

5 Conclusion

In this paper, I experimentally assessed how individuals' beliefs about the importance of genetics in generating inequality affect their redistribution preferences. I investigated this by manipulating beliefs through information treatments, in which I provided different heritability estimates to showcase the importance of genetics. I find that spectators do take the information about genetics into account. Compared to a situation without information, learning about the importance of genetics leads individuals to implement a more equal redistribution. Moreover, when genetics is framed to play a big role in creating inequality, individuals compensate the worse performer more. These findings show that individuals' redistribution preferences are sensitive to inequality of opportunity, even when this is rooted in genetics. As such, beliefs about the role of genetics in generating inequality play a crucial role in determining redistribution preferences.

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6 Appendix

6.1 Appendix A

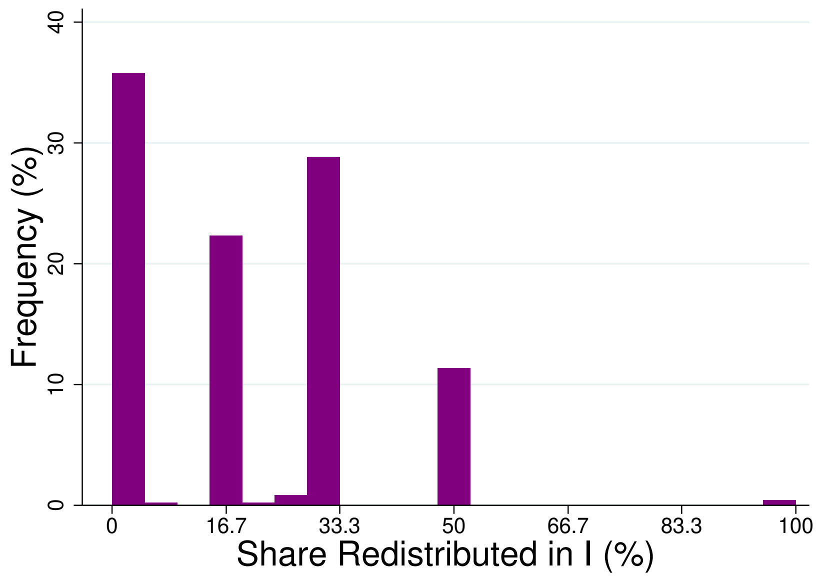


Figure A1: Share Redistributed in I

	Full Sample	LowGen	HighGen	p value
Count	475	241	234	
Female	62.32%	59.34%	65.38%	0.174
Age	41.68	41.58	41.78	0.716
Education				0.813
Less than Bachelor's	40.63%	39.00%	42.31%	
Bachelor's	37.05%	37.34%	36.75%	
Higher than Bachelor's	22.32%	23.65%	20.94%	
Income				0.810
Low (less than 50k)	56.63%	55.19%	58.12%	
Middle (50k to 80k)	24.21%	24.90%	23.50%	
High (80k and more)	19.16%	19.92%	18.38%	
Politics				0.266
Democrats	53.26%	51.45%	55.13%	
Independents	28.42%	27.39%	29.49%	
Republicans	18.32%	21.16%	15.38%	
Religious	30.95%	32.78%	29.06%	0.381
Share redistributed in 1	19.71%	19.69%	19.72%	0.823
Redistributors in 1	64.21%	64.32%	64.10%	0.961
Took Genetic into account	8.00%	8.71%	7.26%	0.561
Priors	31.44%	32.38%	30.47%	0.277

Table A1: Descriptive Statistics by Variable with Significance Differences (χ^2 and Wilcoxon Rank-sum Tests)

