

Pre-Analysis Plan:

Technological Change and
Preferences for Redistribution

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1. Motivation

Fairness perceptions are important in shaping redistributive preferences (e.g, Stantcheva 2021), as well as support for taxing the rich (Hope, Limberg, and Weber 2021). Evidence from laboratory experiments finds that demand for redistribution is higher when the better off are seen to have gained their incomes through luck rather than effort (e.g, Cappelen et al. 2013). This luck vs. effort distinction misses something important, however, as most real-world distributive decisions are between incomes earned through different types of work. In this study, we provide a first experimental test of whether fairness views and preferences for taxing top earners differ when their income is earned through luck, routine work, or (non-routine) complex work. This set up also mirrors the changing nature of tasks in the US labour market in recent decades as a result of routine-biased technological change, which has seen a substantial shift towards the type of abstract problem-solving tasks that are complementary to information and communications technologies.¹ In three novel incentivised belief elicitations, we also test the underlying causes for the differences in perceived deservingness of top incomes across treatments. Specifically, we test whether such differences are due to a change in perceived cognitive cost, agency, or uniqueness of the required skills across tasks of varying complexity.

2. Experimental Design

Our experimental design follows the existing literature by asking impartial spectators to redistribute income between workers (Almås, Cappelen, and Tungodden 2020; Cappelen et al. 2013). We depart from most existing studies in two ways: First, we ask spectators to decide on an allocation of income for groups of five rather than pairs of workers. This allows us to test redistributive preferences for incomes of top earners more directly. Second, we also ask all workers to decide on a level of redistribution within their group. For each group, there is a 50% chance that the decision of one of three impartial spectators will be implemented and a 50% chance that the decision of one of the five workers will be implemented.

Prior to spectators and workers making their redistributive choices, workers are assigned to one of three treatments. In the luck treatment, one of the five workers is randomly allocated an initial bonus of \$5. In the routine work treatment, workers each complete a simple slider task (Gill and Prowse 2012) for three minutes. Here, the worker who completes the most sliders within each group receives an initial bonus allocation of \$5. In the complex work treatment,

¹ See Acemoglu and Autor (2011) for an excellent review of this extensive literature.

each worker completes complex problems for three minutes. The worker who completes the most problems correctly within each group then receives an initial bonus allocation of \$5. These problems consist of an even mix of math exercises (Niederle and Vesterlund 2007), Raven's progressive matrices (Raven 2000), and anagrams (Charness and Villeval 2009). They are selected to mirror the type of abstract, problem-solving tasks that have become so highly valued in the US labour market since the ICT revolution. We purposely choose a mix of different types of problems to capture the non-routine nature of the type of work we are interested in. By dividing the complex work treatment into short individual problems, we are also able to estimate individual performance in a comparable manner to the routine work treatment.

Spectators as well as workers are provided with information on the initial \$5 bonus allocation within their group. They are then able to propose a reallocation of the \$5, to be divided equally between the other group members. The experiment is described in more detail below:

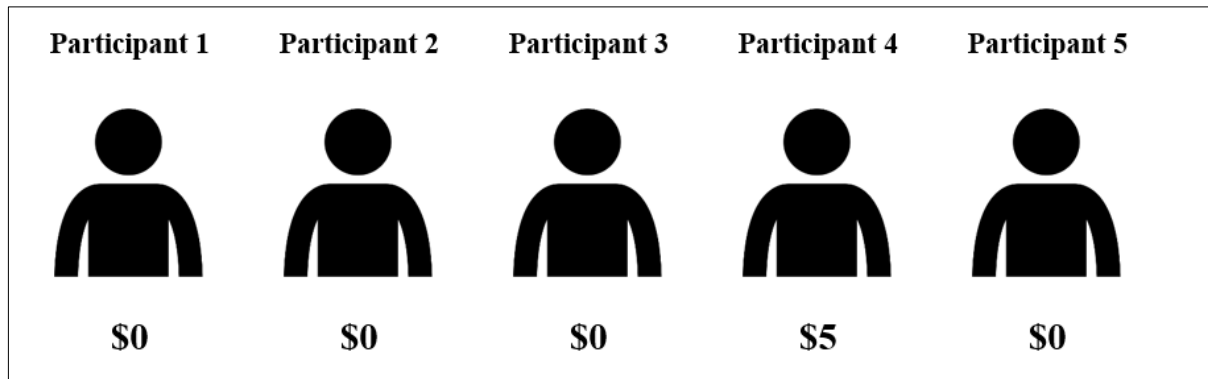
Part I: Workers are randomly assigned to the luck, routine work, or complex work treatment. They are then randomly allocated to a group of five. Each worker within the group has been allocated to the same treatment. The randomly chosen worker (in the luck treatment) or the best performer (in the routine and complex work treatments) is allocated an initial bonus of \$5. This amount will, however, only be paid after the decisions in part II and III.

Part II: Workers are provided with the payoff information for their group (i.e., which group member was allocated the \$5). They then have the option to redistribute the \$5 allocated to the top earner, to be equally distributed across the other group members. Given there is a 50% chance the decision of one of the five workers will be implemented and that worker is chosen at random, there is a 10% chance an individual worker's decision will be implemented.

