Negative income shocks and redistributive preferences

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Abstract

Times of economic crises raise questions about how to distribute burdens and support, evoking a debate about what is fair. While previous research has shown that, even in economically stable times, there exists a plurality of fairness views, it is less clear how and whether the latter react to a changing economic environment. In this project, we use a series of experiments to explore whether negative income shocks affect individual preferences for redistribution. The experiment consists of two parts: a production and a redistribution stage. After having earned an endowment, participants are paired in groups of two and given the opportunity to redistribute income. We then explore the effect of negative income shocks, varying both who is affected and what is known about the experiences of others. Finally, in a separate treatment, we introduce information about experiences of real world economic shocks into our set-up and investigate the impact of these on behaviour in the laboratory.

1 Motivation and research question

Questions about inequality and redistribution regularly give rise to lively public and political debates. One reason for their recurrence is that people differ in their opinions about what is fair (Konow, 2003; Cappelen et al., 2007; Konow & Schwettmann 2016). Previous research has shown that distributional preferences can be inconsistent and dependent on external factors. One finding is that fairness views are subject to a self-serving bias (Piketty, 1995; Konow, 2000; Ubeda, 2014). In a within-subject design Ubeda (2014) shows that if environments change, individuals select the rule that is optimal for themselves in each situation. In fact, such context dependence has been found both inside and outside the laboratory. Barr et al. (2015) for instance relate the propensity to acknowledge entitlement owing to effort in the lab to the economic status of participants in everyday life. Moreover, becoming unemployed seems to act as an external shock that leads people to stop acknowledging earned entitlement (Barr et al. 2016).

Having established that environmental factors can play an important role in the formation of preferences, understanding distributional preferences in the presence of economic shocks becomes a particularly interesting question. Firstly, if not everyone is affected symmetrically, inequality can increase and thereby enhance the scope for redistribution. Recent studies indicate that vulnerable groups could be hit particularly hard by the economic shocks caused by the outbreak of COVID-19 (Furceri et al., 2020). Secondly, it is possible that distributional

preferences themselves are affected by the experience of shocks, leading to a shift in what is considered as fair.

According to Zaki (2020), there are two rivalling views of human behaviour in times of crises. The first one is centred on the assumption that individuals will act selfishly. In line with this argument, Fisman et al. (2015) found that during the Great Recession (2007-2009) participants in the lab acted more selfishly and showed more concern for efficiency than equality. Contrasting this finding, times of crises are frequently associated with mutual aid, feelings of community and increased prosocial behaviour. In this regard, Zaki (2020) talks of *catastrophe compassion*. Psychological research suggests that the experience of own hardship might indeed change the receptiveness and empathy for the suffering of others (Eklund et al., 2009; Lim & DeSteno, 2016). In line with that argument, Cassar & Klein (2019) show that the experience of failure induces subjects to favour higher levels of redistribution as an unaffected observer in a lab experiment. More recently, Cappelen et al. (2020) find that the crisis induced by COVID-19 has increased solidarity and led people to prioritise society's problems over their own. However, the survey also shows an increase in acceptance of inequality caused by luck, thus having heterogeneous effects on the support for redistribution.

To develop a better understanding of how negative income shocks affect redistributive decisions, we exogenously vary the experience of shocks in an experimental setting. We vary both who is affected by the shock (self, other, both) and how much information is available about the experience of other players. Finally, in a separate treatment, we introduce information about experiences of real world economic shocks into our set-up and test whether our findings generalise in this context.

2 Experimental design

2.1 Negative income shocks within the lab

The experiment consists of two stages: A production and a redistribution stage (see figure 1). In the production stage, each individual undertakes a real-effort task and is paid a flat fee for its completion. Individuals are randomly assigned to a more difficult or an easier version of the task and receive respectively higher or lower *pre-shock earnings* (x_{h0},x_{l0}). Below, we will refer to them as *h* and *l* players. This differentiation allows for a richer analysis, as we can assess whether the relative income of the person who suffers a shock matters. Participants know at the beginning of the experiment that their earnings in the production stage will depend on a) the difficulty level of the real-effort task and b) "external factors" that will be specified later on.[1] After players have completed the real-effort task, a negative income shock may occur. Half of the participants suffer a shock, while the other half does not. They are immediately

[1] See appendix B.1-B.3 for experimental instructions.

informed whether they have been hit by a shock as well as about their new *post-shock earnings* (x_{h1},x_{l1}).

For the redistribution stage, we always match an *h* to an *l* player and give them the opportunity to redistribute the *total post-shock earnings* ($X_1 = x_{h1} + x_{l1}$) brought into this stage by both players (see e.g. Cappelen et al., 2007; 2013). Each player i (i ∈ {h, l}) thereby acts as a dictator and at the end of the experiment we randomly choose one of the two's allocation decisions to be payoff relevant.

