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Inequality and visibility of wealth in experimental social networks

Akihiro Nishi[1,2], Hirokazu Shirado[1,2], David G. Rand[1,3,4] & Nicholas A. Christakis[1,2,5,6]

Humans prefer relatively equal distributions of resources[1–5], yet societies have varying degrees of economic inequality[6]. To investigate some of the possible determinants and consequences of inequality, here we perform experiments involving a networked public goods game in which subjects interact and gain or lose wealth. Subjects ($n = 1,462$) were randomly assigned to have higher or lower initial endowments, and were embedded within social networks with three levels of economic inequality (Gini coefficient = 0.0, 0.2, and 0.4). In addition, we manipulated the visibility of the wealth of network neighbours. We show that wealth visibility facilitates the downstream consequences of initial inequality—in initially more unequal situations, wealth visibility leads to greater inequality than when wealth is invisible. This result reflects a heterogeneous response to visibility in richer versus poorer subjects. We also find that making wealth visible has adverse welfare consequences, yielding lower levels of overall cooperation, inter-connectedness, and wealth. High initial levels of economic inequality alone, however, have relatively few deleterious welfare effects.

The unequal distribution of wealth in modern societies probably arose after we abandoned the relatively possession-free existence of hunter-gatherers[7–9], and it reflects several processes: individual variation in inborn traits (such as abilities, desires), differential access to environmental resources, and differential accumulation of wealth through transactions. Despite such inequality, humans have strong egalitarian preferences[1–5]. What forces, then, lead to the emergence and maintenance of economic inequality? And what are the welfare implications of this inequality? We shed light on these questions using laboratory experiments that explore macro-level dynamics of economic inequality arising from micro-level cooperative interactions of individuals embedded within dynamic social networks[10–12]. We focus on two dimensions: (1) initial conditions of wealth inequality (as a proxy for variation in initial endowments or private access to environmental resources), and (2) the local visibility of wealth.

We carried out a series of experiments with 1,462 subjects, divided among 80 sessions lasting an average of 30.0 minutes (s.d. = 7.13). Subjects were placed in groups with an average size of 17.21 (s.d. = 2.79) and arranged in a social network with an Erdős–Rényi random graph configuration in which 30% of ties were present (see Supplementary Information)[10,11,13]; subjects were therefore initially connected to an average of 5.33 (s.d. = 0.98) neighbours. The subjects played a cooperation game lasting 10 rounds with their neighbours. In each round, all subjects chose whether to cooperate, by reducing their own wealth by 50 'units' per neighbour in order to increase the wealth of all neighbours by 100 units each, or to defect by paying no cost and providing no benefits. Subjects made the same choice with all their neighbours. These interactions constituted the economic transactions, affecting each individual's wealth and thus resulting in population-level changes in overall wealth and inequality. The arbitrary units were converted to real money at the end of the game (see Supplementary Information).

After making their cooperation choice, subjects were informed of the choices made by their neighbours. Then, subjects had the opportunity to change their neighbours by making or breaking ties. Specifically, 30% of all pairs of subjects were chosen at random in each round and given the opportunity to rewire their networks (this set-up was fixed across all manipulated conditions)[10,11]. If a tie already existed between the two subjects, then one of the two was picked at random to be allowed to choose whether to voluntarily break the tie with the other; if a tie did not already exist between the two, both of them were given the option to form a tie and, if both approved, a new tie was formed. When making this decision, subjects were aware of whether the person to whom they might disconnect or connect had cooperated or defected in the past round. Thus, people could choose to alter a new subset of their social ties at each round; the network could be rewired; and subjects' network degree (number of directly connected neighbours) and transitivity (the probability that any two of a focal subject's neighbours are themselves connected) could change.

Within this basic setup, we then manipulated initial wealth inequality and wealth visibility (Extended Data Table 1 and Extended Data Figs 1 and 2). To manipulate initial wealth inequality, subjects were randomly assigned to one of three conditions. In the 'no initial inequality' condition, each subject started with the same initial endowment of 500 units. In the other two conditions, there was initial wealth inequality, such that 'rich' subjects received a larger initial endowment than 'poor' subjects. The endowments of the rich and poor were set to different levels of inequality such that the expected Gini coefficient (see Supplementary Information)[14] at the beginning was either 0.0 (no initial inequality), 0.2 (low initial inequality), or 0.4 (high initial inequality). Importantly, the overall per capita initial wealth in all groups was equivalent (that is, 500 units); only the distribution of wealth varied. Subjects were randomly assigned to be rich or poor within the low and high initial inequality conditions, and they were randomly assigned to one of the nodes in the randomly generated network regardless of their endowment (see Fig. 1 for illustration, and also Supplementary Video 1).

Independent of baseline inequality, we also manipulated the visibility of local neighbours' wealth. In the 'invisible' (private) condition, subjects only knew their own accumulated wealth. In the 'visible' condition, subjects could see their own accumulated wealth as well as the accumulated wealth of each of their directly connected neighbours. Subjects were informed whether each of their neighbours cooperated or not, regardless of the visibility condition of neighbours' wealth. In both the visible and invisible set-ups, subjects had only local knowledge about their immediate neighbours and not global knowledge about the whole network.

Initial wealth inequality and visibility had joint and several effects on game dynamics. We begin by considering the persistence of wealth inequality (Fig. 2). Although the Gini coefficients in the invisible conditions converge at a low level (of roughly 0.16) by the later rounds, the Gini coefficients in the visible conditions vary persistently and depend on the initial level of inequality. We see a substantial interaction effect

[1]Yale Institute for Network Science, Yale University, New Haven, Connecticut 06520, USA. [2]Department of Sociology, Yale University, New Haven, Connecticut 06520, USA. [3]Department of Psychology, Yale University, New Haven, Connecticut 06520, USA. [4]Department of Economics, Yale University, New Haven, Connecticut 06520, USA. [5]Department of Ecology and Evolutionary Biology, Yale University, New Haven, Connecticut 06520, USA. [6]Department of Medicine, Yale University, New Haven, Connecticut 06520, USA.

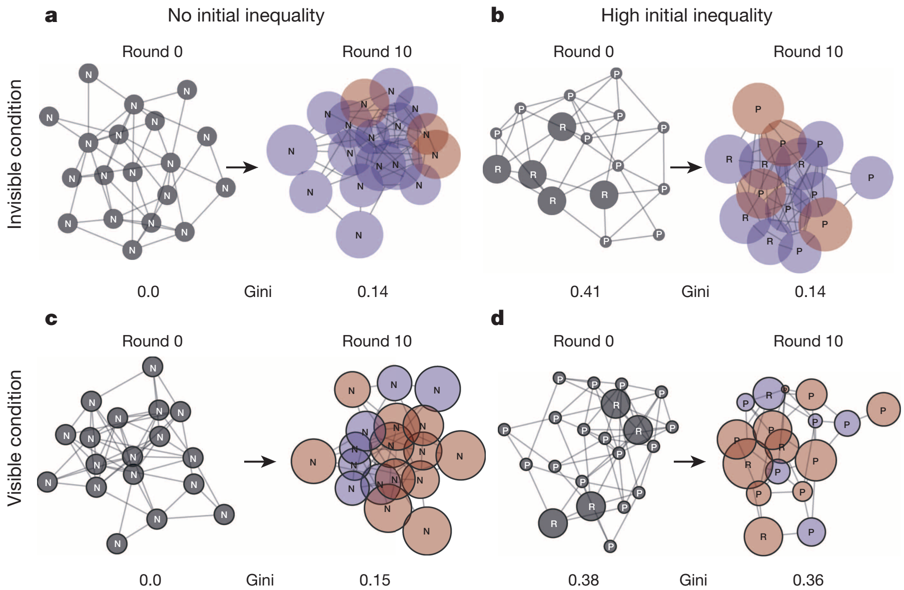

Figure 1 | The level of initial economic inequality and the visibility of connecting neighbours' wealth information are experimentally manipulated in dynamic human social networks. a–d, The states at round 0 (before interactions start) and at round 10 (after they end) in 4 out of 80 sessions (n = 1,462) are shown. The bold outline frame of a circular node indicates the 'visible' condition (wealth information is revealed to directly connected neighbours) and a non-bold outline frame indicates the 'invisible' condition (not revealed). Node size (area) indicates wealth (with bigger nodes being richer). The letter in the node denotes the initial wealth to which subjects were randomly assigned: N is an initially non-poor/non-rich subject (in the no initial inequality condition), P is an initially poor subject, and R is an initially rich subject. Node colours represent the last move (purple, cooperate; red, defect; grey, no history). The Gini coefficient is also indicated (higher is more unequal). The Gini coefficient (for disposable income) is presently roughly 0.26 in Scandinavia and 0.39 in the United States. One of the three treatment conditions in our experiments (low initial inequality) is not shown.