Part III: Spectators each make three allocation decisions, one for each treatment. The order in which they make decisions across the three treatments is randomised. For the routine and complex work decisions, spectators are asked to participate in the respective task themselves for one minute without being informed of their own performance. This stage aims to provide spectators with a better idea of the complexity of each task and allows us to compare spectator and worker decisions while holding task experience constant. For each treatment, spectators are then provided with the payoff information for a group and have the option to redistribute the \$5 allocated to the top earner, to be equally distributed across the other group members. There are three spectators for each group and a 50% chance the decision of one of the three spectators will be implemented. As that spectator is chosen at random, there is a 17% chance an

individual spectator's decision will be implemented. Figure 1 illustrates a potential scenario spectators may face for a group in the routine work treatment condition.² Spectators receive no information on the preferences expressed by the workers in part II.

Figure 1: Spectator decision in the routine work treatment



Part IV: To determine the underlying mechanism for potential differences in redistributive choices across treatments, we elicit spectator as well as worker beliefs at the end of the experiment. Apart from demographics and distributive and political questions, we specifically include three incentivised belief elicitation that allow us to directly test three potential competing mechanisms:

Perceived Cognitive Cost: Subjects are asked whether they would be willing to perform the task (again) within their treatment condition and, if so, what the minimum amount of payment would be they would want to receive for their participation. To put restrictions on subjects' required minimum payments, we inform them that 10 subjects with the lowest suggested amount will be selected to actually complete the task at their proposed rate. Although this introduces a strategic element, it will be held constant across treatments. A higher average required minimum payment in the complex work treatment as opposed to the routine work treatment would suggest that the perceived cognitive cost of the complex problems task is higher. Alternatively, if the required minimum payment in the complex work treatment is lower, it would suggest that the cognitive cost is perceived to be lower. This may be the case because the intrinsic motivation to perform the complex problems task is perceived to be higher. This belief elicitation will allow us to test for these possibilities.

Perceived Agency: Subjects (within treatment conditions) are asked to provide incentivised estimates of the average performance of workers in two previous studies that

² Detailed experimental instructions are in appendix A.

differed (only) in the size of the prize given to the best performer. If subjects believe there to be a larger difference in performance for the slider task than for the complex problems task under different prizes, it would suggest that they perceive workers to have more agency over their effort level in the slider task as compared to the complex problems task. While the absolute estimates for these questions will, of course, be affected by their own performance in the task, the difference between the two prize scenarios should still capture their perception of agency. If subjects are within +/-5 percentage points of the correct answer for each estimate, they will receive an additional payment of 20 cents.

Perceived Uniqueness of Skill: We ask subjects (within treatment conditions) to provide incentivised estimates of the number of workers out of 100 randomly selected ones who were able to perform the task above a certain performance threshold. If subjects are within +/-5 percentage points of the correct answer, they will receive an additional payment of 20 cents. If subjects estimate the number of workers being able to perform very well in the complex problems task to be lower than in the slider task, that would suggest that skills needed for the complex problems task are perceived to be more unique than those needed to perform well in the slider task. The performance threshold is set based on worker performance in the pilot study and corresponds to the number of sliders/complex problems only the top 20% of workers in the pilot were able to complete within 3 minutes.

3. Research Questions and Hypotheses

As outlined above, we are primarily interested in whether redistributive tax preferences differ when incomes are earned through luck, routine work, or complex work. More specifically, we are interested in whether more complex tasks that require higher skills lead to lower support for redistributive taxation than less skilled, routine tasks. One potential explanation for this is the role of other-regarding fairness perceptions in this process. Therefore, our first research question is the following.

RQ1) Does task complexity affect preferences to redistribute top incomes through fairness perceptions?

If task complexity does indeed affect redistributive preferences by altering fairness perceptions, we would expect that we see a strong difference in redistributive choices for spectators who have no personal material interest at stake in the redistributive decision. Hence, solely looking at the spectators allows us to isolate other-regarding fairness perceptions regarding different types of work. Based on our main expectation that more complex, skill-intensive tasks put

downward pressure on redistributive demands as economic success is perceived as more deserved, our first hypothesis is as follows.

H1: Top incomes are less likely to be redistributed by spectators if task complexity is higher.

Second, we are also interested in whether task complexity can affect redistributive preferences by inducing motivated beliefs of individuals. By estimating general deservingness perceptions through our spectator decisions, we are able to isolate potential self-serving motivations in our worker decisions. Self-serving beliefs may affect worker decisions because of the potentially increased ego utility of more complex tasks (Köszegi 2006). This may lead top earners to consider their own high payoff to be even more deserving under the complex work treatment.

RQ2) Does task complexity affect preferences to redistribute top incomes through self-serving beliefs?

For the top earner, this would lead us to expect that they are less likely to redistribute their income if they have performed the complex problems task.

H2: Top earners are less likely to redistribute their incomes if earned through complex tasks.

For the other workers, the effect is less clear. On the one hand, self-serving beliefs might lead to workers increasing their preferred level of redistribution in the complex work treatment. That is, because workers want to maintain a positive self-image despite their relatively worse performance than that of the top earner, and therefore reduce their beliefs about the informativeness of the complex problems task regarding their own ability. In other words, workers are decreasing the perceived agency of the task and therefore the deservingness of top earners' incomes.

On the one hand, they might also be less likely to redistribute the income of the top earner due to a potential increase in motivating beliefs under more complex tasks (Bénabou and Tirole 2006). If workers are aware of the larger post-redistribution payoff for top earners under complex tasks, the perceived return to effort is rationally increased and workers have an incentive to motivate themselves for future tasks. Although motivating beliefs should not play a substantial role in our experimental setting given that the tasks are not repeated, we nonetheless expect that they might offset any treatment effects from self-serving beliefs for this subject group.