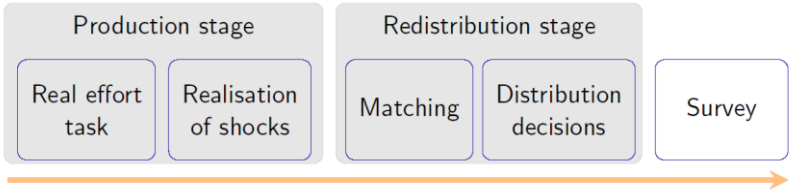

Figure 1: Basic experimental structure

To gain a more precise understanding of how income shocks affect distributive preferences, we vary the shock experiences of the players between treatments. A key feature of our design is that the final allocation decision is always identical (same X_1,x_{h1}, x_{l1}). Thus, the only thing that varies across treatments is the players' experiences of shocks (more detail below). This, allows us to identify the effect of different shock distributions on redistributive decisions.

While the personal experience of a participant is fixed (a player can either have suffered a shock or not), we employ a within-subject design relating to the experience of the other player. After players learn about their own shock, they make three different allocation decisions. One a) for themselves versus another player who has suffered a shock, one b) for themselves versus another player who has not suffered a shock and one c) for themselves versus another player for whom they have no information about whether they have or have not have suffered a shock (see figure 2). We therefore compare situations in which nobody, only the dictators themselves, only the other players and both have suffered a shock. In addition, the no information treatment (c) allows us to explore whether there is a bias in belief formation. For example, people could assume that they are the only ones who have suffered a shock in the absence of explicit information. We therefore also elicit incentivised beliefs on what happened to the other player and map them onto observed allocation behaviour.

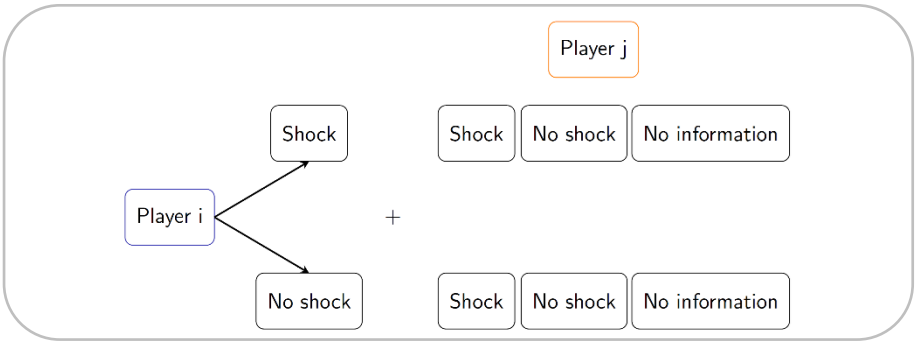

Figure 2: Treatment conditions

As it is possible that earlier allocation decisions have an impact on later ones, we randomise the decision order. One of the three decisions will then be randomly chosen to be payoff relevant for player i and the respective other player j.[2] A second lottery will decide whose decision is being implemented for the chosen round.

2.2 Real world shocks

In addition to exploring the effects of shocks within the laboratory, we bring experiences of real-life economic shocks into the lab and test whether our results generalise to this context. For this study, we define a real-life shock experience as a change from full-time employment to unemployment due to the current COVID-19 crisis.

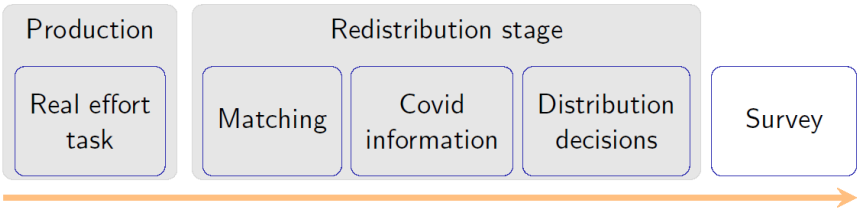

Figure 3: Overview of the experimental structure for real world shocks

The structure of the experiment with real world shocks closely follows the laboratory experiments (see figure 3). As in previous treatments, half of the participants engage in an easier task earning *l*, the other half in a more difficult task earning *h*. The payoffs are kept constant across all treatments. However, after players are matched for the redistribution stage, we now provide information about the real world shock of the other player. A player who did/ did not lose their employment due to COVID can thus either learn that the player they are matched with a) lost their job due to COVID, b) did not lose their job due to COVID or c) don't receive any information about the other player's economic circumstances. The formulation we use to communicate this information is whether the other participant "has suffered a significant loss in livelihood due to the COVID-19 crisis."[3] In the case of incomplete information, we will elicit beliefs about the other player's real-life shock in addition to allocation decisions. The real world shock treatments thus perfectly mirror the 2x3 design of the laboratory shock treatments (see figure 2) and allow us to explore whether our findings generalise in this context.

[2] In addition to randomising the order of decisions, we also account for this potential issue by restricting the analysis to only first choices as a robustness check.

[3] See appendix B.4 for examples of how information about the other player is communicated.