between visibility and initial inequality on Gini over all rounds (two-way interaction $P = 0.043$; all P values determined using regression with standard errors clustered at the level of session and round; see Supplementary Table 2 and Supplementary Information for details). In the high initial inequality condition, making neighbours' wealth visible results in significantly higher levels of inequality compared to when neighbours' wealth is invisible (difference in final round Gini = 0.104, $P = 0.004$) (Fig. 2, inset). In the low initial inequality condition, visibility again results in significantly higher inequality compared to the invisible condition, but to a lesser degree (difference in final round Gini = 0.0387, $P = 0.041$). Conversely, in the no initial inequality condition, visibility does not affect inequality (difference in final round Gini = 0.0185, $P = 0.450$). Thus, visibility serves to facilitate the persistence of whatever relative level of wealth inequality is initially present in the system, compared to what would have happened without visibility.

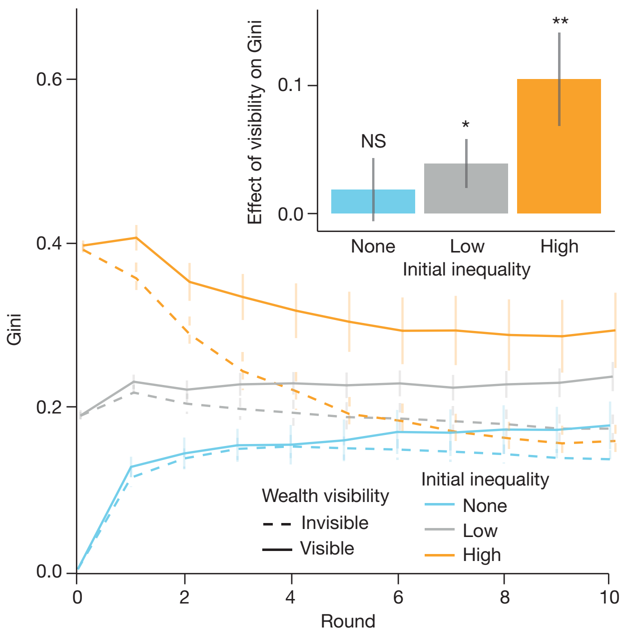

Figure 2 | Wealth visibility increases economic inequality (relative to invisibility) in the presence of initial inequality, but not in the presence of initial equality. The dynamics of the Gini coefficient in each of six settings (80 sessions total) is shown. Inset, the differences between the Gini coefficient over the ten rounds in the visible compared to the invisible condition (in the form of regression coefficients; see Supplementary Information). Error bars, mean ± s.e.m. NS for $P \geq 0.05$, $^{*}P < 0.05$, and $^{**}P < 0.01$.

Examining groups of initially rich and poor subjects separately, we find that those individuals who are initially rich tend to be rich at the end, and, similarly, those who are initially poor tend to be poor at the end, regardless of whether the initial Gini coefficient is 0.2 or 0.4 (Extended Data Fig. 3). Although—in both the visible and invisible conditions—wealth distributions of initially rich and poor subjects gradually overlapped as the level of earned wealth increases in later rounds, few reversals of fortune occurred at the individual level (as also seen in labour markets[15]).

Turning to levels of average population wealth, we find that visibility has a substantial negative effect (Fig. 3a and Supplementary Table 4): despite the same payoffs and rules across conditions, overall wealth is significantly lower in the visible conditions compared to the invisible conditions (regression model coefficient = −489.6, $P = 0.001$). The level of initial inequality is also negatively associated with overall wealth (coefficient = −669.6, $P = 0.019$).

To further understand how visibility and inequality affect social welfare, we also examined cooperation and social tie formation. We find that the negative effect of visibility upon wealth accumulation is driven by a combination of two factors. First, cooperation rates are lower in the visible condition than the invisible condition (difference in cooperation frequency = −0.208, $P < 0.001$; Fig. 3b and Supplementary Table 4), and do not differ based on the initial inequality—with a hypothetical change in the Gini coefficient from 0 to 1 being associated with a difference in cooperation frequency = −0.084, $P = 0.445$. Second, there is lower social connectivity in the visible condition

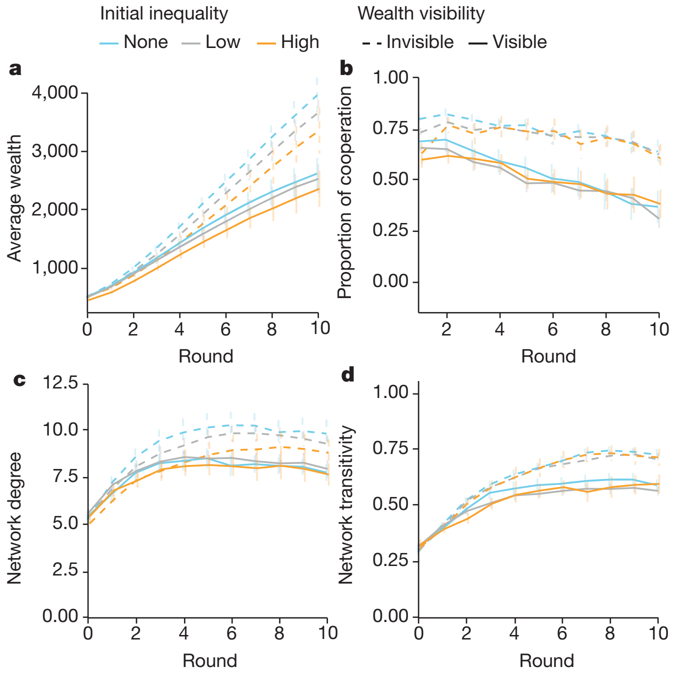

Figure 3 | Visibility of wealth undermines social welfare. a–d, Changes in average wealth (**a**), cooperation rate (**b**), network degree (number of connecting neighbours) (**c**), and network transitivity (probability of a focal subject's two neighbours being connected) (**d**), across rounds are shown (80 sessions total). Error bars, mean ± s.e.m.

