Social and Moral Distance in Risky Settings
Online Appendix

Anastasios Koukoumelis[a], M. Vittoria Levati[b], Chiara Nardi[c,*]

[a] *Department of Economics, University of Bath, UK*
[b] *Department of Economics, University of Verona, Italy*
[c] *Catholic University of the Sacred Heart, Milan, Italy*

*Corresponding author. Department of International Economics, Institutions and Development, Catholic University of the Sacred Heart, Via Necchi 5, 20123 Milan, Italy. E-mail: chiara.nardi@unicatt.it

Appendix A: Experimental instructions

Instructions for Dictators (originally in Italian)

Welcome! You are about to participate in an experiment funded by the Department of Economics of the University of Verona. Please switch off your mobile and remain silent. It is strictly forbidden to talk to the other participants. Raise your hand whenever you have a question and one of the experimenters will come to your aid.

You will receive €3.00 for showing up on time and, beyond this, you can earn more money. Read these instructions carefully to understand how your decisions affect your earnings. All the decisions you make and information you provide will be treated as confidential, that is your name will not be in any way associated with the data collected in the experiment.

During the experiment, we shall not speak of euros but of ECU (Experimental Currency Unit). ECU are converted to euros at the following exchange rate: 1 ECU = €2.

The experiment consists of four parts. You will find the instructions for the first part on the following pages. You will get the instructions for the second, third and fourth part after all participants have completed the first, second and third part, respectively.

In each individual part of the experiment you will have the opportunity to earn money. Your final payoff will be determined by your earnings in only one of these four parts, but neither you nor we know in advance which part will be used.

At the end of the experiment (i.e., after part 4 is over), one experimenter will select one participant by drawing one card from a deck that contains as many cards as the number of participants. This participant will in his/her turn select one of the four parts of the experiment by drawing a ticket from a bag containing four tickets numbered 1 to 4. Each part will therefore have an equal chance of being selected for payment. The outcome of the draw will apply to all the participants. The experimental earnings that correspond to the randomly selected part will be converted to euros and paid out in cash (along with the €3.00 show-up fee). Payments will be carried out privately, i.e., the others will not be aware of your earnings.

Instructions for Part 1

In part 1 of the experiment, you will be paired with another person, who is not in the lab with you now. In the following we will refer to the person you are matched with as the Other.

[*Participants in the Photo treatment read:*
Before you make your decisions, you will see a picture of the Other.]

[*Participants in the Info treatment read:*
The Other is a person who has been affected by the 2008 financial crisis. Because of the crisis, this person might have remained unemployed and his/her living standards and income might have been reduced. Before you make your decisions, you will receive more precise details of his/her situation.]

[*Participants in the Photo+Info treatment read:*
The Other is a person who has been affected by the 2008 financial crisis. Because of the crisis, this person might have remained unemployed and his/her living standards and income might have

been reduced. Before you make your decisions, you will see a picture of the Other and receive more precise details of his/her situation.]

Your task

You must choose one of 11 possible prospects, each of which gives

- a *certain* amount of ECU to you, and
- a *certain* amount of ECU to the Other.

The 11 prospects among which you can choose are reported in the table below:

Prospect	You	the Other	Decision
1	10 ECU with 100% probability	0 ECU with 100% probability	☐
2	9 ECU with 100% probability	1 ECU with 100% probability	☐
3	8 ECU with 100% probability	2 ECU with 100% probability	☐
4	7 ECU with 100% probability	3 ECU with 100% probability	☐
5	6 ECU with 100% probability	4 ECU with 100% probability	☐
6	5 ECU with 100% probability	5 ECU with 100% probability	☐
7	4 ECU with 100% probability	6 ECU with 100% probability	☐
8	3 ECU with 100% probability	7 ECU with 100% probability	☐
9	2 ECU with 100% probability	8 ECU with 100% probability	☐
10	1 ECU with 100% probability	9 ECU with 100% probability	☐
11	0 ECU with 100% probability	10 ECU with 100% probability	☐

Look, for instance, at prospect 1. This prospect gives

- 10 ECU with 100% probability (i.e., with certainty) to you, and
- 0 ECU with 100% probability (i.e., with certainty) to the Other.

Hence, if you choose prospect 1, you earn 10 ECU and the Other earns 0 ECU.

Consider now prospect 2. This prospect gives

- 9 ECU with 100% probability (i.e., with certainty) to you, and
- 1 ECU with 100% probability (i.e., with certainty) to the Other.

Hence, if you choose prospect 2, you earn 9 ECU and the Other earns 1 ECU.

The remaining prospects must be read similarly so that, for example, prospect 10 gives 1 ECU with certainty to you and 9 ECU with certainty to the Other.

Note that moving down the rows, your earnings decrease and the Other's earnings increase.

In the last column of the table—labeled "Decision"—you have to indicate which one of the 11 prospects you want to choose by checking the corresponding box.

The Other's task

The Other has no choice to make and must accept your decision.

Earnings in the first part

If part 1 is randomly selected for payment at the end of the experiment, the earnings in ECU that correspond to your decision will be converted to euros and paid out to you today and to the Other on any day of the following week.

The Other, after reading a brief description of your task and before collecting his/her payment, will be informed about the prospect you choose, i.e., (s)he will learn your and his/her certain earnings.

On the experimenter desk you can find a guarantee of payment to the Other. This guarantee is signed by the executive secretary of the Department of Economics of the University of Verona. At the end of the experiment, you can, if you wish, take a look at this guarantee.

Instructions for Part 2

[*Participants in the Control and Photo treatments read:*
In this part of the experiment, you will be paired with the same person you were paired with in part 1.]