3 Hypotheses

3.1 Negative income shocks within the laboratory

This section outlines how we explore the effect of different shocks on allocation decisions. Table 1 gives an overview of the different pre- and post-shock earnings across treatments. As mentioned above and depicted in table 1, post-shock earnings are identical across all treatments. Therefore, any observed differences between treatments must come from differences in pre-shock earnings. In addition, by exploring differences in behaviour between *h* and *l* players, we then assess whether the relative income of the person who suffers a shock matters.

It is important to note that one potential confound in our analysis could be stake size effects. Differences in individual pre-shock earnings (x_{i0},x_{j0}) automatically imply differences in total pre-shock earnings (X_0). Allocations to self could thus be affected by stake size effects. We address this concern through an additional treatment in appendix A2.

	Pre-shock earnings (x_{h0},x_{l0})	**Post-shock earnings** (x_{h1},x_{l1})
Full information		
C1: No shock	300, 100	300, 100
T1: Shock to self	400, 100* / 300, 200**	300, 100
T2: Shock to other	300, 200 */ 400, 100**	300, 100
T3: Shock to both	400, 200	300, 100
Incomplete information		
C2: No shock to self	300, ? */ ?, 100**	300, 100
T4: Shock to self	400, ? */ ?, 200**	300, 100

Table 1: Pre- and post-shock earnings across treatments

Note: * Self/ other from the perspective of *h* players. ** Self/ other from the respective of *l* players.

As a first step, we explore how shocks that happen either to *oneself* or to the *other player* affect allocations. To look at shocks to self we compare a treatment in which nobody has suffered a shock (C1) to a treatment in which only the dictator has suffered a shock (T1). Similarly, when looking at the effect of a shock to the other player, we compare C1 to T2, a situation in which only the other player has suffered a shock. We expect that players take both own and other's pre-shock earnings into account when making an allocation decision. We thus hypothesise that a shock to own earnings will result in higher allocations to self, whereas a shock to the other player will increase the amount allocated to the other - relative to a control treatment without shocks.

> *H1: Everything else being equal, a shock to own earnings results in higher allocations to oneself and lower allocations to the other player.*

H2: Everything else being equal, a shock to the other player results in lower allocations to oneself and higher allocations to the other player.

After looking at the effect of unilateral shocks, an interesting question is what happens under common shocks (T3). Looking at a situation in which both players have suffered a shock allows us to assess whether they put more weight on one shock than the other. The more players care about own shocks, the closer their allocations to self in T3 will be to their allocations to self in T1, while the more they care about the shock to others, the closer they will be to their allocations to self in T2.[4]

H3: The more weight participants put on own shocks, the closer allocations to self in T3 should be to those in T1. The more weight participant put on other's shocks, the closer allocations to self in T3 should be to those in T2.

Finally, to explore whether participants show a self-serving bias under incomplete information, we check whether allocations to self in C2 are closer to C1 (where nobody has suffered a shock) or to T2 (where only the other player has suffered a shock). Similarly, allocations to self in T4 are compared to allocations to self in T1 (where only the dictator has suffered a shock) versus T3 (where both have suffered a shock).

H4: If there is a self-serving bias in the perception of shocks, allocations to self in C2 (T4) should be closer to C1 than T2 (closer to T1 than T3). If there is no bias, allocations to self in C2 (T4) should lie exactly between C1 and T2 (T1 and T3).

3.2 Real world shocks

In the real world shock treatments, the allocation decision is again always identical ($x_{h1} = 300, x_{l1} = 100$). Instead of the information on pre-shock incomes within the experiment, participants learn whether the other player has or has not suffered a significant loss in livelihood due to the COVID-19 crisis.[5] Our hypotheses for the real world shock treatments are in line with the hypotheses specified above. We still expect that personally suffering a negative shock (losing employment) will lead to more self-focused behaviour and thus higher allocations to self (H1). By contrast, being matched with another participant who lost their job due to COVID-19 should reduce allocations to self (H2). As above, we then explore which effect dominates in the case of shocks to both as well as the implications of incomplete information. This does not only allow us to explore our hypotheses with real world shocks, but

[4] Note that while the absolute shock is identical across players, in relative terms *l* players have suffered a larger shock. While we can thus clearly identify if an *h* player assigns a larger weight to own shocks, an allocation decision closer to the one in T2 can mean either that shocks to the other player are weighted stronger or that subjects account for a higher relative shock. Similarly, for l players we can only clearly identify larger weights on others. As it is not possible to keep both absolute and relative shocks constant, we cannot avoid this problem. However, we mitigate it by adding control questions on the perception of absolute versus relative differences to our survey.

[5] See appendix A1 for an overview of real world shock treatments.

also to compare the direction of treatment effects between exogenously assigned shocks within the lab and real world experiences.