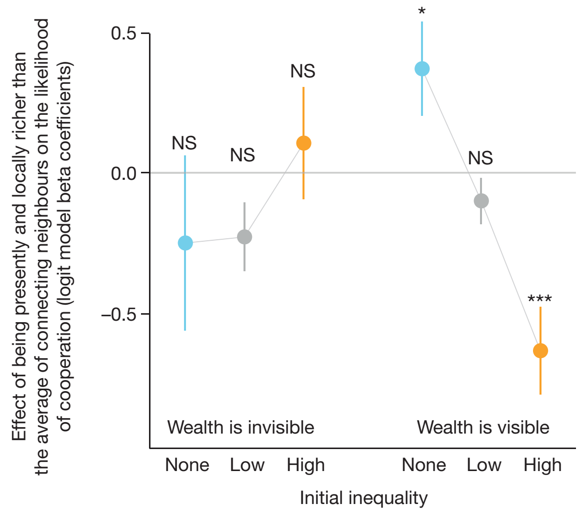

Figure 4 | Wealth visibility leads to exploitation under initial inequality, but fairness under initial equality. When wealth is visible (right), subjects richer than the average of their neighbours are more likely to cooperate in the 'no initial inequality' condition (blue, fairness scenario), but less likely to cooperate in the high initial inequality condition (orange, exploitation scenario). This behavioural pattern is not observed when connecting neighbours' wealth information is invisible (left). Shown are beta coefficients from logit models. P values indicate whether the coefficients are statistically different from 0.0. Error bars, point estimate ± standard error. NS for $P \geq 0.05$, $^*P < 0.05$ $^{***}P < 0.001$. See Supplementary Information for details.

than in the invisible condition (difference in average degree = –0.991, $P = 0.012$; Fig. 3c, Supplementary Table 4 and Extended Data Fig. 4), and there is no difference based on the initial inequality—with a hypothetical change in the Gini coefficient from 0 to 1 being associated with a difference in degree = –1.71, $P = 0.167$. Visibility also seems to affects transitivity (difference in average transitivity = −0.096, $P < 0.001$; Fig. 3d); however, after accounting for the rise in degree across rounds, and across treatments, neither visibility nor initial inequality affects transitivity (Extended Data Fig. 5b).

As average wealth (and overall group wealth) is roughly the multiplicative consequence of the cooperation rate and number of connecting neighbours, the dynamics of average wealth (Fig. 3a) can be explained by these dynamics of cooperation and degree. When we additionally explored these findings at the individual level, we found that subjects have a larger degree in the invisible condition as a consequence of there being a larger proportion of attractive neighbours (that is, cooperators at the last move) available in the social network (Supplementary Table 8). That is, visibility reduces cooperation which in turn reduces the appeal of social connections.

Although the dynamics of cooperation and degree can together explain the rise in average wealth, the macro-level dynamics of economic inequality that we observe in Fig. 2 require more micro-level analysis to fully explain. That is, the cooperation behaviour observed in Fig. 3b, when multiplied by the number of social connections shown in Fig. 3c, can explain the wealth shown in Fig. 3a, but it cannot explain the inequality shown in Fig. 2. Hence, to understand the dynamics of inequality, we examined how subjects exhibit different behavioural patterns of cooperation depending on their own wealth and on the average wealth of their neighbours, providing an individual-level understanding of the effect of visibility on inequality dynamics.

Figure 4 shows important heterogeneity in individual-level behaviours. When neighbours' wealth is visible, the level of initial inequality has a noticeable effect on how a subject's relative wealth affects the subject's cooperation (Fig. 4, right). In the high initial inequality condition, subjects who are locally and presently (that is, in the current round) richer than the average of their neighbours are less likely to cooperate compared to those who are locally and presently poorer (regression model coefficient = −0.633, $P < 0.001$). Moreover, we observe that this tendency is driven largely by richer-than-average subjects who defected in the prior round (coefficient = –0.997, $P < 0.001$; Extended Data Fig. 6b); in an initially unequal world, we observe that defectors who are presently richer than connecting neighbours keep defecting and tend not to change their behaviour. This leads to an 'exploitation' scenario: poorer subjects are more likely to cooperate and invest in their local network, making them worse off relative to their neighbours and allowing the rich to get richer. As a result, richer subjects outperform poorer neighbours, leading to the increase in economic inequality (relative to the invisible condition) observed at the macro level.

Conversely, in the no initial inequality condition, we observe that subjects who are locally and presently richer than their neighbours are more likely to cooperate compared to poorer subjects (regression model coefficient = 0.370, $P = 0.027$). Furthermore, this tendency is driven largely by richer subjects who cooperated in the prior round (coefficient = 0.805, $P = 0.002$; Extended Data Fig. 6a); in an initially equal world, cooperators who are presently richer than connecting neighbours keep cooperating. This leads to a 'fairness' scenario in which the wealth of richer subjects is invested in their local network, allowing poorer neighbours to gain wealth. Thus, poorer subjects have the opportunity to catch up, and wealth visibility does not increase economic inequality relative to the invisible condition. Moreover, when considering mean difference in wealth, rather than Gini, this fairness behaviour leads to an actual reduction in inequality under visibility; see Extended Data Fig. 5a. As such effects are detected when connecting neighbours' wealth information is visible, but not when it is invisible (three-way interaction $P = 0.004$, Supplementary Table 7; $P > 0.05$ for all coefficients in the invisible condition in Fig. 4, left), these individual-level behaviours help to explain the macro-level results of our experiments. Moreover, agent-based simulations show that these patterns are sufficient to reproduce the observed inequality dynamics (see Supplementary Information and Extended Data Figs 7, 8 and 9).

In summary, we find that making wealth visible abets the persistence of experimentally induced inequality, compared to identical circumstances where wealth is invisible. We also find that visibility has a corrosive overall effect on our laboratory 'societies', reducing overall cooperation, interconnectedness, and wealth. Thus, our experiments demonstrate that wealth visibility may be an important societal force, negatively affecting the dynamics of wealth and inequality, as well as social structure and cooperation. Surprisingly, our results are quite different with respect to the effect of initial wealth inequality. Rather than inequality being an 'enemy of cooperation', we find, in this setting, that inequality alone has relatively little effect on cooperation, interconnectedness or overall wealth accumulation. Thus, it is not inequality per se that is so problematic, but rather visibility that adversely affects cooperation here, regardless of what can be seen (that is, regardless of whether subjects are surrounded by an initially equal or unequal economic distribution).

Prior work regarding the role of inequality in contributions to public goods has reported mixed results[16–20], and the role of inequality in the evolution of cooperation has not been fully understood[21–23]. Insofar as it is not inequality per se that affects cooperation in our experiments, but rather visibility, our results help shed light on these findings. Our results may also be relevant to norms in hunter-gatherer societies privileging less attachment to owned items[8] and less ostentation[24]. It is noteworthy that any (limited) wealth that is possessed in foraging societies is necessarily visible. Hence, it may not only be the surplus that arose with the agricultural revolution and fixed human settlements that contributed to inequality, but also the possibility of concealment that may be key. The mere ability to choose to conceal or display wealth might be relevant to how much inequality and cooperation arise in social groups.

Various psychological mechanisms may underlie the observed behaviours. For example, visibility may invoke neurological and psychological processes related to social comparison[3,4,25,26], and visibility may cause subjects to perceive the situation as a competition[27], to think that their wealth signals social position[28], or to fear being near last place[29], all of which might reduce cooperation. Our results are also consistent with findings regarding pay secrecy and worker productivity[26].

There are features potentially relevant to inequality that our experiments do not explore, for example: whether the initial resources are seen as earnings or windfalls; whether individuals producing public goods can earn more; whether the payoff structure, group size, network topology, or rewiring rate matter; or how peer sanctions or institutions (like taxation, courts or policing) affect the outcome. Another promising topic is the effect of allowing subjects to manipulate the visibility of wealth, in keeping with the theory of conspicuous consumption[30] and with notions of costly signalling. These are important directions for future work.

Although the results of laboratory experiments do not translate directly into the real world, the evidence presented here suggests that mechanisms that conceal personal wealth information might induce lower economic inequality, at least given an already high level of inequality. Given the widespread availability of wealth information as well as opportunities and desires to acquire and display wealth in contemporary societies, however, this would clearly not be easy to do. Conversely, when economic inequality is low, similarity could be more publicized, though this might sacrifice population-level economic growth.

Online Content Methods, along with any additional Extended Data display items and Source Data, are available in the online version of the paper; references unique to these sections appear only in the online paper.

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Supplementary Information is available in the online version of the paper.