[*Participants in the Info and Photo+Info treatments read:*
In this part of the experiment, you will be paired with the same person you were paired with in part 1, i.e., with the same person who has been affected by the financial crisis.]

Your task

You must choose one of 11 possible prospects, each of which gives

- a *certain* amount of ECU to you, and
- an *uncertain* amount of ECU (either 10 or 0, with varying probabilities) to the Other.

The 11 prospects among which you can choose are reported in the table below:

Prospect	You	the Other	Decision
1	10 ECU with 100% probability	10 ECU with 0% probability, 0 ECU with 100% probability	☐
2	9 ECU with 100% probability	10 ECU with 10% probability, 0 ECU with 90% probability	☐
3	8 ECU with 100% probability	10 ECU with 20% probability, 0 ECU with 80% probability	☐
4	7 ECU with 100% probability	10 ECU with 30% probability, 0 ECU with 70% probability	☐
5	6 ECU with 100% probability	10 ECU with 40% probability, 0 ECU with 60% probability	☐
6	5 ECU with 100% probability	10 ECU with 50% probability, 0 ECU with 50% probability	☐
7	4 ECU with 100% probability	10 ECU with 60% probability, 0 ECU with 40% probability	☐
8	3 ECU with 100% probability	10 ECU with 70% probability, 0 ECU with 30% probability	☐
9	2 ECU with 100% probability	10 ECU with 80% probability, 0 ECU with 20% probability	☐
10	1 ECU with 100% probability	10 ECU with 90% probability, 0 ECU with 10% probability	☐
11	0 ECU with 100% probability	10 ECU with 100% probability, 0 ECU with 0% probability	☐

Look, for instance, at prospect 1. This prospect gives

- 10 ECU with 100% probability to you, and
- 10 ECU with 0% probability or 0 ECU with 100% probability to the Other.

Hence, if you choose prospect 1, you earn 10 ECU with certainty and the Other earns 0 ECU with certainty.

Consider now prospect 2. This prospect gives

- 9 ECU with 100% probability to you, and
- 10 ECU with 10% probability or 0 ECU with 90% probability to the Other.

Hence, if you choose prospect 2, you earn 9 ECU with certainty and the Other has 10% probability of earning 10 ECU and 90% probability of earning 0 ECU.

The remaining prospects must be read similarly so that, for example, prospect 10 gives 1 ECU with certainty to you and either 10 ECU with 90% probability or 0 ECU with 10% probability to the Other.

Note that moving down the rows, your sure earnings decrease and the Other's probability of earning 10 ECU increases.

In the last column of the table—labeled "Decision"—you have to indicate which one of the 11 prospects you want to choose by checking the corresponding box.

The Other's task

The Other has no choice to make and must accept your decision.

Earnings in the second part

If part 2 is randomly selected for payment at the end of the experiment, the earnings in ECU that correspond to your decision will be converted to euros and paid out to you today and to the Other on any day of the following week. The guarantee of payment to the Other on the experimenter desk certifies that the money will be paid to him/her.

To determine the earnings of the Other, which will be told to you, a random integer number K in the range 1 to 10 (namely 1, 2, 3, ..., 9, 10) will be generated by the computer. For prospect 2, where probabilities are 10% and 90%, the Other will earn either 10 ECU if the random number K is 1 or 0 ECU if the random number K is 2–10, meaning 2, 3, 4, 5, 6, 7, 8, 9, or 10. The computation of the Other's earnings for the other prospects is similar, except that as your decision moves down the rows, the Other's probability of earning 10 ECU increases. In fact, for the prospect in the last row, namely prospect 11, the generation of the random number will not be needed since the Other will receive 10 ECU for sure.

The Other, after reading a brief description of your task and before collecting his/her payment, will be informed about the prospect you choose. i.e., (s)he will learn your certain earnings and his/her probabilities of earning 0 ECU and 10 ECU.

Instructions for Part 3

[*Participants in the Control and Photo treatments read:*
In this part of the experiment, you will be paired with the same person you were paired with in the previous parts.]

[*Participants in the Info and Photo+Info treatments read:*
In this part of the experiment, you will be paired with the same person you were paired with with in the previous parts, i.e., with the same person who has been affected by the financial crisis.]

Your task

You must, once again, choose one of 11 possible prospects, but now each prospect gives

- an *uncertain* amount of ECU (either 10 or 0, with varying probabilities) to you, and
- a *certain* amount of ECU to the Other.

The 11 prospects among which your can choose are reported in the table below:

Prospect	You	The Other	Decision
1	10 ECU with 100% probability, 0 ECU with 0% probability	0 ECU with 100% probability	☐
2	10 ECU with 90% probability, 0 ECU with 10% probability	1 ECU with 100% probability	☐
3	10 ECU with 80% probability, 0 ECU with 20% probability	2 ECU with 100% probability	☐
4	10 ECU with 70% probability, 0 ECU with 30% probability	3 ECU with 100% probability	☐
5	10 ECU with 60% probability, 0 ECU with 40% probability	4 ECU with 100% probability	☐
6	10 ECU with 50% probability, 0 ECU with 50% probability	5 ECU with 100% probability	☐
7	10 ECU with 40% probability, 0 ECU with 60% probability	6 ECU with 100% probability	☐
8	10 ECU with 30% probability, 0 ECU with 70% probability	7 ECU with 100% probability	☐
9	10 ECU with 20% probability, 0 ECU with 80% probability	8 ECU with 100% probability	☐
10	10 ECU with 10% probability, 0 ECU with 90% probability	9 ECU with 100% probability	☐
11	10 ECU with 0% probability, 0 ECU with 100% probability	10 ECU with 100% probability	☐

Look, for instance, at prospect 1. This prospect gives

- 10 ECU with 100% probability or 0 ECU with 0% probability to you, and
- 0 ECU with 100% probability to the Other.