4 Data

4.1 Sample and data collection

We programmed the experiment using LIONESS lab (Giamattei et al., 2020) and recruit participants online via Prolific. We base our required sample size on an average effect size of 0.36 standard deviations that is informed by previous research on redistributive preferences (Fisman et al., 2015; Barr et al., 2015; Cassar & Klein, 2017). A power analysis based on comparisons of means then shows that to be able to detect an effect at a significance level of 5% with 90% power we require a sample size of 134 participants in each treatment cell. This results in a sample size of 536 participants for the laboratory shock treatments, and another 536 participants for the real world shock treatments (see table 2).

	Laboratory shock		Real world shock	
	h players	l players	h players	l players
Shock	134	134	134	134
No shock	134	134	134	134
Total N	536		536	

Table 2: Sample size

As mentioned above, we use the employment status to define whether a participant suffered a recent real world shock. Participants who experienced a change from full-time employment to unemployment due to the current COVID-19 crisis are classified as having suffered a shock, while participants who remained in full-time employment are classified as not having suffered a shock. Prolific provides information about a participant's changes to employment status due to COVID-19. This information is self-reported and provided voluntarily by Prolific users.

For the real world shock treatments, we recruit N=268 participants who indicated that they were full-time employed, but are now unemployed (shock condition) and N=268 participants who are still full-time employed (no-shock condition). For the laboratory shock treatments, we do not require an equal amount of participants who did/ did not have suffered a real world shock. However, to enhance our ability to control for a participant's recent personal experience, we stratify along this dimension to ensure balance across treatment cells. Here, we allow for three levels of shocks: 1) participants who became unemployed (large shock), 2) participants who were full-time employed and now work part-time (medium shock) and 3) participants who still work full-time (no shock).

After participants complete the experiment, we ask them to fill out a short questionnaire. We collect information on participant's gender, age, country of birth and residence, household income and size, political orientation, subjective social status (Adler et al., 2000), highest

educational attainment as well as attitudes towards redistribution and solidarity, effects of COVID-19 crisis on financial situation and perceptions of human behaviour during a crisis. We also ask again about COVID-19 employment status, phrased exactly as the question on Prolific, to validate the information provided by the platform. Finally, we collect data on participant's perceptions of the experiment. Concretely, we are looking at the perceived fairness of the initial difference in pre-shock earnings, affect reactions when learning about own/ other's shocks (see secondary outcomes) and relative versus absolute perception of shocks.

4.2 Analysis

Primary outcome: Allocation to self

Our main variable of interest is the number of tokens individuals allocate to themselves in the redistribution stage (y_i). To answer our main question of how allocation decisions differ depending on experiences of shocks, we perform both non-parametric tests between treatments as well as parametric analysis (regressions) that allows us to include additional controls. In addition to exploring the effects of shocks, we also test whether reactions to shocks differ between *h* and *l* players.

Secondary outcomes

As a secondary outcome, we are also interested in which factors could influence allocation decisions. In particular, we are looking at closeness between participants and positive/ negative affect. We elicit closeness between participants using the IOS scale (Aron et al., 1992). Respondents thereby choose a pair of circles out of seven options with different degrees of overlap. A score of one implies no overlap, while a score of seven indicates the largest possible overlap. We elicit the IOS score after each allocation decision. Affect is measured on a scale from 0 to 100 that distinguishes between positive and negative affect, using a variation of the pictorial assessment scale developed by Desmet et al. (2001). In our analysis, we are then exploring whether different experiences of shocks lead to different feelings of connectedness or affect.

Lastly, we also explore differences in the reaction to laboratory and real word shocks, as well as possible interactions. Finally, for the incomplete information treatments, we analyse the role of beliefs about the other participant's shock. Again, we do so by using both parametric and non-parametric methods.

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Appendix

A.1 Overview of real world shock treatments

	Lost employment due to COVID-19 (Yes/No)
Full information	**i, j**
C1*: No shock	N, N
T1*: Shock to self	Y, N
T2*: Shock to other	N, Y
T3*: Shock to both	Y, Y
Incomplete information	
C2*: No shock to self	N, ?
T4*: Shock to self	Y, ?

Table A1: Real world shock treatments

A.2 Testing for stake size effects

While our treatments hold most things constant one potential confound is the difference in total pre-shock earnings (X_0). Whenever one of the two players suffers a negative shock, inevitably the total amount that can be distributed between players is shrinking. There already exists literature on the importance of stake size effects in dictator and ultimatum games (Cameron, 1999; Raihani et al., 2013; Larney et al., 2019), suggesting that under higher stakes receivers tend to *accept* lower offers in UG and proposers *make* smaller offers in DG. However, it is not clear how a *shock* to the stake size affects allocation decisions. To assess how important this factor might be we run two additional treatments:

	Total pre-shock earnings (X_0)	Total post-shock earnings (X_1)
C3: No shock	400	400
T5: Shock	600	400

Table A2: Stake size effect treatments

In C3 and T5, participants still work on separate real effort tasks with different levels of difficulty but are not informed about their individual pre-shock earnings. They only learn what they received together (X_0) and whether a shock happened. If there is any change in allocations to self between C3 and T5, it can only be attributed to the difference in total pre-shock earnings X_0 and thus allows us to assess whether we need to control for stake size effects in the other treatments.