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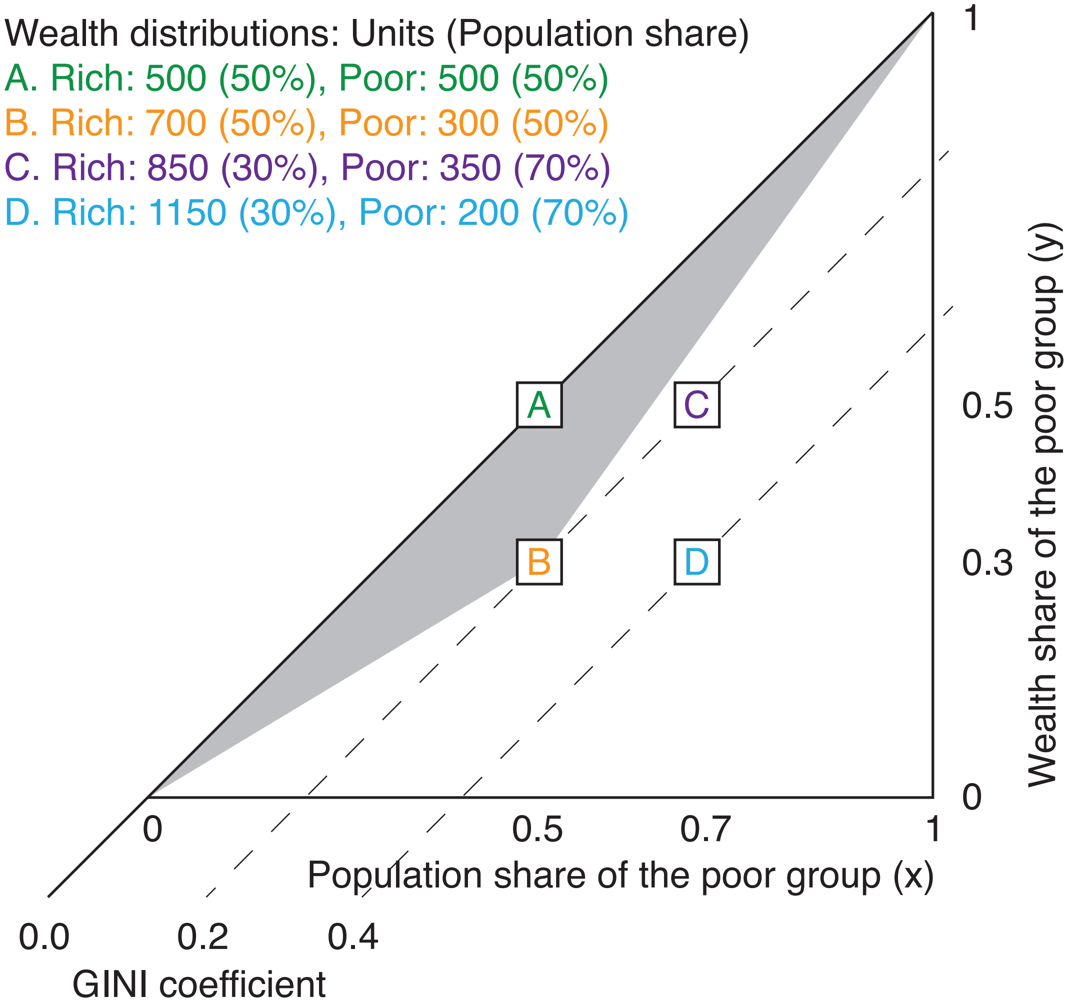
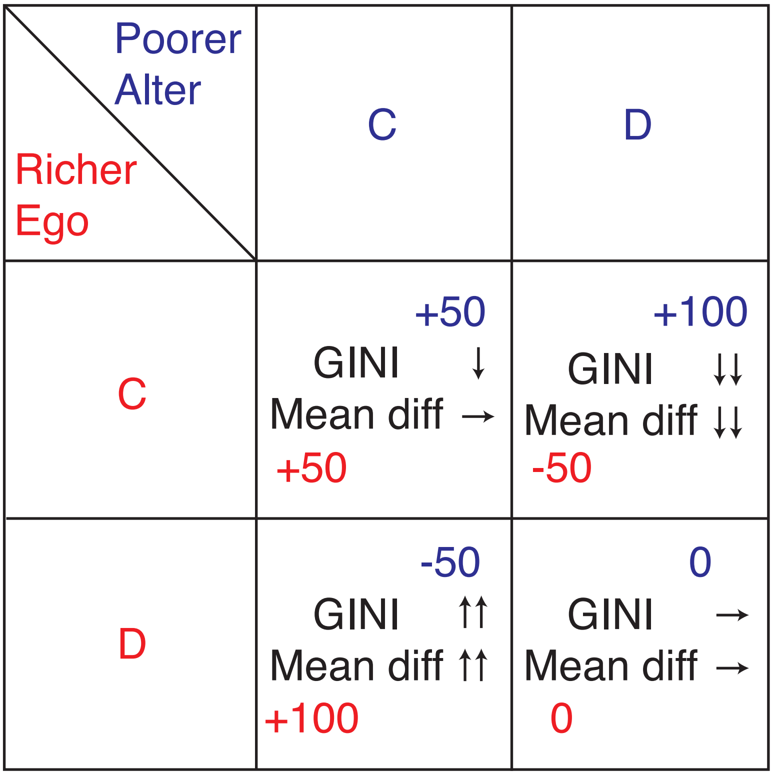
Author Contributions A.N., H.S., D.G.R., and N.A.C. designed the project. A.N. and H.S. conducted the experiments. A.N., H.S., and D.G.R. performed the statistical analyses. A.N., H.S., D.G.R, and N.A.C. analysed the findings. A.N., D.G.R., and N.A.C. wrote the manuscript.

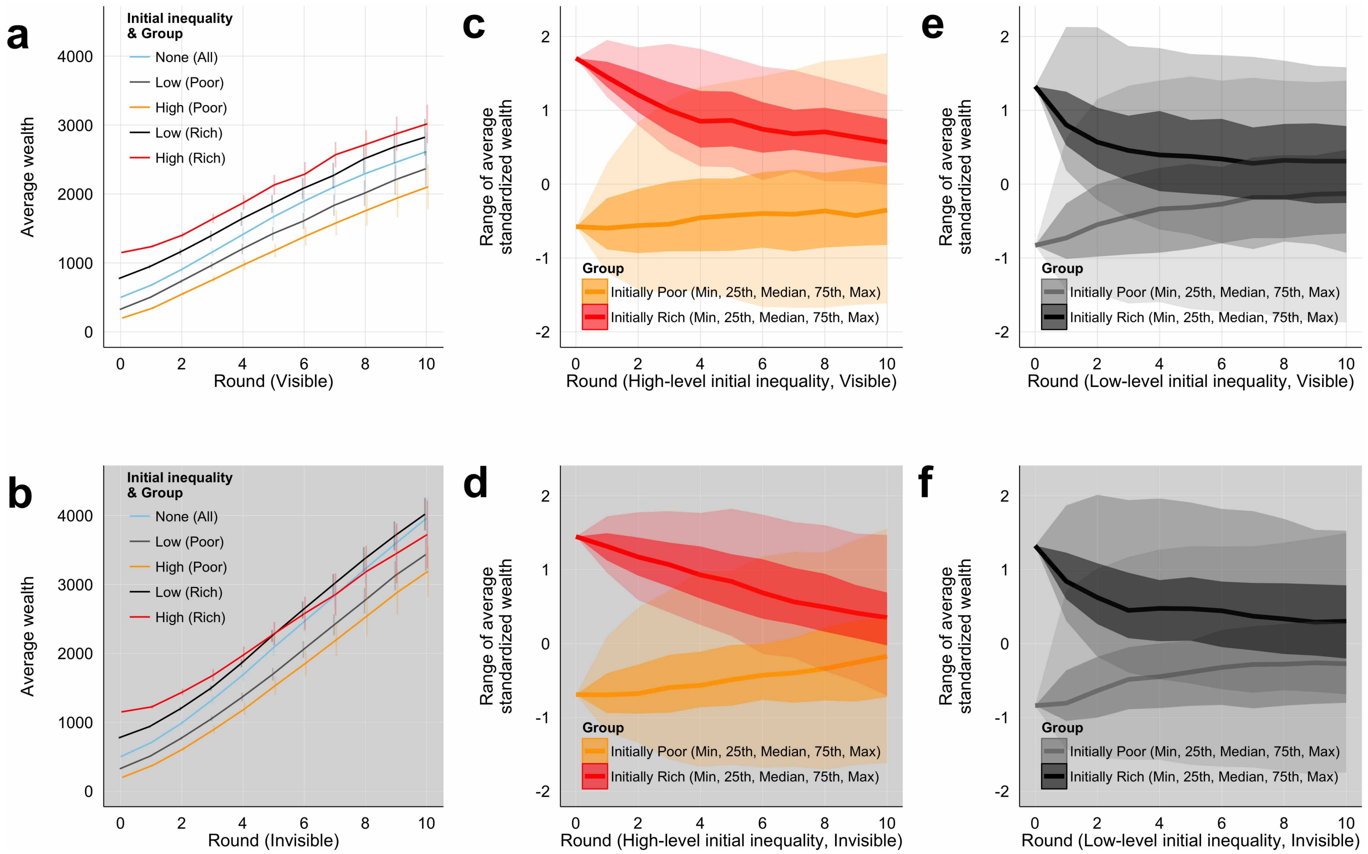
Author Information Reprints and permissions information is available at www.nature.com/reprints. The authors declare no competing financial interests. Readers are welcome to comment on the online version of the paper. Correspondence and requests for materials should be addressed to N.A.C. (nicholas.christakis@yale.edu).