Hence, if you choose prospect 1, you earn 10 ECU with certainty and the Other earns 0 ECU with certainty.

Consider now prospect 2. This prospect gives

- 10 ECU with 90% probability or 0 ECU with 10% probability to you, and
- 1 ECU with 100% probability to the Other.

Hence, if you choose prospect 2, you have 90% probability of earning 10 ECU and 10% probability of earning 0 ECU and the Other earns 1 ECU with certainty.

The remaining prospects must be read similarly so that, for example, prospect 10 gives either 10 ECU with 10% probability or 0 ECU with 90% probability to you and 9 ECU with certainty to the Other.

Note that moving down the rows, the probability that you earn 10 ECU decreases and the Other's sure earnings increase.

In the last column of the table—labeled "Decision"—you have to indicate which one of the 11 prospects you want to choose by checking the corresponding box.

The Other's task

The Other has no choice to make and must accept your decision.

Earnings in the third part

If part 3 is randomly selected for payment at the end of the experiment, the earnings in ECU that correspond to your decision will be converted to euros and paid out to you today and to the Other on any day of the following week. The guarantee of payment to the Other on the experimenter desk certifies that the money will be paid to him/her.

To determine your earnings, a random integer number Z in the range 1 to 10 (namely 1, 2, 3, ..., 9, 10) will be generated by the computer. For prospect 2, where probabilities are 90% and 10%, you will earn 10 ECU if the random number Z is 1–9 or 0 ECU if the random number Z is 10. The computation of your earnings for the other prospects is similar, except that as your decision moves down the rows, your probability of earning 10 ECU decreases. In fact, for the prospect in the last row, namely prospect 11, the generation of the random number will not be needed since you will receive 0 ECU for sure.

The Other, after reading a brief description of your task and before collecting his/her payment, will be informed about the prospect you choose, i.e., (s)he will learn your probabilities of earning 0 ECU and 10 ECU and his/her certain earnings.

Instructions for Part 4

[*Participants in the Control and Photo treatments read:*
In this part of the experiment, you will be paired with the same person you were paired with in parts 1, 2, and 3.]

[*Participants in the Info and Photo+Info treatments read:*
In this part of the experiment, you will be paired with the same person you were paired with in parts 1, 2, and 3, i.e., with the same person who has been affected by the financial crisis.]

Your task

As in the previous parts, you must choose one of 11 possible prospects, but now each prospect gives

- an *uncertain* amount of ECU (either 10 or 0, with varying probabilities) to you, and
- an *uncertain* amount of ECU (either 10 or 0, with varying probabilities) to the Other.

The 11 prospects among which you can choose are reported in the table below:

Prospect	You	The Other	Decision
1	10 ECU with 100% probability, 0 ECU with 0% probability	10 ECU with 0% probability, 0 ECU with 100% probability	☐
2	10 ECU with 90% probability, 0 ECU with 10% probability	10 ECU with 10% probability, 0 ECU with 90% probability	☐
3	10 ECU with 80% probability, 0 ECU with 20% probability	10 ECU with 20% probability, 0 ECU with 80% probability	☐
4	10 ECU with 70% probability, 0 ECU with 30% probability	10 ECU with 30% probability, 0 ECU with 70% probability	☐
5	10 ECU with 60% probability, 0 ECU with 40% probability	10 ECU with 40% probability, 0 ECU with 60% probability	☐
6	10 ECU with 50% probability, 0 ECU with 50% probability	10 ECU with 50% probability, 0 ECU with 50% probability	☐
7	10 ECU with 40% probability, 0 ECU with 60% probability	10 ECU with 60% probability, 0 ECU with 40% probability	☐
8	10 ECU with 30% probability, 0 ECU with 70% probability	10 ECU with 70% probability, 0 ECU with 30% probability	☐
9	10 ECU with 20% probability, 0 ECU with 80% probability	10 ECU with 80% probability, 0 ECU with 20% probability	☐
10	10 ECU with 10% probability, 0 ECU with 90% probability	10 ECU with 90% probability, 0 ECU with 10% probability	☐
11	10 ECU with 0% probability, 0 ECU with 100% probability	10 ECU with 100% probability, 0 ECU with 0% probability	☐

Look, for instance, at prospect 1. This prospect gives

- 10 ECU with 100% probability or 0 ECU with 0% probability to you, and
- 10 ECU with 0% probability or 0 ECU with 100% probability to the Other.

Hence, if you choose prospect 1, you earn 10 ECU with certainty, and the Other earns 0 ECU with certainty.

Consider now prospect 2. This prospect gives

- 10 ECU with 90% probability or 0 ECU with 10% probability to you, and
- 10 ECU with 10% probability or 0 ECU with 90% probability to the Other.

Hence, if you choose prospect 2, you have 90% probability of earning 10 ECU and 10% probability of earning 0 ECU, and the Other has 10% probability of earning 10 ECU and 90% probability of earning 0 ECU.

The remaining prospects must be read similarly so that, for example, prospect 10 gives either 10 ECU with 10% probability or 0 ECU with 90% probability to you and either 10 ECU with 90% probability or 0 ECU with 10% probability to the Other.

Note that moving down the rows, your probability of earning 10 ECU decreases and the Other's probability of earning 10 ECU increases.

In the last column of the table—labeled "Decision"—you have to indicate which one of the 11 prospects you want to choose by checking the corresponding box.

The Other's task

The Other has no choice to make and must accept your decision.