H0: If there is no stake size effect, we expect no difference in allocations to self between C3 and T5.

In addition, we compare C3 to C1 (T5 to T3) to assess how not knowing individual contributions affects allocation decisions. Especially *l* players could allocate more to themselves in C3 as previous research has shown that people are sometimes reluctant to take from others.

In line with our power calculations outlined above, we recruit 134 participants for the shock condition and 134 for the no shock condition. Moreover, we again stratify with respect to the experience of real world shocks (high, medium, no shock) to get a balanced sample across C3 and T5 with respect to this dimension. As in the main analysis, we test for stake size effects using non-parametric as well as parametric methods.

B Study Materials

B.1 Instructions laboratory shock treatments

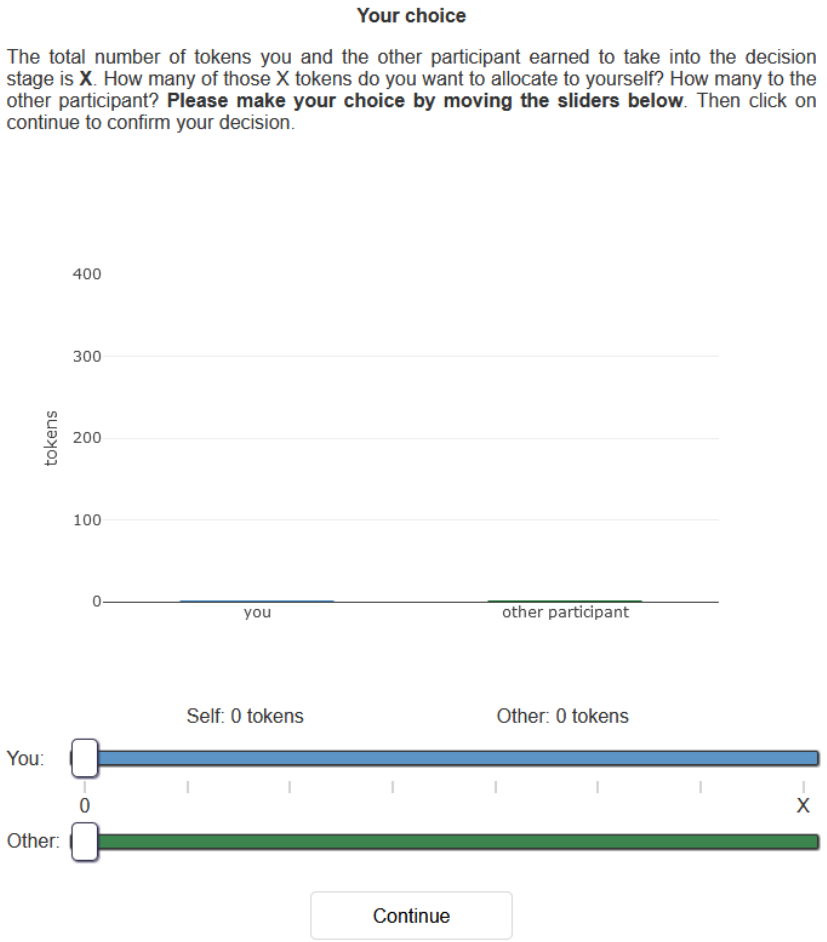
This study consists of three stages: an earning stage, a decision stage, and a short questionnaire. You will be given details about the different stages below. Throughout the study you can earn Experimental Tokens, which are later converted into a bonus (£) at a pre-defined exchange rate (100 tokens = £0.40). Your final bonus will depend partly on your own decision, partly on the decision of another Prolific participant and partly on external factors. How your bonus is determined will be outlined below in greater detail.

Earning stage: In this stage, you have to work in order to earn tokens that are then used in the second stage of the study. As a task, you will be given randomly generated strings of letters that you need to type in reverse order. As an example: If you see the string "rlgowsahc", the correct answer will be "chaswoglr". In order to earn your tokens, you need to correctly solve 10 strings. All participants are randomly assigned to different difficulty levels and earn a different number of tokens. For a higher difficulty level you will earn more tokens. This will help us to correctly calibrate different difficulty levels for another study. **You have been assigned to a more difficult/ an easier level** for which you will earn **x tokens**.[6] After finishing the string reversal task, you will be given more information about external factors that could affect the number of tokens you take into the second stage.

Decision stage: The second stage of the study consists of **three separate decision rounds**. In each round, you will be matched with a different Prolific participant who is participating in the same study but has been assigned to an **easier/ a more difficult level**. In each round, you have to decide how you want to divide the total number of tokens that you and the other

[6] X varies with the treatment condition. For *h* players x is 400 in the shock and 300 in the no shock treatment. For *l* players x is 200 in the shock and 100 in the no shock treatment.

participant took into the second stage between yourself and the other participant. The other participant will do the same. The screenshot below shows what the decision screen will look like:



At the end of the experiment, there will be a lottery that selects one of the three decision rounds to count towards your bonus. In other words, each of the three decision rounds can be relevant for your final payment. Once a round has been selected, another lottery will decide whether your choice or the other participant's choice will determine your final bonuses. With a 50% chance, your choice will determine your and the other participant's final bonuses, with a 50% chance, the other participant's choice will determine your and their final bonuses. All interactions in this study are completely anonymous. You will never know the identity of the other participants, and they will never know yours.