H3: Workers are no more or less likely to redistribute top incomes if earned through complex tasks.

Finally, we are interested in the mechanisms that might account for the treatment effects of different work tasks.

RQ3) Which mechanism(s) can explain any observed differences in redistributive preferences across treatments?

As noted earlier, we test three potential mechanisms why the income of higher earners who perform more complex, skill-intensive tasks might be perceived as more deserved. First, more complex tasks might be seen as cognitively more costly. Constantly adapting to more challenging, skill-intensive tasks might be perceived as a higher burden on workers (*ceteris paribus*). Hence, they might deserve their higher payoffs.

H4: Higher complexity is perceived as costly to the worker (holding time spent and monetary output constant).

Second, agency might play a role. It might, for instance, be the case that individuals have more discretion over the number of tasks that they can fulfil in the routine work treatment than in the complex work treatment, which might rely more strongly on predetermined elements of skill and luck. Note that this might actually increase perceptions of deservingness for people in the routine work treatment.

H5: Workers are perceived as having less agency over more complex tasks.

Finally, we have argued that perceptions of the uniqueness of skills might be crucial. If the ability to perform more complex, skilled tasks is perceived as relatively rare, workers who perform such tasks might be seen as unique and therefore more deserving of a wage premia. Hence, if people perceive the ability to solve complex problems as rare, they might regard a higher reward as justified and fair.

H6: The ability to perform more complex, high-skilled tasks is perceived as rare and more unique.

4. Sampling

To identify the minimum required sample size for our experiment, we conducted a power analysis. To do this, we used the results of a pilot study that we conducted in May 2022. Although results were statistically insignificant, the coefficient for the complex work treatment compared to the routine work treatment was around 0.4 and the standard variation was 1.6. Based on this, we use a conservative treatment effect size of 0.3 as well as an alpha of 0.05 and a power target of 0.8. Hence, we would need to around 450 observations per treatment group. To ensure that our experiment is still well-powered in case of potential attrition, we will recruit around 800 workers per treatment group. Since every spectator makes 3 decisions, we will recruit 480 spectators, resulting in a total of 1440 observations (480 per treatment group).

We will recruit participants using quota-based sampling (gender and age) via Prolific Academic. Coding and randomization will be implemented via Qualtrics. Workers first finish Stage 1 and then receive a follow-up survey for Stage 2 up to a maximum of three days after having finished Stage 1. To ensure a low dropout rate, participants are be informed that they will only be paid the bonus allocation if they participate in the follow-up survey. Since workers dropping out cannot express redistributive preferences, the chance of a worker's decision being implemented might slightly increase above the 10% chance of an individual worker's redistributive decision being implemented (as set out in Section 2).

5. Empirical Strategy

In this section, we describe the operationalisation of our key outcome variables. Afterwards, we summarise our empirical strategy.

Let us start with the measurement of our outcome variables. Recall that individuals that have performed the same task are randomly assigned to groups of 5, with the best performing individual (in the case of the routine and complex work treatments) receiving a payment of \$5. For the group receiving the luck treatment, the payment is simply randomly assigned. Respondents (top earners, other workers, and impartial observers) then have the possibility to redistribute the \$5 among the group of 5. More specifically, they can choose how much money should be taken away from the top earner and redistributed equally among the other group members. Choices range from \$0 (top earner keeps all of the payoff) to \$5 (top earner receives no payoff and each of the other four workers receives \$1.25). We then measure the extent of this elicited redistributive preference by looking at the amount that is taken away from the top earner as a share of the top earner's total additional payment. Simply put, this can be seen as a

measure capturing the tax rate on top earners, ranging from 0% (no payoff is redistributed) to 100% (all of the payoff is redistributed).

We now describe our model specifications. To test H₁, H₂, and H₃, we calculate the following models.

$$(1) \text{RedPref}_i = \beta_0 + \beta_1 S_i + \beta_2 C_i + \varepsilon_i$$

RedPref_i denotes our outcome variables for each respondent *i* (i.e., tax rate preferences on the highest income earners). *S_i* is the binary treatment variable for the slider task and β_1 is its coefficient. *C_i* is the binary treatment variable for the complex problems task and β_2 is its coefficient. For both variables, the indicator takes the value ‘1’ for the routine/complex work treatment and ‘0’ for the luck treatment. β_0 denotes the intercept. ε_i denotes the error term. We calculate Equations 1 and compare the treatment effects for top earners, other workers, and impartial observers respectively. Furthermore, we check for heterogeneous treatment effects by analysing whether effects vary by major socio-economic characteristics (e.g., age, income, gender, partisanship etc.).

To outline the empirical strategy to test the proposed mechanisms, we need to first specify the respective outcomes variables of our belief elicitation. Our cognitive cost belief elicitation asks subjects to specify a minimum required payment for additional work within their treatment condition. Our outcome variable to test H₄ is therefore the minimum required payment in \$ stated by subjects. We estimate the following model:

$$(2) \text{MinPay}_i = \beta_0 + \beta_1 T_i + \varepsilon_i$$

Here, *MinPay_i* denotes our outcome variable for each respondent and *T_i* is now a binary treatment variable equal to ‘1’ if subject *i* is in the complex work treatment and equal to ‘0’ if subject *i* is assigned to the routine work treatment.