Earnings in the fourth part

If part 4 is randomly selected for payment at the end of the experiment, the earnings in ECU that correspond to your decision will be converted to euros and paid out to you today and to the Other on any day of the following week. The guarantee of payment to the Other on the experimenter desk certifies that the money will be paid to him/her.

To determine your earnings, a random integer number Z in the range 1 to 10 (namely 1, 2, 3, ..., 9, 10) will be generated by the computer. For prospect 2, where probabilities are 90% and 10%, you will earn 10 ECU if the random number Z is 1–9 or 0 ECU if the random number Z is 10.

Independently of Z, to determine the Other's earnings, which will be told to you, a further random integer number K in the range 1 to 10 will be generated by the computer. For prospect 2, the Other will earn 10 ECU if the random number K is 1 or 0 ECU if the random number K is 2–10.

The computation of yours and the Other's earnings for the other prospects is similar, except that as your decision moves down the rows, your probability of earning 10 ECU decreases and the Other's probability of earning 10 ECU increases. In fact, for the prospect in the last row, namely prospect 11, the generation of the random numbers will not be needed since you will receive 0 ECU for sure and the Other will receive 10 ECU for sure.

The Other, after reading a brief description of your task and before collecting his/her payment, will be informed about the prospect you choose, i.e., (s)he will learn your and his/her probabilities of earning 0 ECU and 10 ECU.

Instructions for Recipients (originally in Greek)

We provide a translation of the instructions used in the Photo+Info treatment. The instructions for the other treatments were adapted accordingly.

Distributed before collecting the recipient data

You are about to participate in a research study funded by the Department of Economics of the University of Verona (Italy). You will have to fill in a short questionnaire and then we will take a photo of you. Both your answers to the questionnaire and your photo will be treated as confidential and used only for scientific purposes.

On any day during the following week we will randomly match you with a student from the University of Verona, whose identity will never be revealed to you. Your photo and the information you will provide via the questionnaire will be shown to this Verona student.

You will receive €5.00 for participating in this study. Beyond this, you can earn more money depending on the decisions that the Verona student will make next week. We will phone and inform you when and where the extra money will be paid to you. To receive your extra payment, it is strictly necessary that you bring the slip of paper that you are about to receive. So, please, keep it safe!

If you agree to participate in the study, please complete and sign the attached consent form.

Distributed before paying the experimental earnings

Thanks for coming back. Today you will receive €3.00 and, beyond this, you can earn more money depending on the decisions made by the Verona student with whom you have been matched. In the following we will refer to this student as the Other (using the male gender).

The Other's task

After having seen your picture and received the information you provided, the Other had to choose four prospects.

1. A prospect allowed both him and you to earn an even amount of Euros between €0 and €20 (namely, €0, €2, €4, . . . , €18, or €20) with certainty. The Other could increase your earnings by reducing his own earnings.
2. Another prospect allowed him to earn an even amount of Euros between €0 and €20 with certainty and allowed you to earn €0 or €20 with given probabilities. The Other could increase your probability of earning €20 by reducing his own sure earnings.
3. A further prospect allowed him to earn €0 or €20 with given probabilities and allowed you to earn an even amount of Euros between €0 and €20 with certainty. The Other could increase your sure earnings by reducing his probability of earning €20.
4. The fourth prospect allowed both him and you to earn €0 or €20 with given probabilities. The Other could increase your probability of earning €20 by reducing his probability of earning €20.

A random draw determined which one of the four prospects chosen by the Other would be paid out. Today you will learn the choice of the Other in the randomly selected prospect and collect your corresponding earnings.

Appendix B: Questionnaire for Greek recipients

(**1**) What is your age? ......

(**2**) What is your gender?

☐ Male
☐ Female

(**3**) Has the financial crisis affected your standards of living?

☐ Really a lot
☐ A lot
☐ A bit
☐ Not at all

(**4**) During the crisis, the value of your mobile and immobile property has significantly decreased:

☐ Yes
☐ No
☐ I don't have any property

(**5**) During the crisis, your real income

☐ increased or remained the same
☐ was reduced by less than 10%
☐ was reduced between 10% and 20%
☐ was reduced between 20% and 30%
☐ was reduced between 30% and 40%
☐ was reduced by more than 40%

(**6**) Were you or one of your close relatives rendered unemployed due to the financial crisis?

☐ Yes
☐ No

Table C1: Descriptive statistics of giving by task order

	Sequence 1	Sequence 2	Sequence 3	Sequence 4	Kruscal-Wallis test (p-value)
CC	1.533	1.200	0.933	1.133	0.701
	(1.852)	(1.606)	(1.112)	(1.737)	
CR	1.233	1.300	0.667	0.967	0.245
	(1.675)	(1.622)	(1.269)	(1.608)	
RC	0.767	0.567	0.933	0.833	0.830
	(1.382)	(1.006)	(1.311)	(1.315)	
RR	0.700	0.767	0.867	0.900	0.905
	(1.179)	(1.357)	(1.592)	(1.348)	
No. of dictators	30	30	30	30	

Note: Standard deviations are reported in parentheses. The p-values are two-tailed and have not been adjusted for multiple testing, as none fall below the significance threshold.

Appendix C: Checking the presence of order effects

In a pilot study implementing the Control treatment, we randomized the sequences in which the four allocation tasks were presented to subjects so as to control for experimenter demand effects of presentation. We considered the following sequences of tasks: CC CR RC RR (Sequence 1), CR CC RR RC (Sequence 2), RC RR CC CR (Sequence 3), and RR RC CR CC (Sequence 4). This is only a small subset of the 24 possible sequencing variants, but to collect sufficiently many observations for all variants was not feasible.[1]

Overall, we ran four sessions, one for each sequence. 120 dictator-recipient pairs participated in the pilot, equally divided across sessions. In all sessions, the mean age of our dictators was around 21 years. Approximately half of them were majoring in economics and about sixty percent were females. Their risk attitude (on a 0–10 scale) was also similar across sessions, ranging from 3.5 to 4.6.