B.2 Instructions real world shock treatments

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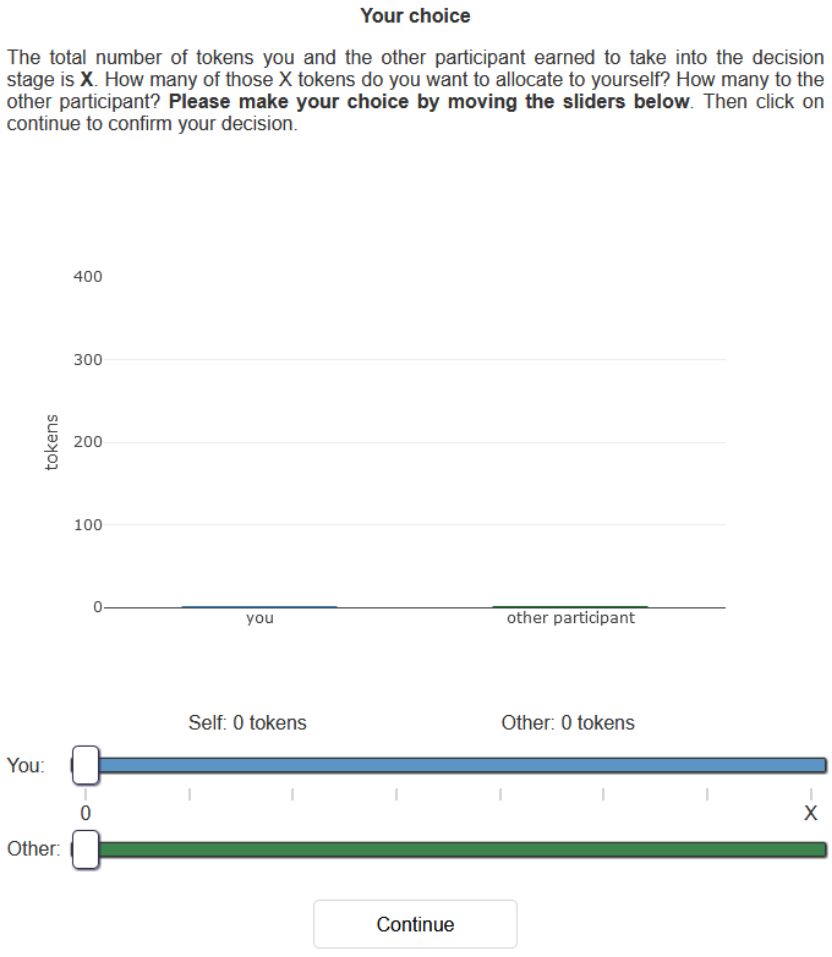


[7] X=300 for *h* players and 100 for *l* players.

In each round, before making your decision, we may show you some **background information about the other participant**. Concretely, we may tell you whether they suffered a **significant loss in livelihood** due to the Covid-19 crisis. This information comes from self-reports on Prolific. Similarly, we may inform your matched participants whether you reported a significant loss in livelihood on Prolific before they make their decisions. Be assured that all interactions in this study are **completely anonymous**. You will never know the identity of the other participants, and they will never know yours.

At the end of the experiment, there will be a lottery that selects one of the three decision rounds to count towards your bonus. In other words, each of the three decision rounds can be relevant for your final payment. Once a round has been selected, another lottery will decide whether your choice or the **other participant's choice** will determine your final bonuses. With a 50% chance, your choice will determine your and the other participant's final bonuses, with a 50% chance, the other participant's choice will determine your and their final bonuses.