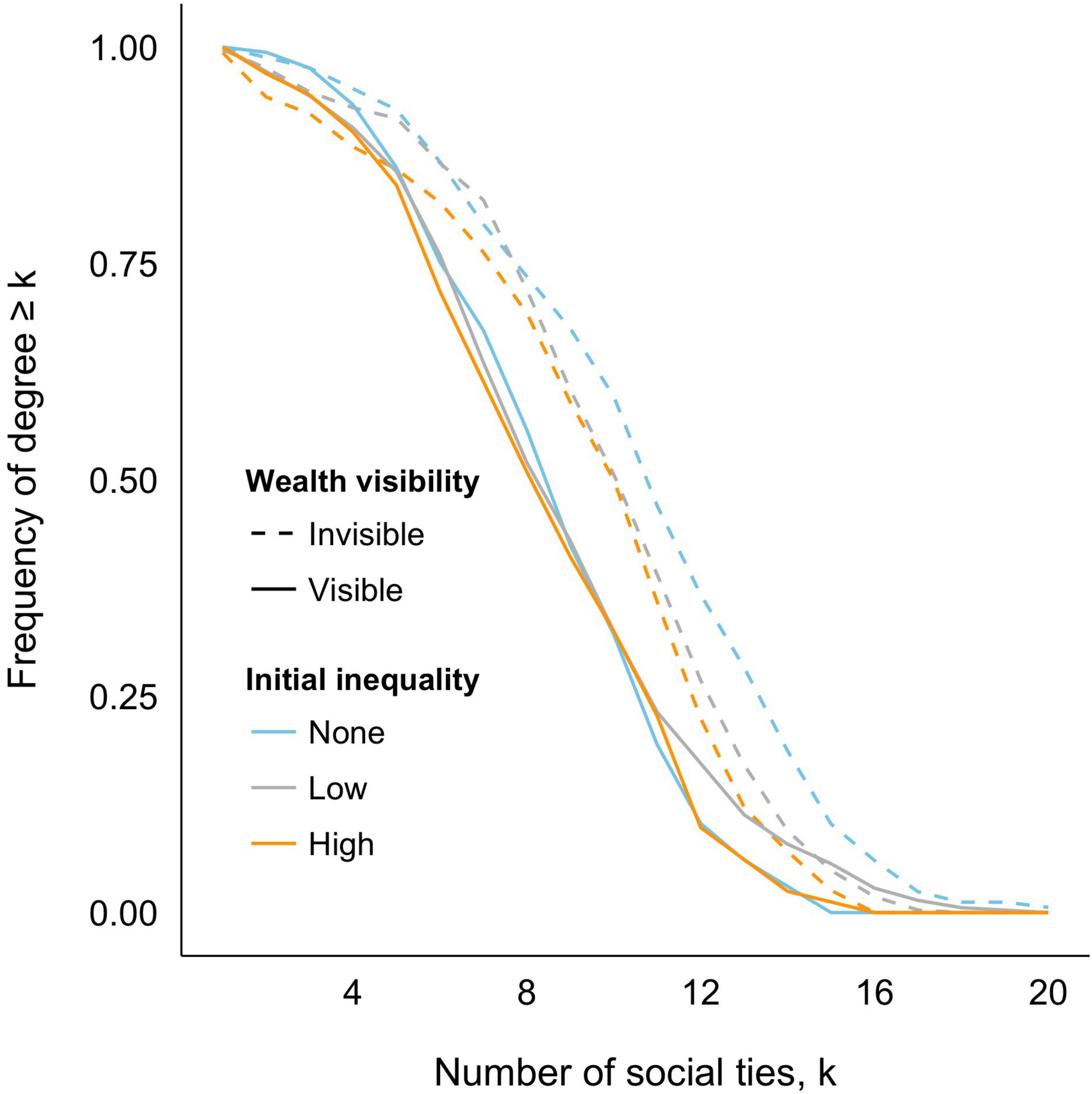
Extended Data Figure 1 | Lorenz curve description of the four wealth distributions. We prepared four different wealth conditions (A–D). For example, the shaded area for condition B divided by the area of the largest isosceles right triangle represents the Gini coefficient for condition B (that is, 0.2). Any points on the same dotted line achieve the same level of economic inequality in terms of the Gini coefficient. Condition A is equivalent to any other condition on the line from (0,0) to (1,1). Conditions B and C are analysed together since they did not yield different analytical results (see Supplementary Information).