	Income (D=1 if High)	Religious (D=1 if Yes)	Gender (D=1 if Female)	Education (D=1 if Bachelor's)	Priors	Math Ability (D=1 if High)	Politics (D=1 if Republicans)
HighGen	2.427	3.672*	4.747*	6.130**	4.791	3.614*	3.515
	(2.280)	(1.974)	(2.836)	(2.588)	(2.926)	(2.095)	2.381)
D	-3.424	-2.545	2.044	3.795	0.124**	-0.917	-7.246**
	(2.392)	(2.732)	(2.510)	(2.407)	(0.0599)	(2.522)	(3.017)
HighGen X D	3.412	0.652	-1.399	-3.551	-0.0196	0.956	-0.156
	(3.451)	(3.841)	(3.546)	(3.429)	(0.0838)	(3.619)	(4.554)
Constant	23.31***	22.61***	20.56***	19.46***	17.75***	22.10***	24.81***
	(1.727)	(1.387)	(2.005)	(1.782)	(2.031)	(1.518)	(1.757)
Observations	475	475	475	475	475	475	340
R-squared	0.015	0.014	0.013	0.016	0.031	0.012	0.039

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A2: Heterogeneity Analysis on Share Redistributed in II

	Genetics	Effort	Fairness	Control	Responsibility	Share II
Genetics	1.000					
Effort	-0.316	1.000				
Fairness	-0.311	0.452	1.000			
Control	-0.332	0.526	0.510	1.000		
Responsibility	-0.279	0.566	0.523	0.724	1.000	
Share II	0.225	-0.304	-0.408	-0.289	-0.278	1.000

All p values < 0.05, Bonferroni correction applied

Table A3: Cross-correlation table: Posterior Beliefs and Share II

	Share II	Compensation	Nature	Efficiency
Share II	1.000			
Compensation	-0.183*	1.000		
Nature	-0.209*	0.814*	1.000	
Efficiency	-0.118	0.770*	0.753*	1.000

* p < 0.05, Bonferroni correction applied

Table A4: Cross-correlation table: Share II and Mechanism Statements

	Genetics	Effort	Control	Responsibility	Fairness
HighGen	3.750***	-1.029***	-1.448***	-0.989***	-0.961**
	(0.377)	(0.344)	(0.403)	(0.357)	(0.395)
Prior Beliefs about Heritability	0.0451***	-0.00741	-0.0138**	-0.0136**	-0.00424
	(0.00683)	(0.00620)	(0.00601)	(0.00606)	(0.00727)
HighGen X Prior Beliefs	-0.00864	0.00263	0.0120	0.00476	0.00291
	(0.0101)	(0.00896)	(0.01000)	(0.00925)	(0.0101)
Constant	1.357***	7.999***	7.601***	8.400***	7.685***
	(0.212)	(0.222)	(0.251)	(0.226)	(0.267)
Observations	475	475	475	475	475
R-squared	0.428	0.049	0.052	0.046	0.034

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A5: Linear Regression of Posterior Beliefs on Treatment and Prior Beliefs

	Share Redistributed in II
Environment = Yes	10.28***
	(3.175)
HighGen	4.749**
	(1.869)
HighGen X Environment = Yes	-4.186
	(4.202)
Constant	19.47***
	(1.268)
Observations	475
R-squared	0.048

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

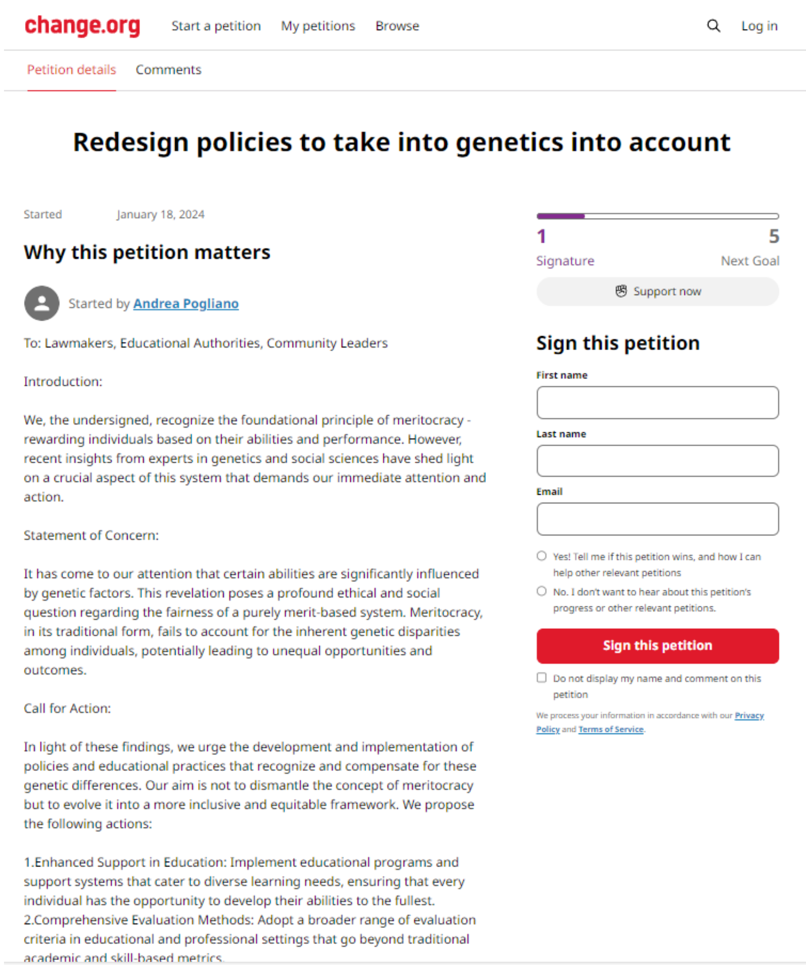
Table A6: Impact of Environment on Share Redistributed in II