The agency belief elicitation asks subjects to estimate the average performance of workers in competitions with differently sized prizes. The outcome variable of interest is hereby the difference in estimated average performance between the competition with a prize of \$30 and that with a prize of \$10. This will be the percentage point increase in the proportion of sliders or complex problems that subjects expect workers to additionally complete when the prize amount is increased. We estimate the following model:

$$(3) \text{AvgDiff}_i = \beta_0 + \beta_1 T_i + \varepsilon_i$$

Here, $AvgDiff_i$ denotes our outcome variable for each respondent equal to the estimated difference in average performance of workers (in percentage points) when the competition prize is \$30 as compared to \$10. T_i is again a binary treatment variable equal to '1' if subject i is in the complex work treatment and equal to '0' if subject i is assigned to the routine work treatment.

Finally, the uniqueness of skill elicitation asks subjects to estimate the percentage of workers who are able to perform above a specified performance threshold within their treatment group. The outcome variable here is the estimate of the percentage of workers. We estimate the following model:

$$(4) \text{TopPerc}_i = \beta_0 + \beta_1 T_i + \varepsilon_i$$

Here, TopPerc_i denotes our outcome variable for each respondent equal to the estimated percentage of workers able to perform above a certain performance threshold within the respective treatment group. T_i is again a binary treatment variable equal to '1' if subject i is in the complex work treatment and equal to '0' if subject i is assigned to the routine work treatment.

6. Ethics

Our study has received ethical approval from King's College London. The reference number is MRSP-21/22-29830. We are neither using deception nor collecting any information that would allow us to identify subjects personally.

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Appendix A: Experimental Instructions

A.1. Worker Instructions

Introduction - Treatment

Thank you for participating in this study. In the following, you will have the opportunity to earn a bonus payment of up to \$5. Specifically, you will be asked to complete a task which will take 3 minutes.

After completing this first part of the study, you will be paired with four other participants who completed the same task. The participant with the best performance on the task in the group will be given an initial bonus allocation of \$5. You will then be invited to participate in a short follow-up study. The final bonus payments will only be allocated after the follow up study, so it is important you complete both studies. We will pay out all final bonus payments within 10 days after the follow up study is completed.

Please click on the arrow below to proceed.

Introduction - Control

Thank you for participating in this study. In the following, you will have a chance to receive a bonus payment of up to \$5. There is nothing for you to do in the first part of the study.

After completing the first part of the study, you will be paired with four other participants. One of you will be randomly chosen to receive an initial bonus allocation of \$5. You will then be invited to participate in a short follow-up study. The final bonus payments will only be allocated after the follow up study, so it is important you complete both studies. We will pay out all final bonus payments within 10 days after the follow up study is completed.

Please click on the arrow below to proceed.

Slider Task Introduction

You will now take part in a slider task. You will have to move as many sliders as possible to the number 50. You will have a total of 3 minutes for this task. The participant within your group of five who is able to move the most sliders to 50 will receive an initial bonus allocation of \$5. Please ensure you are ready to begin the task. The 3 min countdown will begin as soon as you proceed to the next page.

Page break

Please move as many sliders as possible to the number 50.

[Sliders]

Complex Problems Task Introduction

You will now take part in a complex problems task. You will have to correctly answer as many complex problems as possible. You will have a total of 3 minutes for this task. The participant within your group of five who is able to correctly answer the most problems will receive an initial bonus allocation of \$5.

There are three types of complex problems you will be asked to solve in random order:

1. Raven's matrices: You will be shown a pattern of figures and asked to identify the missing piece.
2. Multiplication: You will be given a number and asked to identify two numbers that multiply to the given number. For example, if the given number is 18, a possible answer is 2 & 9, as $2 \times 9 = 18$.
3. Anagrams: You will be given 5 letters and asked to form a word that includes all of the 5 given letters. For example, if the letters are eglna, a possible solution is angle.

Please ensure you are ready to begin the task. The 3 minute countdown will begin as soon as you proceed to the next page.

[Problems]

End Part I Control

You have now completed the first part of this study.

You will be randomly assigned to a group with four other participants and there will be an initial allocation of the \$5 bonus. You will then be invited for a short follow-up study within the next 3 days where you will be asked about your preferences for redistributing the bonus allocation within your group.

We will pay out all final bonus payments within 10 days after this follow-up study. Please note that you will only receive your final bonus payment if you also complete the follow-up study.

If you have any questions in the meantime, please contact us via the Prolific messaging centre or at K1899400@kcl.ac.uk.

Please click the arrow in the bottom-right corner to submit your responses.

End Part I Treatment

You have now completed the first part of this study.

You will be randomly assigned to a group with four other participants and there will be an initial allocation of the \$5 bonus. You will then be invited for a short follow-up study within the next 3 days where you will be asked about your preferences for redistributing the bonus allocation within your group. You will not have to complete any tasks again in this follow up study.

We will pay out all final bonus payments within 10 days after this follow-up study. Please note that you will only receive your final bonus payment if you also complete the follow-up study.

If you have any questions in the meantime, please contact us via the Prolific messaging centre or at K1899400@kcl.ac.uk.

Please click the arrow in the bottom-right corner to submit your responses.

Distribution Stage

Complex Problems Introduction

Thank you for participating in this follow-up study. In the previous study, you took part in a complex problem task. You were asked to correctly complete as many complex problems as possible within 3 minutes. These complex problems consisted of Raven's matrices, multiplication exercises, and anagrams.

You have now been randomly assigned to a group and the participant who correctly completed the most complex problems within your group has received an initial \$5 bonus allocation. On the next screen, you will be asked to decide on the allocation of the \$5 bonus within your group. You can redistribute equally among the remaining 4 people in your group any amount of the \$5. There is a 50% chance that the decision of an impartial participant who is not part of your group will be implemented and a 50% chance that the decision of someone in your group will be implemented.