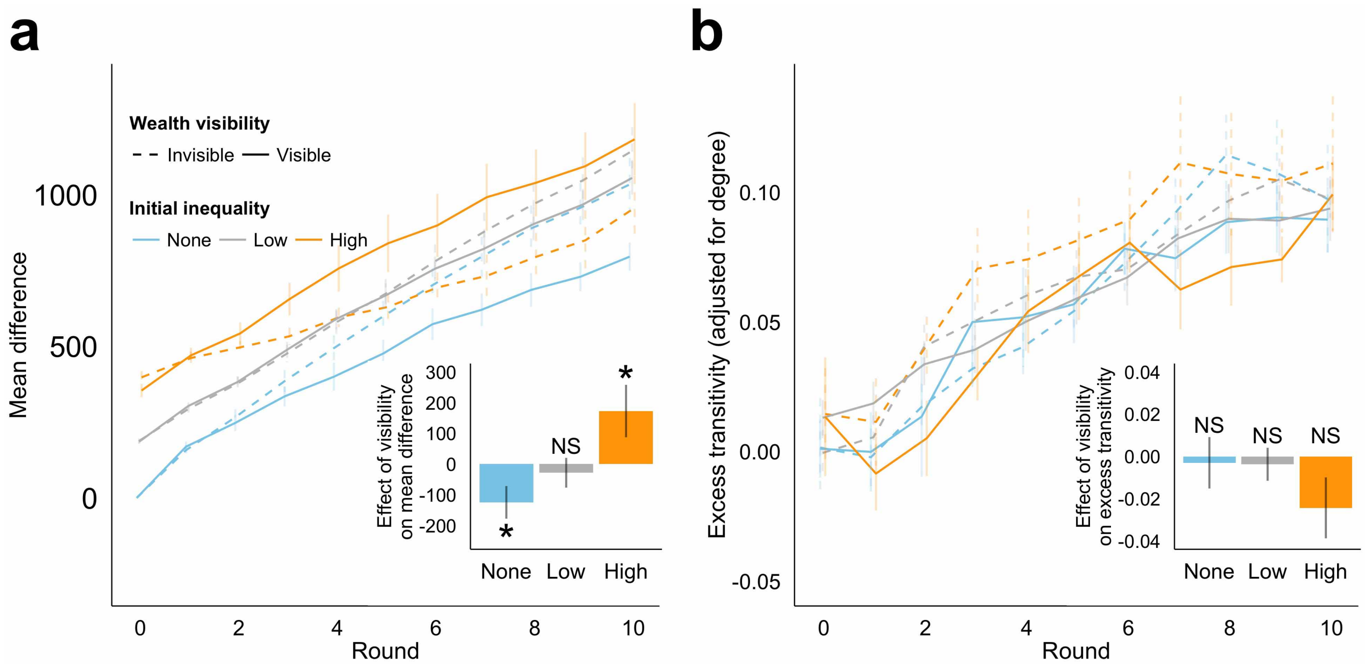
Extended Data Figure 2 | Rules in our experiments and the implied dynamics of the Gini coefficient and mean difference. The Gini coefficient is a relative measure of inequality, while the mean difference is an absolute measure of inequality. When we focus on a tie between two subjects (a richer ego and a poorer alter), there are four combinations in the choices of cooperation behaviours in a single round. For example, when a richer ego = C and a poorer alter = C (that is, when a richer ego cooperates and a poorer alter also cooperates), both of them pay 50 units, and obtain 100 units, in which case the payoff is +50 for both. As both of them get the same payoff, the mean difference between them does not increase or decrease (→). On the other hand, the difference in wealth between them becomes less important in a relative manner, which leads to the reduction in the Gini coefficient between them (↓). The behaviours of the mean difference and Gini coefficient vary for the four combinations. C represents cooperation, and D represents defection. GINI represents local Gini coefficient of the focal two individuals, and 'Mean diff' represents the mean difference in wealth of the two subjects. GINI or mean difference can show the following outcomes: does not change (→), increases (↑), increases to a greater degree (↑↑), decreases (↓), or decreases to a greater degree (↓↓).



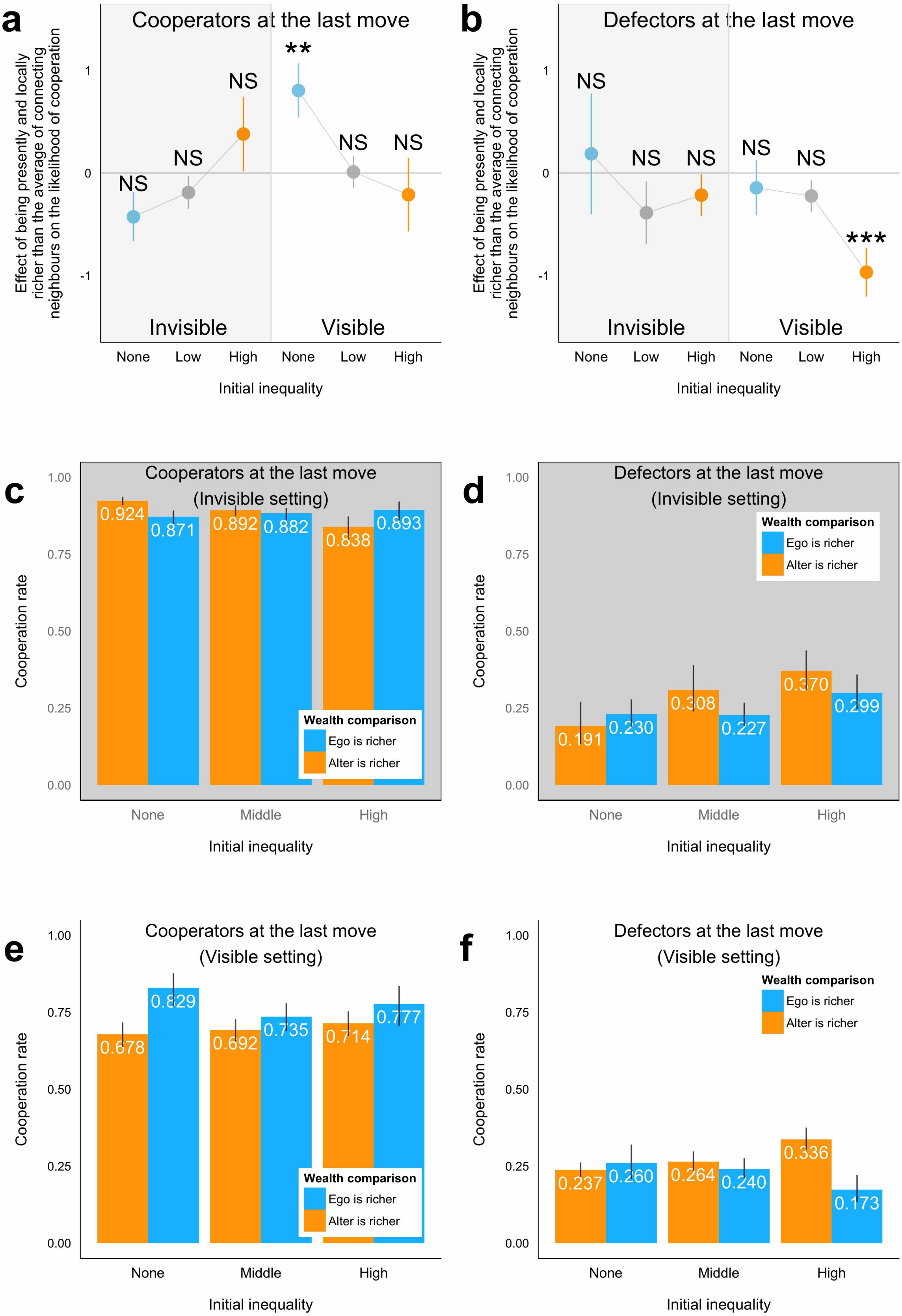
Extended Data Figure 3 | A majority of initially rich individuals stay wealthier than a majority of initially poor individuals over the ten rounds regardless of the initial conditions. **a**, **b**, The mean and standard error of mean (bar) of the average wealth of a group of initially rich individuals and of a group of initially poor individuals are calculated at each round for the visible condition (**a**) and for the invisible condition (**b**). Error bars, mean ± s.e.m. **c**–**f**, For each round at each session, we standardized wealth of each individual (that is, (individual wealth–mean)/s.d.), and calculated the minimum (min), 25th percentile (25th), median, 75th percentile (75th), and maximum (max) of the standardized wealth of a group of initially rich individuals and a group of initially poor individuals, separately. These figures show the trajectories of the mean of the five indicators (minimum, 25th, median, 75th, and maximum) among different sessions of the same initial condition (**c** for high-level initial inequality, visible; **d** for high-level initial inequality, invisible; **e** for low-level initial inequality, visible; and **f** for low-level initial inequality, invisible). Darker shades represent the mean of interquartile ranges (25th to 75th), lighter shades represent the mean of ranges (minimum to maximum), and the solid lines represent the mean of the median among the different sessions. Crossing of shades and medians between the two groups, if observed, implies the influence of the initial wealth difference on present wealth may be wiped out.