	LowGen	HighGen	p value
Petition			0.623
Yes	48.96	53.42	
No	31.12	28.21	
I don't know	19.92	18.38	
Heritability Beliefs			
BMI	44.79	55.48	0.000
Mental Health	54.69	64.28	0.000
Personality	44.28	56.96	0.000
IQ	53.15	65.63	0.000
Average	49.22	60.59	0.000
Environment	22.41	24.79	0.541
Trust	5.98	5.20	0.01

Table A7: Treatment Differences on Other Outcomes (χ^2 and Wilcoxon Rank-sum Tests)

Type	Example Answers	Total	LowGen	HighGen
Egalitarians	"Equality is something we should strive for. Thinking that one person deserves more or better is not good for the society." "Because I believe in splitting all things equally between everyone, regardless of the rule. The economy is bad and we all need the funds."	7.16%	7.05%	7.26%
Performance Meritocrats	"I just felt that despite genetics being at play behind math skills, if the person did better at something, they did better, so I didn't mess with the bonuses." "If someone is better, they are better. I do not care how or why."	16.63%	13.69%	19.66%
Genetics-Compensating	"I think it is not fair to punish poor performance in mathematics because it is influenced by genetics. It is simply something that the person cannot fully control no matter how hard they try." "I distributed some to the other person because if genetics is that important for math ability then it's unfair to person D. Because they might just not be as good based on their birth."	18.74%	9.96%	27.78%
Genetics Minimizers	"It only impacts as little as 20%. There could be other factors that are more relevant." "I believe that people have the power to learn, no matter what the genetics are. It is not all about genetics."	15.37%	25.73%	4.70%
Information Lacking	"I don't think the information about genetics was relevant. i think this because we don't know what the participants genetics are like." "Since I do not know any additional information about the participants, I don't know with confidence if genetics played a part in this specific circumstance."	7.58%	7.47%	7.69%
Information Distrusting	"I question the validity of the said 2010 study. I need citations and more data." "I don't believe the figure quoted in the survey. I find it hard to imagine that 90 percent of mathematical ability is based on genetics."	3.58%	2.90%	4.27%
Non-Classified	"This is another study that tries to justify redistributing money from smart people to dumb people. Only dumb people do studies like this."	30.95%	33.20%	28.63%

Table A8: Categorization Open-text Answers


change.org Start a petition My petitions Browse Log in

Petition details Comments

Redesign policies to take into genetics into account

Started January 18, 2024

Why this petition matters

Started by Andrea Pogliano

To: Lawmakers, Educational Authorities, Community Leaders

Introduction:

We, the undersigned, recognize the foundational principle of meritocracy - rewarding individuals based on their abilities and performance. However, recent insights from experts in genetics and social sciences have shed light on a crucial aspect of this system that demands our immediate attention and action.