For each allocation task, Table C1 reports summary statistics—means and standard deviations in parenthesis—of giving across sequences. According to a series of Kruscal-Wallis (KW) tests, we detected no differences in giving across sequences for all the considered tasks (the p-values are 0.701, 0.245, 0.830, and 0.905 for CC, CR, RC, and RR, respectively). Notably, no significant differences were detected between orders also when performing pairwise comparisons using Wilcoxon rank sum tests. On the basis of these findings, we could exclude the presence of order effects.

[1] Alternatively, we could have randomized the task order individually for each participant. However, we chose not to do so in order to avoid providing the instructions on screen and to allow the experimenter to read them aloud at the beginning of each task. Complete randomization at the individual level would have required to describe all four tasks from the outset of the experiment, thereby generating a strong experimenter demand effect.

Appendix D: Optimal giving when the dictator is inequality averse and altruist

In this appendix, we illustrate the predictions of our model in terms of giving decisions in the four experimental tasks. The model extends (1), the linear combination of ex ante and ex post fairness discussed in Brock et al. (2013) and Saito (2013). Specifically, in (2), we assume that dictators are motivated by both inequality aversion and altruism, where altruism, denoted by $\theta_{t,k} = \theta(r_t, d_k)$, is context-dependent and varies with the riskiness of the payoffs in task t (r_t, with $t = \{\text{CC, CR, RC, RR}\}$) and the social/moral distance between dictator and recipient in treatment k (d_k, with $k = \{\text{Control, Photo, Info, Photo+Info}\}$).

Task CC

PROPOSITION D.1: In the standard dictator game, task CC, the optimal choice x^*_{CC} depends, ceteris paribus, on which region the altruism level $\theta_{CC,k}$ lies in, with the regions defined by the inequality aversion parameters α and β.

PROOF: In CC, ex ante utility equals ex post utility. Recalling that the payoffs are $\pi_D = 10 - x$ and $\pi_R = x$, with $x \in [0, 10]$, we have

$$E(U(\pi_D, \pi_R)) = U(E(\pi_D, \pi_R)) =$$
$$V(\pi_D, \pi_R) = \begin{cases} 10 - x - (\beta + \theta_{CC,k})(10 - 2x) & \text{if } x \in [0, 5], \\ 10 - x - (\alpha - \theta_{CC,k})(2x - 10) & \text{if } x \in [5, 10]. \end{cases}$$

Taking the first derivative of $V(\pi_D, \pi_R)$ with respect to x gives

$$\frac{\partial V(\pi_D, \pi_R)}{\partial x} = \begin{cases} -1 + 2(\beta + \theta_{CC,k}) & \text{if } x \in [0, 5], \\ -1 - 2(\alpha - \theta_{CC,k}) & \text{if } x \in [5, 10]. \end{cases}$$

The sign of this derivative depends on whether $(\beta + \theta_{CC,k})$ and $(\alpha - \theta_{CC,k})$ are $\gtreqless 0.5$, or, equivalently, on how $\theta_{CC,k}$ compares to $0.5 - \beta$ and $0.5 + \alpha$. Let

$$\theta' := 0.5 - \beta, \qquad \theta'' := 0.5 + \alpha.$$

We assume throughout that $\alpha \geq 0$, $\beta \geq 0$, and $\theta_{CC,k} \in [0, 1]$.[2] If $\beta > 0$ and $\alpha > 0$, then $\theta' < \theta''$ and the optimal allocation in CC depends on $\theta_{CC,k}$ as follows:

$$x^*_{CC} \in \begin{cases} \{0\} & \text{if } 0 \leq \theta_{CC,k} < \theta' < \theta'', \\ [0 - 5] & \text{if } 0 \leq \theta_{CC,k} = \theta' < \theta'', \\ \{5\} & \text{if } \theta' < \theta_{CC,k} < \theta'', \\ [5 - 10] & \text{if } \theta_{CC,k} = \theta'', \\ \{10\} & \text{if } \theta_{CC,k} > \theta''. \end{cases} \tag{D.1}$$

[2] The restriction $\theta_{CC,k} \geq 0$ rules out spite and reflects our focus on altruism.

If $\theta_{CC,k}$ is small and lies below the lower threshold θ' (defined by β), the optimal allocation is zero. If $\theta_{CC,k}$ equals θ', the dictator should allocate anything between 0 and 5, the equal split (the hyphen "–" indicates that all allocations in the interval are equally optimal). If $\theta_{CC,k}$ exceeds θ', the optimal allocation depends on whether $\theta_{CC,k}$ is smaller than, equal to, or greater than the upper threshold θ'' (defined by α). If $\theta_{CC,k}$ lies between θ' and θ'', the optimal choice is the equal split. If $\theta_{CC,k}$ equals θ'', the dictator may give any amount between 5 and 10. Finally, the dictator should give everything if $\theta_{CC,k}$ exceeds θ''. Hence, given α and β, and therefore the thresholds θ' and θ'', the strength of altruism determines giving behavior in task CC. ■

Comparison with Fehr and Schmidt (1999). Under their model, $\theta_{CC,k} = 0$, so for $x > 5$ the first derivative of $V(\pi_D, \pi_R)$ with respect to x is $-1-2\alpha < 0$ for all $\alpha \geq 0$, making hyperfair allocations never optimal. In our model, $\theta_{CC,k}$ enters the derivative as $-1 - 2(\alpha - \theta_{CC,k})$, which is positive whenever $\theta_{CC,k} \geq 0.5 + \alpha$. Thus, sufficiently strong altruism makes giving more than the equal split optimal.