We will provide you with information on which member of your group was allocated the initial bonus of \$5. You will then have the option to redistribute all or part of the \$5. Any indicated amount will be split evenly among everyone else in the group. Please note, that you might be the person who was allocated the \$5 initially.

Please click on the arrow below to proceed.

Slider Task Introduction

Thank you for participating in this follow-up study. In the previous study, you took part in a slider task. You were asked to move as many sliders as possible to the number 50 within 3 minutes.

You have now been randomly assigned to a group and the participant who correctly completed the most sliders within your group has received an initial \$5 bonus allocation. On the next screen, you will be asked to decide on the allocation of the \$5 bonus within your group. You can redistribute equally among the remaining 4 people in your group any amount of the \$5. There is a 50% chance that the decision of an impartial participant who is not part of your group will be implemented and a 50% chance that the decision of someone in your group will be implemented.

We will provide you with information on which member of your group was allocated the initial bonus of \$5. You will then have the option to redistribute all or part of the \$5. Any indicated amount will be split evenly among everyone else in the group. Please note, that you might be the person who was allocated the \$5 initially.

Please click on the arrow below to proceed.

Control Introduction

Thank you for participating in this follow-up study.

You have now been randomly assigned to a group and one of you has been randomly chosen to receive an initial \$5 bonus allocation. On the next screen, you will be asked to decide on the allocation of the \$5 bonus within your group. You can redistribute equally among the remaining 4 people in your group any amount of the \$5. There is a 50% chance that the decision of an impartial participant who is not part of your group will be implemented and a 50% chance that the decision of someone in your group will be implemented.

We will provide you with information on which member of your group was allocated the initial bonus of \$5. You will then have the option to redistribute all or part of the \$5. Any indicated amount will be split evenly among everyone else in the group. Please note, that you might be the person who was allocated the \$5 initially.

Please click on the arrow below to proceed.

Understanding Questions

Before you make your decision, please answer the following questions. Your final payment will not depend on your answers to these questions. However, please answer to the best of your ability as your answers will impact the quality of our research.

U1: How many participants are in each group?

- 3
- 4
- 5

- 10

U2: If you decide to redistribute \$4 of the initial bonus allocation of \$5 that one of the participants in your group received, how much will each of the other participants have after your decision?

- \$0
- \$1
- \$4
- \$5

U3: What is the chance that a redistribution decision made by one of the members of your group will be implemented?

- 25%
- 50%
- 75%
- 100%

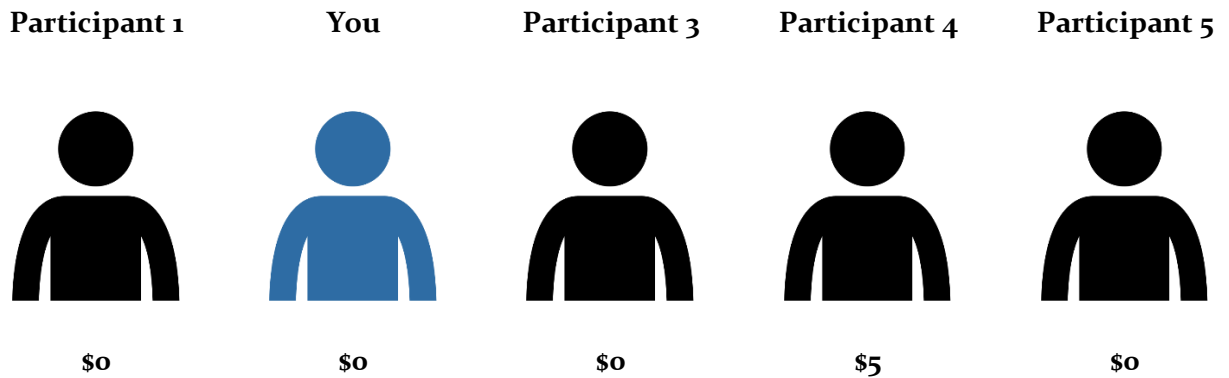
Please review the correct answers to the questions below:

1. How many participants are in each group?
5
2. If you decide to redistribute \$4 of the initial bonus allocation of \$5 that one of the participants in your group received, how much will each of the other participants have after your decision?
\$1
3. What is the chance that a redistribution decision made by one of the members of your group will be implemented?
50%

Please click on the arrow below to proceed to the first decision.

Decision Screen

Please consider the below information for your group.



You now have the option to redistribute the bonus allocation of *Participant 4*.

Participant 4 received the initial \$5 bonus allocation because they correctly completed the most sliders/complex problems within your group/was randomly chosen to receive the initial \$5 bonus allocation. Please indicate how much of the \$5 you wish to redistribute. Any indicated amount will be split evenly among you and the other three participants within the group. If you do not want to redistribute the bonus allocation, you can just enter \$0.

Decision 1: How much of the \$5 do you want to redistribute?

Amount you want to redistribute (in \$):

Please click on the arrow below to proceed.

Beliefs and Preferences [if blue - only for treatment groups]

B1: What was the reason you chose to redistribute the amount you did?

[]

B2: How fair did you consider the initial allocation of the \$5 bonus within your group?

[Scale]

B3: To what extent did you think the top earner deserved their \$5 bonus in the initial allocation?

[Scale]

B4: To what extent do you think effort *is required to perform well on the task participants in your group completed*/was required to receive the initial allocation of the \$5 bonus?