Statement of Concern:

It has come to our attention that certain abilities are significantly influenced by genetic factors. This revelation poses a profound ethical and social question regarding the fairness of a purely merit-based system. Meritocracy, in its traditional form, fails to account for the inherent genetic disparities among individuals, potentially leading to unequal opportunities and outcomes.

Call for Action:

In light of these findings, we urge the development and implementation of policies and educational practices that recognize and compensate for these genetic differences. Our aim is not to dismantle the concept of meritocracy but to evolve it into a more inclusive and equitable framework. We propose the following actions:

1.Enhanced Support in Education: Implement educational programs and support systems that cater to diverse learning needs, ensuring that every individual has the opportunity to develop their abilities to the fullest.
2.Comprehensive Evaluation Methods: Adopt a broader range of evaluation criteria in educational and professional settings that go beyond traditional academic and skill-based metrics.

1 Signature 5 Next Goal

Support now

Sign this petition

First name

Last name

Email

Yes! Tell me if this petition wins, and how I can help other relevant petitions

No. I don't want to hear about this petition's progress or other relevant petitions.

Sign this petition

Do not display my name and comment on this petition

We process your information in accordance with our Privacy Policy and Terms of Service.

Figure A2: Petition on Change.org

6.2 Appendix B

6.2.1 Survey for Spectators

Prolific ID

Please enter the participant ID that you received from Prolific:

Captcha

Please confirm you are not a bot.

Consent

Payment: The study is expected to last 12 minutes and your compensation for completing it is $2.5. You will have the option of earning additional money (up to $0.50) by answering correctly to two questions in the survey. We will indicate such questions clearly.

Before proceeding, please give your consent that you voluntarily participate in this study, that you have been sufficiently informed about the nature of the study, and that you explicitly give us your consent that:

- We can collect your anonymous, non-sensitive personal data (like age, income, etc).
- We can use this personal data for scientific purposes.
- We can store your anonymous, non-sensitive personal data on our safe-guarded university servers for up to 10 years.
- We can make anonymized data available to other researchers online.

We promise to protect your data according to the latest General Data Protection Regulation (GDPR) data regulation laws. Notice that you can also withdraw your consent anytime during the study by returning your submission before completing this study. In that case, your data will not be stored.

In case you have any questions at any point, please contact us at pogliano@ese.eur.nl.

- I consent
- I do not consent

Demographics

Please, start by answering the following questions.

What is your gender?

- Male
- Female
- Other
- I prefer not to disclose

What is your age?

What is the highest level of education you have completed?

- Less than High School
- High School
- Some college
- Bachelor's Degree
- Master's Degree
- Doctorate or Professional Degree
- I prefer not to disclose

Which political party do you more strongly identify with?

- Democrat
- Republican
- Independent

What was your total personal gross income last year? Take into account all your sources of income, including scholarships, health benefits, fringe benefits, and others. Please note that this is your personal income, not the income of your household.

- Less than $10,000
- $10,000 to $20,000
- $20,000 to $30,000
- $30,000 to $40,000
- $40,000 to $50,000
- $50,000 to $60,000
- $60,000 to $70,000
- $70,000 to $80,000
- $80,000 to $90,000
- $90,000 to $100,000
- Over $100,000
- I prefer not to disclose

How frequently do you participate in religious activities, such as attending religious services, prayer, or other religious gatherings?

- Multiple times a week
- Once a week
- Several times a month
- Rarely
- Never
- I prefer not to disclose

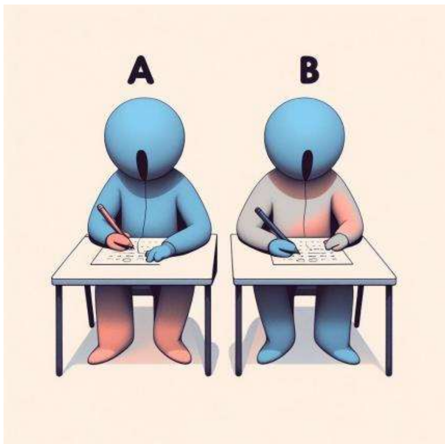
Decision 1

Please read the instructions carefully. There will be a comprehension quiz later to ensure you understand the instructions.