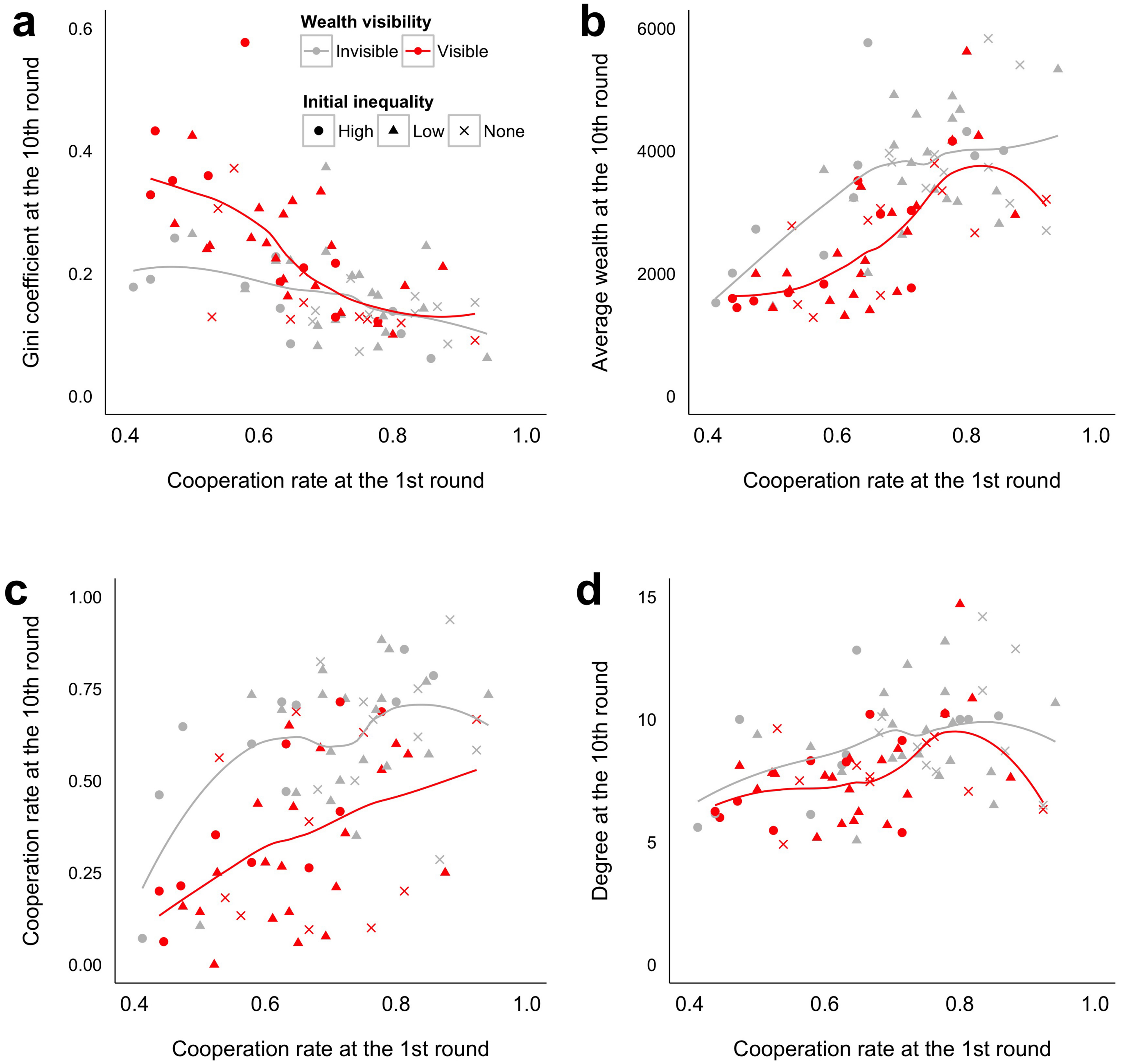
Extended Data Figure 4 | Cumulative degree distributions at the final (tenth) round. The proportion of subjects who have at least k social ties (degree) is calculated for each k (1 to 20) at each initial condition. Each distribution of the three initial inequality conditions in the invisible setting is significantly different from that in the visible setting (Kolmogorov–Smirnov test, $P < 0.01$), and has fatter tails. The pairwise comparison in different initial inequality conditions at the same neighbours' wealth information setting (that is, none versus low, none versus high and low versus high) show those distributions are not significantly different (Kolmogorov–Smirnov test, $P > 0.12$) except none versus high in the invisible condition (Kolmogorov–Smirnov test, $P = 0.030$). The means of these distributions, by round, are shown in Fig. 3c.



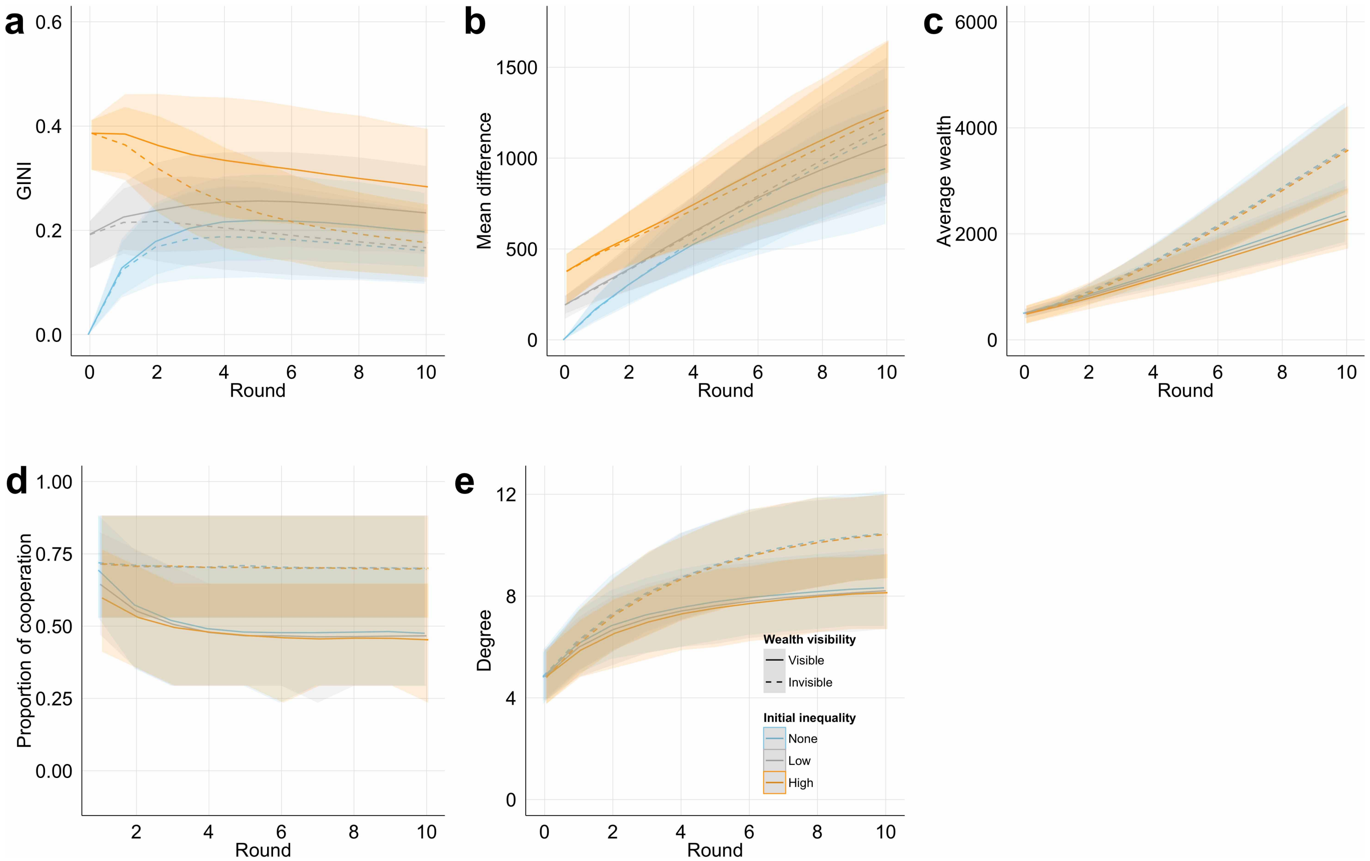
Extended Data Figure 5 | Changes in mean difference in wealth and in excess transitivity in the experimental conditions. **a**, The dynamics of mean difference in each of six settings is shown. Inset, the differences between mean difference at the first to tenth rounds in the visible compared to the invisible condition are shown separately for three different conditions of initial inequality (none, blue; low, grey; high, orange). Positive bars indicate that making neighbours' wealth visible increases mean difference in wealth. **b**, The dynamics of excess transitivity (transitivity adjusted for network degree at each session) in each of the six settings is shown. (See Fig. 3d for the dynamics of transitivity unadjusted for degree.) As a larger degree naturally results in a larger transitivity, we calculate the expected value of transitivity given a certain network degree and a certain size in a random graph in simulations (10,000 iterations), and report the deviation of the observed transitivity from the expected transitivity (that is, observed transitivity minus expected transitivity). Inset, the differences between excess transitivity at the first to tenth rounds in the visible compared to the invisible condition are shown separately for three different conditions of initial inequality (none, blue; low, grey; high, orange). Negative bars indicate that making neighbours' wealth visible decreases excess transitivity. Error bars, mean ± s.e.m. NS for $P \geq 0.05$, $^{*}P < 0.05$.