[Scale]

B5: To what extent do you think skill *is required to perform well on the task participants in your group completed*/was required to receive the initial allocation of the \$5 bonus?

[Scale]

B6: To what extent do you think luck *is required to perform well on the task participants in your group completed*/was required to receive the initial allocation of the \$5 bonus?

[Scale]

B7: Why do you think *some perform well on the task participants in your group completed*/one participant received the initial allocation of the \$5 bonus? Please allocate a total of 100 points across the below four options. Please ensure that the more points you allocate to an option, the more important you consider it to *be able to perform well on the task*/receive the initial allocation of the \$5 bonus. Please allocate all 100 points before proceeding.

- Inherited Intelligence
- Education
- Luck
- Effort

M1: What would be the minimum bonus payment you would need to receive to participate in a follow-up study where you complete the same task again for 3mins? You will not be informed of your performance on the task. We will select the 10 participants who suggest the lowest amount to participate in the follow-up study and they will receive their stated minimum bonus payment in return.

M2a: We previously asked 100 participants to also complete the same task that you completed for 3mins. There were a total of 100 sliders/ 30 complex problems that could be attempted in this study. The participant with the highest performance received a prize of \$10. How many of those 100 possible sliders/ 30 possible complex problems do you think participants in this study completed on average? If your guess lies within +/- 5 percentage points of the correct answer you will receive an additional bonus payment of 20ct.

[]

M2b: In another study, we again asked 100 participants to also complete the same task that you completed for 3mins. There were a total of 100 sliders/ 30 complex problems that could be attempted in this study. The participant with the highest performance however received a prize of \$30. How many of those 100 possible sliders/ 30 possible complex problems do you think participants in this study completed on average? If your guess lies within +/- 5 percentage points of the correct answer you will receive an additional bonus payment of 20ct.

[]

M3: Consider again the task you completed at the beginning of this study. We randomly selected 100 participants who also completed this task as part of our study. How many of these 100 participants do you believe were able to correctly complete more than 12 pages of sliders/ 12 complex problems within the 3mins? If your guess lies within +/- 5 percentage points of the correct answer you will receive an additional bonus payment of 20ct.

Demographics

In this final part of the study, we will ask you a number of questions about yourself. Please read the questions carefully and answer honestly. This part should take only 2-3 minutes.

D1: How old are you?

[]

D2: What is your gender?

- Female
- Male
- Other
- Prefer not to answer

D3: To which of these groups do you consider you belong? You can choose more than one group.

- American Indian or Alaska Native
- Asian
- Black or African-American
- Native Hawaiian or other Pacific Islander
- Spanish, Hispanic or Latino
- White
- Other group
- Prefer not to answer

D4: Which category best describes your highest level of education?

- Primary education or less
- Some high school
- High school degree/GED
- Some college
- 2-year college degree
- 4-year college degree
- Master's degree;
- Doctoral degree

- Professional degree (JD, MD, MBA)
- Prefer not to answer

D5: What is your total (annual) household income before tax?

- Under \$10,000
- \$10,000 – \$20,000
- \$20,001 – \$30,000
- \$30,001 – \$40,000
- \$40,001 – \$50,000
- \$50,001 – \$60,000
- \$60,001 – \$80,000
- \$80,001 – \$100,000
- \$100,001 – \$150,000
- \$150,001 – \$200,000
- \$200,001 - \$350,000
- \$350,001 - \$500,000
- Above \$500,000
- Don't know
- Prefer not to answer

D6: What is your current employment status?

- Full-time employee
- Part-time employee
- Self-employed or small business owner
- Medium or large business owner
- Unemployed and looking for work
- Student
- Not currently working and not looking for work (e.g. full-time parent)
- Retiree
- Prefer not to answer

D7: Have you ever taken a module on economics or a related subject area at university?

- Yes
- No
- I have never attended higher education

Thanks again for participating in this study. All bonus payments will be paid within the next 10 days.

If you have any further comments on the study, or if you would like any more information, please contact the researchers at K1899400@kcl.ac.uk.

Please click the arrow in the bottom-right corner to submit your responses.

A.2. Spectator Instructions

General Introduction

Thank you for participating in this study.

In the following, you will be asked to decide on an allocation of money between groups of five participants three times. There is a 50% chance that one of your three allocation decisions will be implemented and will decide the actual payoffs of those five participants. Please consider each of your three decisions carefully as we will not tell you which of your decisions is the one that might be implemented.

Please proceed to your first decision.

Introduction Slider Task Spectators

The five participants in the group had 3 minutes to move as many sliders as possible to the number 50. The participant who correctly completed the most sliders in the group received an initial bonus allocation of \$5, while the others received nothing. To give you a better understanding of the task, you can now try it yourself for 1 min.

Please proceed on the arrow below.

Slider Task

In the following, you will be shown a scenario similar to the one below. Each of the five participants in the group completed the slider task. The participant who correctly completed the most sliders in the group received an initial bonus allocation of \$5, while the others received nothing.

You are given information on the current bonus allocations of the five participants in the group. Before we pay out these bonus payments, however, you have the opportunity to redistribute part or all of the \$5 within the group. Any indicated amount will be split evenly among the other four participants within the group.

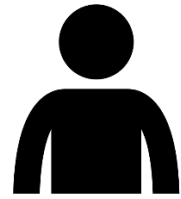
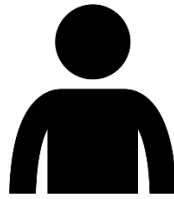
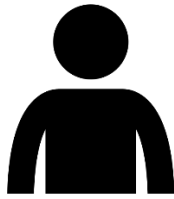
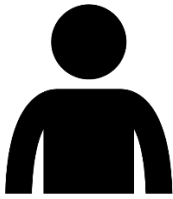
Participant 1

Participant 2

Participant 3

Participant 4

Participant 5



\$0

\$0

\$0

\$5

\$0

Please proceed on the arrow below.