Unlike traditional survey questions that are about hypothetical situations, we now ask you to make a choice that has actual consequences for a real life situation. Out of the participants in our study that are doing the same task as you are now, 1 out of every 3 will be randomly selected to have one of their decision implemented. What this means is that you might very well be one of those selected, and so you should make your choices carefully, as they could actually be implemented.

Now please read the following information.

Last week we invited two persons, person A and person B, to conduct an assignment on an online platform. The persons did not know which type of assignment they had to complete. The assignment turned out to require **mathematical ability**.



Each person was paid $1.25 for completing the assignment regardless of their performance. Person A and Person B were also informed they might receive some additional payment but they were not informed what that depended on.

To make sure you understood the information correctly, please answer the following questions. You will be able to continue to the next page once you have answered them correctly.

How much do the persons receive for completing the assignment?

- $1.25
- $1.25 and a known additional amount
- $1.25 and an unknown additional amount

Which type of assignment do the persons complete?

- Mathematical Assignment
- Reading Assignment
- Comprehension Assignment

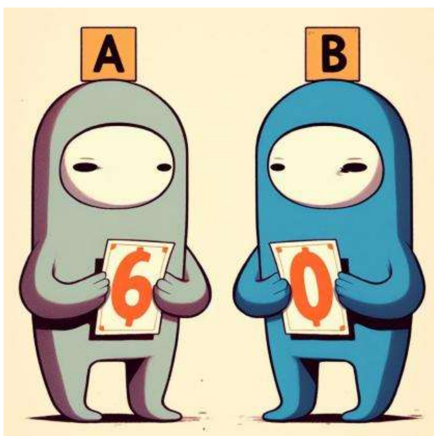
Does your decision affect the payoff of real people?

- Yes, it might affect the payoff of real people
- No, it is purely hypothetical

Please take your time to make your decision. Remember, it can have real consequences.

Now you learn that person A completed more tasks correctly in the mathematical assignment than person B.

The research team considered assigning an **additional bonus of $6** to person A, since person A performed better. Person A and person B are **not** informed about this.



This is where you come into play. You can decide how to redistribute the bonus between Person A and Person B before they learn their payoffs. They will receive the final payoffs **determined by you** without further details.

How would you distribute the bonus?

Person A (won the bonus)	6
Person B (did not win the bonus)	0
Total	6

Role of Genetics

Did you take the role of **genetics** (that is, the fact that genetics might have affected the performance of the people) into account when deciding how to distribute the bonus?

- Yes
- No

In your opinion, how many participants in the current study took the role of **genetics** into account when deciding how to redistribute the bonus?

Give your answer as a number between 0 and 100. For example, if you answer "20", that means that you think that 20 participants out of 100 take genetics into account.

If your estimate is correct (± 5), you will get additional bonus of 0.25$.

Priors

Several studies have shown that **genetics** can influence many outcomes in people's lives, like their eye color or their chance of getting certain diseases. Genetics can also influence **mathematical ability**.

To the best of your knowledge, how much of the difference in mathematical ability between people is due to **genetics**?

Enter the value as a **percentage**.

0 10 20 30 40 50 60 70 80 90 100

How confident are you of your answer to the previous question?

- ○ Extremely Confident
- ○ Somewhat Confident
- ○ Neither Confident nor Unconfident
- ○ Somewhat Unconfident
- ○ Extremely Unconfident

What do you think **other participants** answered to the previous question about the importance of genetics?

Give your answer as a percentage. For example, if you answer "70", that means that you think that **on average** participants believe that 70% of the difference in people's mathematical ability is due to genetics.

If your estimate is correct (± 5 percentage points), you will get an additional bonus of 0.25$.

0 10 20 30 40 50 60 70 80 90 100

HighGen

<u>Please read carefully.</u>

As reported by a 2010 study by researchers at the King's College in London, **as much as 90%** of the difference in people's mathematical ability is due to **genetics.** In other words, genetics can explain as much as 90% of the differences in mathematical abilities between people.