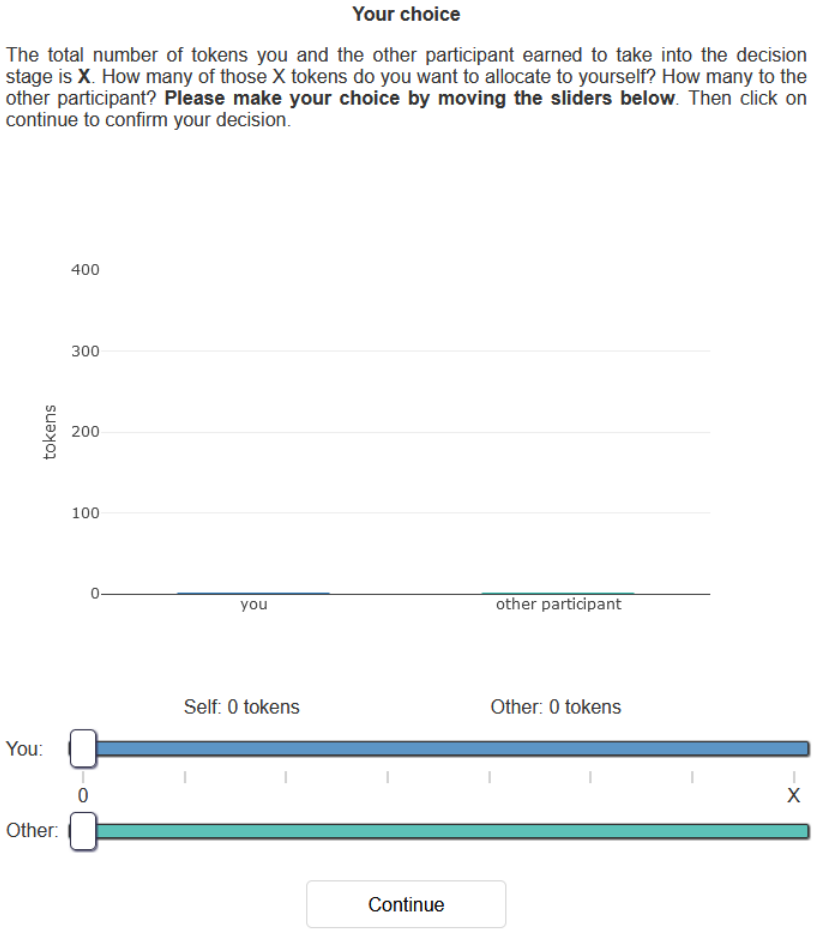
B.3 Instructions stake size effect treatment

This study consists of three stages: an earning stage, a decision stage, and a short questionnaire. You will be given details about the different stages below. Throughout the study you can earn Experimental Tokens, which are later converted into a bonus (£) at a pre-defined exchange rate (100 tokens = £0.40). Your final bonus will depend partly on your own decision, partly on the decision of another Prolific participant and partly on external factors. How your bonus is determined will be outlined in greater detail below.

Earning stage: In this stage, you have to work in order to earn tokens that are then used in the second stage of the study. As a task, you will be given randomly generated strings of letters that you need to type in reverse order. As an example: If you see the string "rlgowsahc", the correct answer will be "chaswoglr". In order to earn your tokens, you need to correctly solve 10 strings. All participants are randomly assigned to different difficulty levels. This will help us to correctly calibrate different difficulty levels for another study. You **have been assigned to a more difficult/ an easier level**.

You will then be matched with another Prolific participant who is participating in the same study, but has been assigned to an **easier/ a more difficult level**. After both of you finished the string reversal task, you will learn the total number of tokens you and the other participant earned in the first stage. You will also be given more information about external factors that could affect the number of tokens you take into the second stage.

Decision stage: In the second stage of the study, you have to decide how you want to divide the total number of tokens you and the other participant took into the second stage between yourself and the other participant. The other participant will do the same. The screenshot below shows what the decision screen will look like:

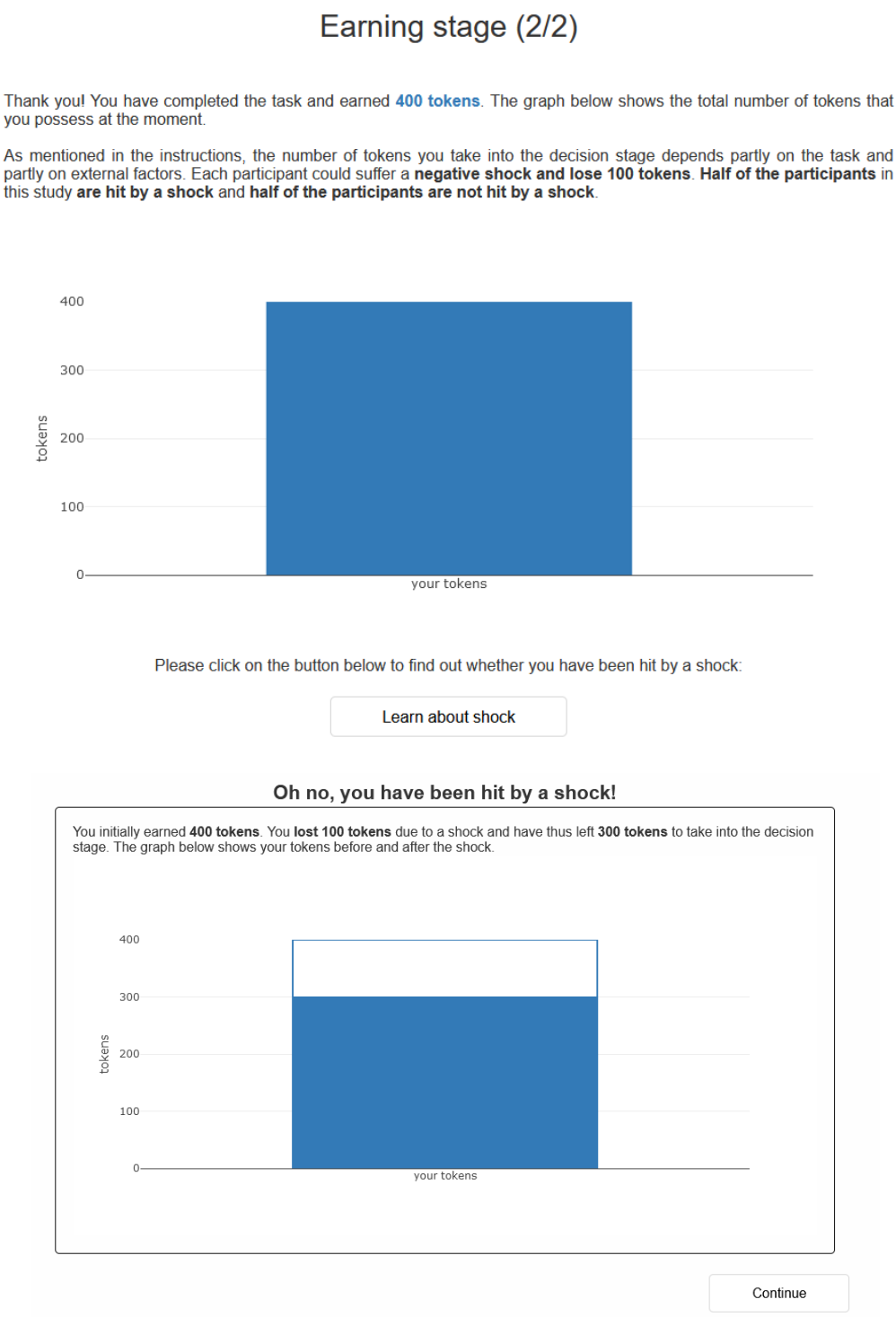


At the end of the experiment, there will be a lottery that decides whether your choice or the other participant's choice will determine your final bonuses. With a 50% chance, your choice will determine your and the other participant's final bonuses, with a 50% chance, the other participant's choice will determine your and their final bonuses. All interactions in this study are completely anonymous. You will never know the identity of the other participants, and they will never know yours.

B.4 Examples of experimental screens

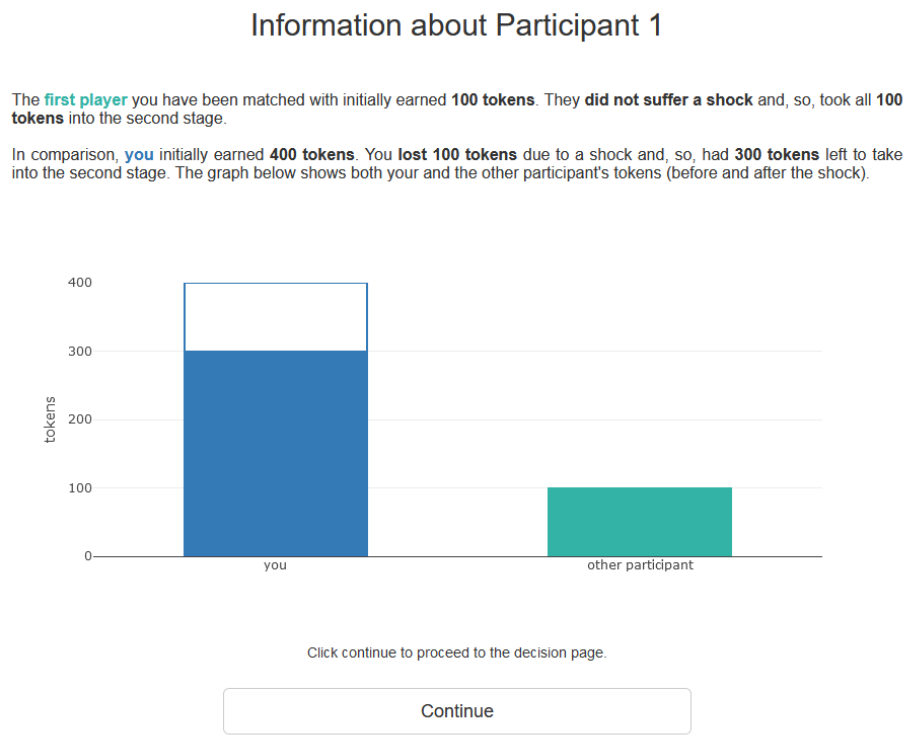
Learning about own shock

The picture below shows how the screen looks like for *h* players who suffer a shock in the laboratory treatment. The screen for the stake size effect treatment is very similar. In case of no shock, the message reads "Phew, you have not been hit by a shock!".



Information about other participant

Example for the situation in which the player themselves suffered a shock and the other participant did not suffer a shock (laboratory treatment).



Example for the situation in which the other participant did suffer a significant loss in livelihood due to the Covid-19 crisis (real world treatment)