Introduction Complex Problems Task Spectators

The five participants in the group had 3 minutes to answer as many complex problems as possible. The participant who answered the most complex problems correctly in the group received an initial bonus allocation of \$5, while the others received nothing. To give you a better understanding of the task, you can now try it yourself for 1 min.

There are three types of complex problems you will be asked to solve in random order:

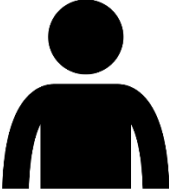
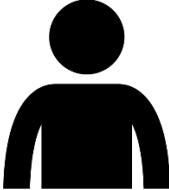
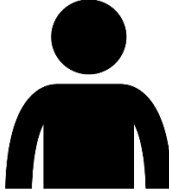


1. Raven's matrices: You will be shown a pattern of figures and asked to identify the missing piece.
2. Multiplication: You will be given a number and asked to identify two numbers that multiply to the given number. For example, if the given number is 18, a possible answer is 2 & 9, as $2 \times 9 = 18$.
3. Anagrams: You will be given 5 letters and asked to form a word that includes all of the 5 given letters. For example, if the letters are eglna, a possible solution is angle.

Please proceed on the arrow below.

Complex problems task

In the following, you will be shown a scenario similar to the one below. Each of the five participants in the group completed the complex problems task. The participant who answered the most complex problems correctly in the group received an initial bonus allocation of \$5, while the others received nothing.

You are given information on the current bonus allocations of the five participants in the group. Before we pay out these bonus payments, however, you have the opportunity to redistribute part or all of the \$5 within the group. Any indicated amount will be split evenly among the other four participants within the group.

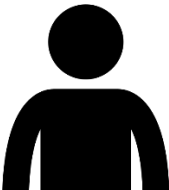
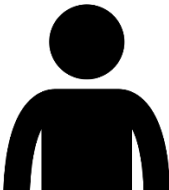
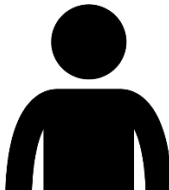


Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
				
\$0	\$0	\$0	\$5	\$0

Please proceed on the arrow below.

Introduction Control Spectators

You will be shown a scenario similar to the one below. One of the five participants in the group was randomly chosen to receive an initial bonus allocation of \$5, while the others received nothing.

You are given information on the current bonus allocations of the five participants in the group. Before we pay out these bonus payments, however, you have the opportunity to redistribute part or all of the \$5 within the group. Any indicated amount will be split evenly among the other four participants within the group.

Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
				
\$0	\$0	\$0	\$5	\$0

Please proceed on the arrow below.

Understanding Section

Before you make your first decision, please answer the following questions. Your final payment will not depend on your answers to these questions. However, please answer to the best of your ability as your answers will impact the quality of our research.

U1: What is the chance that one of your allocation decisions will be implemented and decide the bonus payments for the group?

- 10%
- 25%
- 50%
- 100%

U2: How many participants are in each group?

- 3
- 4
- 5
- 10

U3: If you decide to redistribute \$4 of the initial bonus allocation of \$5 that one of the participants in the group received, how much will each of the other participants have after your decision?

- \$0
- \$1
- \$4
- \$5

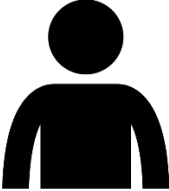
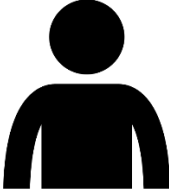
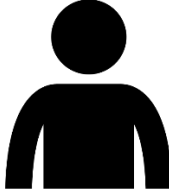


Please review the correct answers to the questions below:

1. What is the chance that one of your allocation decisions will be implemented and decide the bonus payments for the group?
50%
2. How many participants are in each group?
5
3. If you decide to redistribute \$4 of the initial bonus allocation of \$5 that one of the participants in the group received, how much will each of the other participants have after your decision?
\$1

Please click on the arrow below to proceed to the first decision.

Decision Screens

Please carefully consider the below scenario.

Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
				
\$0	\$0	\$0	\$5	\$0

You now have the option to redistribute the bonus allocation of *Participant 4*.

Participant 4 received the initial \$5 bonus allocation because they correctly completed the most sliders/complex problems within the group/was randomly chosen to receive the initial \$5 bonus allocation. Please indicate how much of the \$5 you wish to redistribute. Any indicated amount will be split evenly among the other four participants within the group. If you do not want to redistribute the bonus allocation, you can just enter \$0.

Decision 1: How much of the \$5 do you want to redistribute?

Amount you want to redistribute (in \$):

Please click on the arrow below to proceed.

Beliefs and Preferences [if blue - only for treatment decisions]

B1: What was the reason you chose to redistribute the amount you did?

[]

B2: How fair did you consider the initial allocation of the \$5 bonus within the group?

[Scale]

B3: To what extent did you think the top earner deserved their \$5 bonus in the initial allocation?

[Scale]

B4: To what extent do you think effort *is required to perform well on the task participants in this group completed*/was required to receive the initial allocation of the \$5 bonus?

[Scale]

B5: To what extent do you think skill *is required to perform well on the task participants in this group completed*/was required to receive the initial allocation of the \$5 bonus?