In case you are curious about the study, at the end of this questionnaire you will receive a link to read more about it.

Are you surpised by this fact?

- Extremely Surprised
- Very Surprised
- Somewhat Surprised
- Not Surprised

<u>Now please read the following information carefully.</u>

We now ask you to make a decision for two **other** persons that were invited to complete the assignment, person C and person D.

As in the previous question, Person C and person D were paid $1.25 regardless of their performance. They were informed they might receive some additional payment but they were not informed what that depended on.

Also in this case, the assignment turned out to require mathematical ability. Remember, **as much as 90%** of the difference in people's mathematical ability is due to **genetics**.

To make sure you understood the scenario correctly, please answer the following questions. You will be able to continue to the next page once you have answered them correctly.

Are the two people in this scenario the same as in your previous decision?

- Yes, but the task they complete is different
- No, but the task they complete is the same

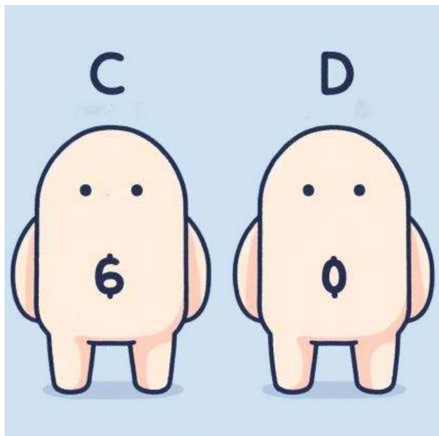
○ No, and the task they complete is different

How much of the difference in people's mathematical ability is due to genetics?

○ as much as 90%
○ as much as 60%
○ as much as 30%

Now you learn that person C completed more tasks correctly in the mathematics assignment than person D.

As before, the research team considered assigning an **additional bonus of $6** to person C, since person C performed better. Person C and person D are **not** informed about this.



How would you distribute the bonus in this scenario?

Remember, there is a chance 1 out of 3 that one of your choices will actually be implemented.

Person C (won the bonus)	6
Person D (did not win the bonus)	0
Total	6

LowGen

Please read carefully.

As reported by a 2010 study by researchers at the King's College in London, **as little as 20%** of the difference in people's mathematical ability is due to **genetics.** In other words, genetics can explain as little as 20% of the differences in mathematical abilities between people.

In case you are curious about the study, at the end of this questionnaire you will receive a link to read more about it.

Are you surpised by this fact?

- ○ Extremely Surprised
- ○ Very Surprised
- ○ Somewhat Surprised
- ○ Not Surprised

Now please read the following information carefully.

We now ask you to make a decision for two **different** persons that were invited to complete the assignment, person C and person D.

As in the previous question, Person C and person D were also paid $1.25 regardless of their performance. They were informed they might receive some additional payment but they were not informed what that depended on.

Also in this case, the assignment turned out to require mathematical ability. Remember, **as little as 20%** of the difference in people's mathematical ability is due to **genetics**.

To make sure you understood the scenario correctly, please answer the following questions. You will be able to continue to the next page once you have answered them correctly.

Are the two people in this decision the same as in your previous decision?

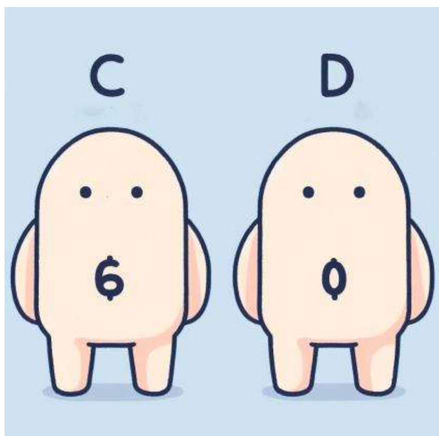
- Yes, but the task they complete is different
- No, but the task they complete is the same
- No, and the task they complete is different

How much of the difference in people's mathematical ability is due to genetics?

- as little as 20%
- as little as 40%
- as little as 60%

Now you learn that person C completed more tasks correctly in the mathematics assignment than person D.

As before, the research team considered assigning an **additional bonus of $6** to person C, since person C performed better. Person C and person D are **not** informed about this.