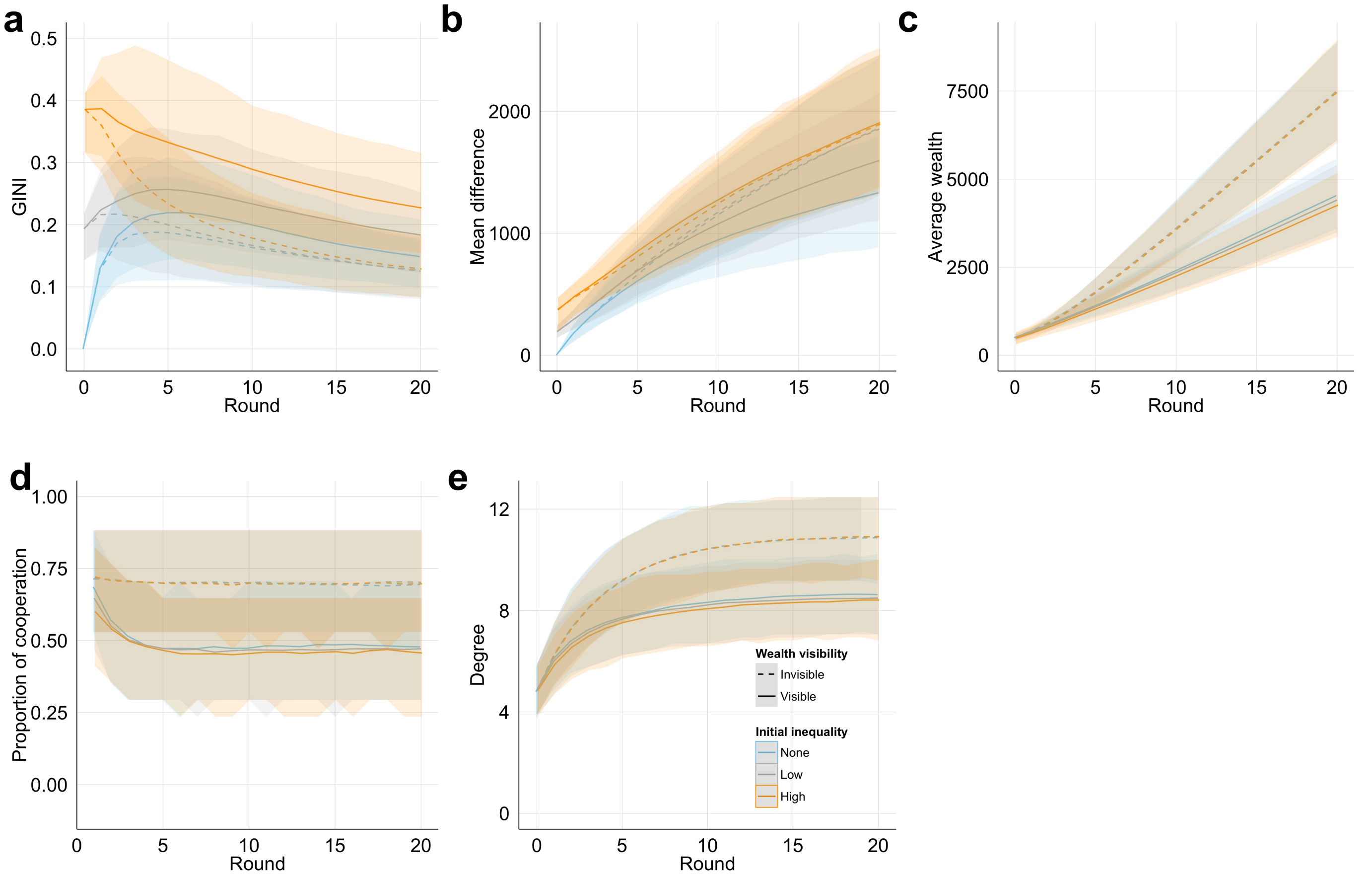
Extended Data Figure 6 | Additional results regarding behavioural mechanisms. **a**, **b**, Stratified results of Fig. 4 according to the prior move (cooperation or defection). Bars represent standard errors. **c**–**f**, Cooperation rate in the different conditions with respect to the variable of social comparison (ego (a focal individual) is richer or alters (given as the average of an ego's connecting neighbours) are richer) for each setting. For example, **e** shows that richer subjects are more likely to cooperate (82.9%) when the initial economic inequality is set to none in the visible condition. Panel **f** shows that richer subjects are less likely to cooperate (17.3%) when the initial economic inequality is set to high in the visible condition. Error bars, mean ± s.e.m. NS for $P \geq 0.05$, $^{**}P < 0.01$, $^{***}P < 0.001$.



Extended Data Figure 7 | Relationship between population-level cooperation rates at first round and outcomes at final rounds. **a–d**, Scatter plots of the first-round cooperation rate and the tenth-round Gini coefficient (**a**); average wealth (**b**); cooperation rate (**c**); and degree (**d**). Loess smoothed fitted curves are shown. The proportion of innately cooperative subjects in each session was not experimentally manipulated here (or in agent-based simulations).



Extended Data Figure 8 | Agent-based simulations reproduced the results that were observed in the online experiments with human subjects. **a–e**, Results of agent-based simulations for Gini coefficient, mean difference, average wealth, proportion of cooperation, and degree (interconnectedness) are shown, respectively. The medians (solid and dashed lines) and 90% confidence regions (shaded area, 5th percentile to 95th percentile) are presented.



Extended Data Figure 9 | Results of agent-based simulations with session up to 20 rounds show that the effect of visibility in Gini dynamics is robustly observed. **a–e**, The medians and 90% confidence regions (shaded area, 5th percentile to 95th percentile) are presented.

Extended Data Table 1 | Parameters for experimental settings

Visibility of connecting neighbours' wealth information	Wealth conditions	Initial wealth of rich individuals (%)	Initial wealth of poor individuals (%)	Level of initial economic inequality	Expected initial mean difference	Expected initial GINI	Number of games per session
Yes	A	500 (100%)		No	0	0.00	10
Yes	B	700 (50%)	300 (50%)	Low	200	0.20	10
Yes	C	850 (30%)	350 (70%)	Low	210	0.21	10
Yes	D	1150 (30%)	200 (70%)	High	399	0.41	10
No	A	500 (100%)		No	0	0.00	10
No	B	700 (50%)	300 (50%)	Low	200	0.20	10
No	C	850 (30%)	350 (70%)	Low	210	0.21	10
No	D	1150 (30%)	200 (70%)	High	399	0.41	10

Please refer to the Lorenz curve in Extended Data Fig. 1 for the wealth conditions A, B, C and D.