Feasible regions for $\theta_{CC,k}$. Given $\theta_{CC,k} \in [0,1]$, $\theta_{CC,k} < \theta'$ can hold only if $\beta < 0.5$ (so that $\theta' > 0$). If $\beta \geq 0.5$, then $\theta' \leq 0$ and hence $\theta_{CC,k} \geq \theta'$ for all $\theta_{CC,k} \in [0,1]$. Likewise, $\theta_{CC,k} > \theta''$ can occur only if $\alpha < 0.5$ (so that $\theta'' < 1$). If $\alpha \geq 0.5$, then $\theta'' \geq 1$ and hence $\theta_{CC,k} \leq \theta''$ for all $\theta_{CC,k} \in [0,1]$. These bounds clarify the feasible regions referenced in (D.1).

Just ex ante utility in tasks CR, RC, and RR

PROPOSITION D.2: If the dictator cares only about the expected payoffs, i.e., if $\gamma = 0$ in (1), then the results in tasks CR, RC, and RR coincide with those in CC.

PROOF: Suppose $\gamma = 0$ in (1). Then

$$V(\pi_D, \pi_R) = U(E(\pi_D, \pi_R)),$$

meaning that the dictator evaluates the allocation using the utility of the expected payoffs.
In each of the risk-involving tasks j (with $j = \{\text{CR, RC, RR}\}$), the expected payoffs are $E[\pi_D] = 10 \cdot \frac{10-x}{10} + 0 \cdot \frac{x}{10} = 10 - x$ and $E[\pi_R] = 10 \cdot \frac{x}{10} + 0 \cdot \frac{10-x}{10} = x$. Because these expected payoffs coincide with those in CC, substituting them into (2) yields exactly the same expressions and derivative signs as in the proof for task CC. Therefore, optimal giving x_j^* follows the same cases as in (D.1), with $\theta_{CC,k}$ replaced throughout by $\theta_{j,k}$. ■

Just ex post utility in tasks CR, RC, and RR

PROPOSITION D.3: If the dictator cares only about ex post utility, i.e., if $\gamma = 1$ in (1), then optimal giving in tasks CR, RC, and RR depends, ceteris paribus, on the region in which the altruism level $\theta_{j,k}$ ($j = \{CR, RC, RR\}$) lies. If $\beta < 0.5$, the region for optimal positive giving shrinks compared to that in task CC. If $\theta_{j,k} < 0.5$, the equal split of 5 and hyperfair allocations above the equal split cannot be optimal.

PROOF: Suppose $\gamma = 1$ in (1). Then

$$V(\pi_D, \pi_R) = E(U(\pi_D, \pi_R)),$$

that is, the dictator evaluates the allocation by the expected utility of the realized payoffs.

Optimal giving in CR In task CR, the dictator's payoff is always $10-x$, while the recipient's payoff can be either 10 with probability $\frac{x}{10}$ or 0 with probability $\frac{10-x}{10}$. Hence

$$V(\pi_D,\pi_R) = E(U(\pi_D,\pi_R)) = \frac{10-x}{10}U(10-x,0) + \frac{x}{10}U(10-x,10),$$

which using (2) can be written as:

$$\begin{aligned}E(U(\pi_D,\pi_R)) = 10-x-\frac{10-x}{10}\,(\beta+\theta_{CR,k})\,(10-x-0) \\ -\frac{x}{10}\,(\alpha-\theta_{CR,k})\,(10-10+x) \\ = 10-x-\frac{(10-x)^2}{10}(\beta+\theta_{CR,k})-\frac{x^2}{10}(\alpha-\theta_{CR,k}).\end{aligned}$$

Differentiating with respect to x:

$$\frac{\partial E(U(\pi_D,\pi_R))}{\partial x} = -1+(\beta+\theta_{CR,k})\frac{(10-x)}{5}-(\alpha-\theta_{CR,k})\frac{x}{5}.$$

Solving the first-order condition yields the stationary point

$$x^*_{CR} = 5\frac{2(\beta+\theta_{CR,k})-1}{\alpha+\beta}.$$

The second derivative is

$$\frac{\partial^2 E(U)}{\partial x^2} = -\frac{\beta+\theta_{CR,k}}{5}-\frac{\alpha-\theta_{CR,k}}{5} = -\frac{\alpha+\beta}{5},$$

which is negative for all $\alpha,\beta>0$. Hence the stationary point is a unique maximum whenever it lies in the feasible set.

Since $\alpha+\beta>0$, $x^*_{CR}>0$ holds if and only if $2(\beta+\theta_{CR,k})-1>0$ or, equivalently, $\theta > 0.5-\beta \equiv \theta'$. If $\beta<0.5$, implying $\theta'>0$, the condition for positive giving is more stringent in CR than in CC as $\theta_{CR,k}$ must exceed θ' in order for x^*_{CR} to be positive.

Additionally, $x^*_{CR}\geq 5$ if and only if $2(\beta+\theta_{CR,k})-1\geq\alpha+\beta$ implying $\beta\geq\alpha+1-2\theta_{CR,k}$, which due to $\beta<\alpha$ can be satisfied only if $1-2\theta_{CR,k}<0$ or, equivalently, $\theta_{CR,k}>0.5$. In particular, from $2(\beta+\theta_{CR,k})-1\geq\alpha+\beta$, we obtain $\theta_{CR,k}\geq 0.5+(\alpha-\beta)/2$, which is equivalent to $\theta_{CR,k}>\theta'+(\alpha+\beta)/2$.