How would you distribute the bonus in this scenario?

<u>Remember</u>, there is 1 chance out of 3 that one of your choices will actually be implemented.

Person C (won the bonus)	6
Person D (did not win the bonus)	0
Total	6

Open Question 1

Now we are interested in understanding the reasoning behind your choice for (not) redistributing the bonus. Please provide your motivation in 2 to 3 sentences.

Open Question 2

Now please evaluate the following statement.

I took the information about genetics into account when deciding how to distribute the bonus.

- Yes
- No, I forgot about it

○ No, I did not think it was relevant

Why did you think the information about genetics was relevant? Please explain in 2-3 sentences.

Why did you think the information about genetics was not relevant? Please explain in 2-3 sentences.

Manipulation Questions

Now think back at the question with persons C and D and answer the following questions.

How much did **genetics** impact the performance of the persons?

Not at all Completely

0○ 1○ 2○ 3○ 4○ 5○ 6○ 7○ 8○ 9○ 10○

How much **control** did the persons have over their performance?

They had no control They had full control

0○ 1○ 2○ 3○ 4○ 5○ 6○ 7○ 8○ 9○ 10○

How **responsible** were the persons for their performance?

Not responsible Fully responsible

0○ 1○ 2○ 3○ 4○ 5○ 6○ 7○ 8○ 9○ 10○

How **fair** do you think it was that person C had a better performance?

Extremely unfair — Extremely Fair

0○ 1○ 2○ 3○ 4○ 5○ 6○ 7○ 8○ 9○ 10○

How much did **effort** impact the performance of the persons?

Not at all — Completely

0○ 1○ 2○ 3○ 4○ 5○ 6○ 7○ 8○ 9○ 10○

Did you think about the environment the persons grew up in when redistributing?

○ Yes
○ No

External

Now please answer the following questions.

To the best of your knowledge, how important do you think **genetics** is in influencing the following traits? (0 means that genetics plays no role, 100 means that genetics fully determines the trait)

	0	10	20	30	40	50	60	70	80	90	100	
Personality												
Mental Health												
IQ												
Body Mass Index												

Petition

Some experts think that because some of our abilities are linked to our genetics (like in the case of mathematical ability), the idea of **meritocracy** (where people are rewarded based on their performance and abilities) might **not be entirely fair**.

They suggest that we should create **policies** and environments that give everyone a chance to do well in society, **no matter their genetics**.

Do you agree with this statement?
Answer carefully: If the majority of the respondents of this study will answer "yes" to this question, next week we will start a **petition** on Change.org to advocate for such changes in policies.

- ○ Yes
- ○ No
- ○ I don't know

MEC

Now, please indicate how much you agree with the following statements (0 means you completely disagree, while 10 means that you completely agree).

	0	1	2	3	4	5	6	7	8	9	10
Inequality coming from genetics is fair because everyone has some genetics that can make them successful.	○	○	○	○	○	○	○	○	○	○	○

	0	1	2	3	4	5	6	7	8	9	10
Inequality coming from genetics is fair because genetics are given by nature.	○	○	○	○	○	○	○	○	○	○	○
Select a value of 1 to ensure you are reading this attentively.	○	○	○	○	○	○	○	○	○	○	○

	0	1	2	3	4	5	6	7	8	9	10
Inequality coming from genetics is fair because it contributes to the efficiency of society.	○	○	○	○	○	○	○	○	○	○	○
I believe that the information provided to me in this study is accurate.	○	○	○	○	○	○	○	○	○	○	○

Mathematical Ability

Finally, answer this last question.

How do you rate your mathematical ability?

○ Extremely below average

- Below average
- Average
- Above average
- Extremely above average

Debriefing90

Thank you for taking part in this study!

The goal of our research is to understand individual's attitudes towards genetics.

In the scenario above, you were informed that as much as 90% of the difference in people's mathematical ability is due to genetics. More precisely, 20% to 90% of the difference is due to genetics, depending on the study. However, it's always important to remember that genetics only partly determine your abilities: environment and practice also play a big role in determining abilities.