[Scale]

B6: To what extent do you think luck *is required to perform well on the task participants in this group completed*/was required to receive the initial allocation of the \$5 bonus?

[Scale]

B7: Why do you think *some perform well on the task participants in this group completed*/one participant received the initial allocation of the \$5 bonus? Please allocate a total of 100 points across the below four options. Please ensure that the more points you allocate to an option, the more important you consider it to *be able to perform well on the task/receive the initial allocation of the \$5 bonus*. Please allocate all 100 points before proceeding.

- Inherited Intelligence
- Education
- Luck
- Effort

M1: What would be the minimum bonus payment you would need to receive to participate in a follow-up study where you complete the same task again for 3mins? You will not be informed of your performance on the task. We will select the 10 participants who suggest the lowest amount to participate in the follow-up study and they will receive their stated minimum bonus payment in return.

M2a: We previously asked 100 participants to also complete the same task that you completed for 3mins. There were a total of 100 sliders/ 30 complex problems that could be attempted in this study. The participant with the highest performance received a prize of \$10. How many of those 100 possible sliders/ 30 possible complex problems do you think participants in this study completed on average? If your guess lies within +/- 5 percentage points of the correct answer you will receive an additional bonus payment of 20ct.

[]

M2b: In another study, we again asked 100 participants to also complete the same task that you completed for 3mins. There were a total of 100 sliders/ 30 complex problems that could be attempted in this study. The participant with the highest performance however received a

prize of \$30. How many of those 100 possible sliders/ 30 possible complex problems do you think participants in this study completed on average? If your guess lies within +/- 5 percentage points of the correct answer you will receive an additional bonus payment of 20ct.
[]

M3: Consider again the task you completed at the beginning of this study. We randomly selected 100 participants who also completed this task as part of our study. How many of these 100 participants do you believe were able to correctly complete more than 12 pages of sliders/ 12 complex problems within the 3mins? If your guess lies within +/- 5 percentage points of the correct answer you will receive an additional bonus payment of 20ct.

Second Decision Intro

You have now completed your first allocation decision.

Please remember that there is a 50% chance that one of your three allocation decisions will be implemented and will decide the actual payoffs of the group of participants.

Please click on the arrow below to proceed to your second decision.

Third Decision Intro

You have now completed your second allocation decision.

Please remember that there is a 50% chance that one of your three allocation decisions will be implemented and will decide the actual payoffs of the group of participants.

Please click on the arrow below to proceed to your third and final decision.

Demographics

In this final part of the study, we will ask you a number of questions about yourself. Please read the questions carefully and answer honestly. This part should take only 2-3 minutes.

D1: How old are you?

[]

D2: What is your gender?

- Female

- Male
- Other
- Prefer not to answer

D3: To which of these groups do you consider you belong? You can choose more than one group.

- American Indian or Alaska Native
- Asian
- Black or African-American
- Native Hawaiian or other Pacific Islander
- Spanish, Hispanic or Latino
- White
- Other group
- Prefer not to answer

D4: Which category best describes your highest level of education?

- Primary education or less
- Some high school
- High school degree/GED
- Some college
- 2-year college degree
- 4-year college degree
- Master's degree;
- Doctoral degree
- Professional degree (JD, MD, MBA)
- Prefer not to answer

D5: What is your total (annual) household income before tax?

- Under \$10,000
- \$10,000 – \$20,000
- \$20,001 – \$30,000
- \$30,001 – \$40,000
- \$40,001 – \$50,000
- \$50,001 – \$60,000
- \$60,001 – \$80,000
- \$80,001 – \$100,000
- \$100,001 – \$150,000

- \$150,001 – \$200,000
- \$200,001 - \$350,000
- \$350,001 - \$500,000
- Above \$500,000
- Don't know
- Prefer not to answer

D6: What is your current employment status?

- Full-time employee
- Part-time employee
- Self-employed or small business owner
- Medium or large business owner
- Unemployed and looking for work
- Student
- Not currently working and not looking for work (e.g. full-time parent)
- Retiree
- Prefer not to answer

D7: Have you ever taken a module on economics or a related subject area at university?

- Yes
- No
- I have never attended higher education

D8: In politics people sometimes talk of left and right. Where would you place yourself on the following scale?

Left		Right	Don't know								
0	1	2	3	4	5	6	7	8	9	10	

D9: Which party do you feel closest to?

- Democratic party
- Republican party
- Other
- Don't know

D10: Who did you vote for in the recent 2020 Presidential Election?

- Joe Biden
- Donald Trump

- Other candidate
- Didn't vote
- Don't remember
- Prefer not to say

D11: Please tell us, in general, how willing or unwilling you are to take risks. Please use a scale from 0 to 10, where 0 means "completely unwilling to take risks" and a 10 means you are "very willing to take risks". You can also use any numbers between 0 and 10 to indicate where you fall on the scale.

[Scale]

D12: Please respond to the following statements by indicating the extent to which you agree or disagree with them on a scale from 1 (I strongly agree) to 7 (I strongly disagree).

- There is a right way and a wrong way to do almost everything
- Practically every problem has a solution
- I feel relieved when an ambiguous situation suddenly becomes clear
- I find it hard to make a choice when the outcome is uncertain

D13: Do you have any feedback or impressions regarding this study?

[]

End

Thanks again for participating in this study.

If you have any further comments on the study, or if you would like any more information, please contact the researchers at K1899400@kcl.ac.uk.

Please click the arrow in the bottom-right corner to submit your responses.