Finally, $x^*_{CR}=10$ if $\theta_{CR,k}$ equals the upper threshold θ''.[3] Thus, in CR like in CC, optimal

[3]From $5\frac{2(\beta+\theta_{CR,k})-1}{\alpha+\beta} = 10$, we have $2(\beta+\theta_{CR,k})-1 = 2(\alpha+\beta) \Rightarrow \beta+\theta_{CR,k} = 0.5+(\alpha+\beta) \Rightarrow \theta_{CR,k} = 0.5+\alpha\equiv\theta''$.

giving depends on the region where $\theta_{CR,k}$ lies as follows:

$$x^*_{CR} \in \begin{cases} \{0\} & \text{if } 0 \le \theta_{CR,k} \le \theta', \\ [1,4] & \text{if } \theta' < \theta_{CR,k} < \theta' + \frac{\alpha+\beta}{2}, \\ \{5\} & \text{if } \theta_{CR,k} = \theta' + \frac{\alpha+\beta}{2}, \\ [6,9] & \text{if } \theta' + \frac{\alpha+\beta}{2} < \theta_{CR,k} < \theta'', \\ \{10\} & \text{if } \theta'' \le \theta_{CR,k} \le 1. \end{cases}$$

Note that while x^*_{CR} increases with $\theta_{CR,k}$ and decreases with α, the effect of β on x^*_{CR} is ambiguous and depends on whether $\theta_{CR,k}$ is smaller or greater than θ''. Specifically, $\frac{\partial(x^*_{CR})}{\partial\beta} > 0$ if and only if $\theta_{CR,k} < \theta''$.[4]

Optimal giving in RC In task RC, the recipient's payoff is always x, while the dictator's payoff can be either 10 with probability $\frac{10-x}{10}$ or 0 with probability $\frac{x}{10}$. The ex post formulation of preferences imply

$$V(\pi_D, \pi_R) = E(U(\pi_D, \pi_R)) = \frac{10-x}{10}U(10,x) + \frac{x}{10}U(0,x),$$

which, using (2), is

$$\begin{aligned} E(U(\pi_D, \pi_R)) &= 10 - x - \frac{10-x}{10}(\beta + \theta_{RC,k})(10-x) - \frac{x}{10}(\alpha - \theta_{RC,k})x \\ &= 10 - x - \frac{(10-x)^2}{10}(\beta + \theta_{RC,k}) - \frac{x^2}{10}(\alpha - \theta_{RC,k}). \end{aligned}$$

This is the same expression as in the proof for task CR and thus the predictions are identical, with $\theta_{CR,k}$ replaced by $\theta_{RC,k}$.

Optimal giving in RR In task RR, one of the players, both players, or neither of them has a payoff of 10, so the dictator's expected utility is

$$\begin{aligned} E(U(\pi_D, \pi_R)) = \left(\frac{10-x}{10}\right)^2 U(10,0) + \left(\frac{x}{10}\right)^2 U(0,10) \\ + \frac{10-x}{10}\frac{x}{10}U(10,10) + \frac{10-x}{10}\frac{x}{10}U(0,0). \end{aligned}$$

With the functional form given in (2), this is

$$\begin{aligned} E(U(\pi_D, \pi_R)) &= \left(\frac{10-x}{10}\right)^2 (10 - (\beta + \theta_{RR,k})10) \\ &\quad + \left(\frac{x}{10}\right)^2 (0 - (\alpha - \theta_{RR,k})10) + \frac{10-x}{10}\frac{x}{10}10 \\ &= \frac{(10-x)^2}{10}(1 - \beta - \theta_{RR,k}) + \frac{x^2}{10}(\theta_{RR,k} - \alpha) + \frac{10-x}{10}x. \end{aligned}$$

[4] Differentiating x^*_{CR} with respect to β yields $5\frac{2(\alpha+\beta)-2(\beta+\theta_{CR,k})+1}{(\alpha+\beta)^2}$, which is positive if $2(\alpha+\beta) - 2(\beta + \theta_{CR,k}) + 1 > 0$ implying $2\alpha - 2\theta_{CR,k} + 1 > 0$ or $\theta_{CR,k} < \alpha + 0.5 \equiv \theta''$.

Differentiating with respect to x yields

$$\begin{aligned}\frac{\partial E(U(\pi_D,\pi_R))}{\partial x} &= -\frac{10-x}{5} + \frac{\beta+\theta_{RR,k}}{5}(10-x) - \frac{\alpha-\theta_{RR,k}}{5}x - \frac{x}{10} + \frac{10-x}{10} \\ &= -1 + (\beta+\theta_{RR,k})\frac{10-x}{5} - (\alpha-\theta_{RR,k})\frac{x}{5}.\end{aligned}$$

This derivative is identical to that obtained for task CR (with $\theta_{RR,k}$ replacing $\theta_{CR,k}$). Since for CR we established that the second derivative is negative for all $\alpha, \beta > 0$, the same conclusion applies here. Therefore, optimal giving in RR is characterized exactly as in CR, with $\theta_{RR,k}$ in place of $\theta_{CR,k}$. ■

Table E1: Descriptive statistics of dictator characteristics

	Control	Photo	Info	Photo+Info	Test (p-value)
Age	20.59	20.60	21.27	20.65	Kruskal-Wallis (p=0.147)
	(1.90)	(1.84)	(2.64)	(2.39)	
Female	0.54	0.50	0.50	0.50	Fisher's exact (p=0.951)
Economics	0.49	0.58	0.53	0.52	Fisher's exact (p=0.788)
Risk taking	4.56	4.22	4.10	3.85	Kruskal-Wallis (p=0.617)
	(3.00)	(2.57)	(2.52)	(2.39)	
No. of dictators	59	60	60	60	

Note: Standard deviations are reported in parentheses. The p-values are two-tailed and have not been adjusted for multiple testing, as none fall below the significance threshold.