In case you want to read more on the topic, here a link to the study mentioned before.

In the next page you will be redirected to Prolific.

Debriefing20

Thank you for taking part in this study!

The goal of our research is to understand individual's attitudes towards genetics.

In the scenario, you were informed that as little as 20% of the difference in people’s mathematical ability is due to genetics. More precisely, 20% to 90% of the difference is due to genetics, depending on the study. However, it's always important to remember that genetics only partly determine your abilities: environment and practice also play a big role in determining abilities.

In case you want to read more on the topic, here a link to the study mentioned before.

In the next page you will be redirected to Prolific.

6.2.2 Survey for Workers

Prolific ID

Please enter the participant ID that you received from Prolific:

Block 14

Please confirm you are not a bot.

I'm not a robot
reCAPTCHA
Privacy - Terms

Consent

Before proceeding, please give your consent that you voluntarily participate in this study, that you have been sufficiently informed about the nature of the study, and that you explicitly give us your consent that:

- We can collect your anonymous, non-sensitive personal data (like age, income, etc).
- We can use this personal data for scientific purposes.
- We can store your anonymous, non-sensitive personal data on our safe-guarded university servers for up to 10 years.
- We can make anonymized data available to other researchers online.

We promise to protect your data according to the latest General Data Protection Regulation (GDPR) data regulation laws. Notice that you can also withdraw your consent anytime during the study by returning your submission before completing this study. In that case, your data will not be stored.

In case you have any questions at any point, please contact us at pogliano@ese.eur.nl.

- ○ I consent
- ○ I do not consent

Info

Payment: The study is expected to last 5 minutes, in which you will have to answer 10 questions. You have 30 seconds to answer each question.

Your compensation for completing the study is $1.25. You may receive an additional payment of up to $6 (on average $3) based on your responses and the responses of other participants in this study. The more questions you answer correctly, the higher the probability that you will receive a (higher) additional payment.

In case you obtain the additional payment, this will be paid to you within the next 2 weeks. Moreover, your information could be used for other studies. This may result in extra payments to your Prolific account in the coming months, requiring no further action from you.

By moving to the next page, you start the quiz. Make sure to have **pen and paper** at hand, that might help you with some of the questions.

Question 1

A faucet gives 20 gallons of water in 5 seconds. How many gallons does it give in 7 seconds?

- ○ 24
- ○ 26
- ○ 28
- ○ 30

30

Question 2

Which of the following is the arithmetic mean of the first 11 odd numbers?

- 11
- 10
- 9
- 13

30

Question 3

Mike can build a go cart in 30 days, Jed can build one in 20 days and Erick in 60 days. If all of them share the work, how quickly can they build a go cart?

- 15
- 10
- 8
- 6

30

Question 4

$4 - 15 \div (30 - 33) =$

- 22.5
- 9
- 3.66
- -1

30

Question 5

The ratio 36 : 12 is the same as

- 3 : 1
- 3 : 2
- 4 : 1
- 2 : 1

30

Question 6

Karen is organizing a vacation for a large group of active seniors. If passenger vans can hold 14 people, how many vans will be needed to transport 75 seniors?

- 5
- 6
- 8
- 7

30

Question 7

Michelle is 7 years older than her sister Joan, and Joan is 3 years younger than their brother Ryan. If the sum of their ages is 64, how old is Joan?

- ◯ 16
- ◯ 22
- ◯ 18
- ◯ 19

30

Question 8

Olga saves $15 from every paycheck to save up for a new game system that cost $399. Currently, she has $360 saved. Ignoring any taxes on the purchase, how many more paychecks does she have until she has enough money saved to buy the game system?

- ◯ 1
- ◯ 2
- ◯ 4
- ◯ 3

30

Question 9

One in every 9 people in a town vote for party A. All others vote for party B. How many people vote for party B in a town of 810?

- 90
- 720
- 801
- 819

30

Question 10

If Marcy chews an average of 32 sticks of gum per month, how many months will it take her to chew 2,400 sticks of gum?

- 85
- 75

○ 80

○ 70

30

Conclusion

Thank you for taking part in this study!
In the next page you will be redirected to Prolific.