Appendix E: Assessing the quality of randomization across treatments

The dictators' characteristics in each treatment are summarized in Table E1. Overall, their average age is 20.8 years, which is not surprising given their recruitment from the undergraduate student population. About half of the sample is female and the most common field of study is economics. On the basis of their responses to the SOEP question, the mean of the risk attitude variable (measured on a scale from 0 to 10) ranges from 4.56 in the Control to 3.85 in the Photo+Info treatment. With unbiased recruitment, it should not be possible to reject the null hypothesis that the dictators' characteristics have identical distributions across treatments. Kruskal-Wallis tests indicate that this is the case for the age and risk attitude variables (the p-values are 0.147 and 0.617, respectively), and Fisher's exact tests show that there is no difference in the proportions of either female or economic students across treatments (the p-values are 0.951 and 0.788, respectively).

Table E2 presents descriptive statistics of recipient characteristics in the three experimental treatments. The average age is close to 50 years; there are no significant differences in age across treatment groups (p-value = 0.707; Kruskal-Wallis test). The sample is equally representative of both genders (p-value = 1.000; Fisher's exact test). Attractiveness, rated on a scale from 1 (homely) to 5 (strikingly beautiful), is virtually the same in the Photo and Photo+Info groups, and this holds independently of whether we consider the dictators' rating or the averages of the ratings provided by the panel of external evaluators (the p-values are 0.779 and 0.720, respectively; Wilcoxon rank sum test).[5] The vast majority of recipients was portrayed with a neutral expression; a Fisher's exact test reveals no significant difference between the distributions of facial expressions in the Photo and Photo+Info treatments (p-value = 0.793). Finally, the recipients assigned to the Info and Photo+Info treatments were equally impacted by the financial crisis. A series of Fishers' exact tests shows that the randomization worked well for (a) the extent to which the recipients' standards of living deteriorated during the financial crisis, (b) the decrease in the value of their

[5] The evaluators were in substantial agreement regarding their ratings of the 120 photos. Inter-evaluator reliability—as measured by Cronbach's alpha—equals 0.88, which is in line with the values reported in the literature (Langlois et al. 2000). Even when we standardize the evaluators' ratings following the procedure suggested by Andreoni and Petrie (2008) we detect no significant difference in attractiveness between the two treatments (p-value = 0.844; Wilcoxon rank sum test).

property, (c) the reduction in their income, and (d) the proportion of recipients that were affected by unemployment (all p-values > 0.135).

TABLE E2: Descriptive statistics of recipient characteristics

	Photo	Info	Photo+Info	Test (p-value)
Age	49.08	50.03	48.95	Kruskal-Wallis (p=0.707)
	(8.25)	(8.99)	(7.85)	
Female	0.50	0.52	0.50	Fisher's exact (p=1.000)
Attractiveness:				
¬ Dictators' ratings	2.77		2.73	Wilcoxon rank sum (p=0.779)
	(0.70)		(0.63)	
¬ Evaluators' ratings	2.50		2.61	Wilcoxon rank sum (p=0.720)
	(0.55)		(0.59)	
Facial expressions:				Fisher's exact (p=0.793)
¬ Happy	0.22		0.23	
¬ Neutral	0.73		0.75	
¬ Angry	0.03		0.00	
¬ Surprised	0.02		0.02	
Decreased standards of living:				Fisher's exact (p=0.314)
¬ Really a lot		0.28	0.35	
¬ A lot		0.62	0.48	
¬ A bit		0.10	0.13	
¬ Not at all		0.00	0.03	
Decreased value of property:				Fisher's exact (p=0.135)
¬ Yes		0.87	0.87	
¬ No		0.05	0.12	
¬ No property owners		0.08	0.02	
Decreased real income:				Fisher's exact (p=0.179)
¬ Not at all		0.00	0.07	
¬ Less than 10%		0.02	0.07	
¬ Between 10% and 20%		0.06	0.10	
¬ Between 20% and 30%		0.42	0.28	
¬ Between 30% and 40%		0.32	0.28	
¬ More than 40%		0.18	0.20	
Affected by unemployment		0.60	0.68	Fisher's exact (p=0.447)
No. of dictators	60	60	60	

Note: Standard deviations are reported in parentheses. The p-values are two-tailed and have not been adjusted for multiple testing, as none fall below the significance threshold.

Appendix F: Additional figures

FIGURE F1: Histograms of dictators' choices by task and treatment.

References

Andreoni, J. and Petrie, R. (2008), 'Beauty, Gender and Stereotypes: Evidence From Laboratory Experiments', *Journal of Economic Psychology* **29**(1), 73–93.

Brock, J. M., Lange, A. and Ozbay, E. Y. (2013), 'Dictating the Risk: Experimental Evidence on Giving in Risky Environments', *American Economic Review* **103**(1), 415–437.

Fehr, E. and Schmidt, K. M. (1999), 'A Theory of Fairness, Competition, and Cooperation', *The Quarterly Journal of Economics* **114**(3), 817–868.

Langlois, J. H., Kalakanis, L., Rubenstein, A. J., Larson, A., Hallam, M. and Smoot, M. (2000), 'Maxims or Myths of Beauty? A Meta-Analytic and Theoretical Review', *Psychological Bulletin* **126**(3), 390–423.

Saito, K. (2013), 'Social Preferences under Risk: Equality of Opportunity versus Equality of Outcome', *American Economic Review* **103**(7), 3084–3101.