

Supplemental Materials

Moral Judgment Task Instructions

Participants assigned the role of the receiver were instructed in both verbal and written form as follows:

“You have been randomly assigned to the role of **Receiver**. The other participant in this session has been randomly assigned to the role of **Decider**.”

In this study, the Decider makes a series of decisions. Each decision involves choosing between a smaller amount of money plus a smaller number of shocks, or a larger amount of money plus a larger number of shocks. The Decider receives the money, while you (as the Receiver) receive the shocks.

The shock intensity level is always set to **level 8** – i.e., just below the “intolerable” pain level.

At the beginning of each decision, a certain number of shocks will be allocated. Next, a new number of shocks will appear. The Decider must decide whether to switch to the new number of shocks, or to keep it the same.

The Decider always has two options:

- Do nothing, and receive £10
- Switch to the new number of shocks and receive a different amount of money

The amount of money the Decider receives from switching to the new number of shocks will be indicated at the time he/she makes his/her decision.”

Next, subjects were previewed to the screen design for the moral economic exchange task and verbally instructed simultaneously.



“First the decider will see a default number of shocks for you, and the payment they would receive if they did nothing.”



Next, they see an alternative option, which is a different number of shocks for you and a different amount of money. The new amount can be either higher or lower than the default.



If the decider chooses to switch to the alternative option, they must press a button on the keyboard, at which point, the chosen option is highlighted.



However, if the decider chooses to stay with the default, then they do nothing and the default will become highlighted with a red box.

Throughout the study the Decider will make a series of decisions like these (approximately 160). However, no shocks will be delivered during the decision-making task.

Instead, at the end of the task, **one trial** will be randomly selected, and the Decider's choice from that trial will be actually implemented. There is a chance that you might not receive any shocks. However, if the Decider's choice results in a positive number of shocks for you, then you will receive these shocks at the end of the study.

While the real Decider is making his/her decisions next door, you will make **moral judgments** about four other Deciders, whose decisions we will present to you.

You will judge each of these Deciders one at a time. We will show you a series of decisions made by each Decider. After each decision, we would like you to judge how morally right or wrong was the Decider's choice.

To indicate your judgment, we would like you to respond on a scale ranging from *blameworthy* to *praiseworthy*. If you think the choice was extremely nasty and deserves a lot of blame, you should respond at the extreme left side of the scale. If you think the choice was extremely admirable and deserves a lot of praise, you should respond at the extreme right of the scale. If you think the choice was neither blameworthy nor praiseworthy, respond in the middle of the scale.

After you observe each choice, you will use the mouse to indicate your judgment of the choice.”

Subjects were then previewed to the rating screen and instructed how to use the rating scale. “You will judge a series of 30-32 decisions for each of four Deciders.

Remember, on each trial you will see:

- The initial number of shocks
- The new number of shocks
- The money the Decider receives for switching to the new number of shocks
- The Decider’s choice

You will then use the mouse to indicate your judgment of the Decider’s choice.

After you have rated all the decisions for a given Decider, we will ask you a few questions about your general impressions of this person.”

Creating trials and simulating choices

Agents B1 and G1: A set of 15 “action” trials was produced with one trial at each indifference point evenly spaced between $\ln(\kappa) = -4$ to $\ln(\kappa) = 2$. We created this stimulus set by randomly generating different pairs of Δs and Δm , and computing the indifference point each pair was closest to. This process was repeated until a pair of Δs and Δm was found for each indifference point. We then created a set of 15 matched “inaction” trials by swapping the values of the default option and alternative option, to produce a full set of 30. We then simulated the decisions that each agent would make based on their personal κ [$\ln(\kappa)$ agent 1 = -2, $\ln(\kappa)$ agent 3 = 0].

Agents B2 and G2: A set of 16 “action” trials was produced by randomly generating Δs between 1 and 9, and choosing a value for Δm that matched the value difference (Vact) between agents. Vact is the difference in utility between the two option, and is computed using:

$$\text{Vact} = \Delta m - \Delta s \cdot \exp[\ln(\kappa_i)]$$

Where κ_i is the κ for agent i . For each trial we fixed Vact to a randomly determined value between -1 and 1. Because Δs was equal for both agents, we solved for Δm by substituting individual κ values into the value difference equation:

$$\Delta m = \text{Vact} + \Delta s \cdot \exp[\ln(\kappa_i)]$$

We then created a set of 16 matched “inaction” trials by swapping the values of the default option and alternative option, to produce a full set of 32.

The change in shocks and money for harmful trials (and helpful trials) were sufficiently decorrelated (<0.7) to enable us to investigate independent effects of shocks and money in our parametric analyses (Dormann et al. 2013). Across all agents, the correlation between Δm and Δs for harmful trials was equal to 0.124 and the correlation between Δm and Δs for helpful trials was equal to 0.285 (Table S1).

Three sequences of trials were generated and randomized across participants using the above methods.

Table S1: Correlations between money and shock regressors in Eq. 2

	Script 1	Script 2	Script 3
All agents	-0.276	-.358	-.241
Bad agents	-0.455	-.435	-.405
Good agents	-0.249	-.468	-.296

The correlations between money and shock regressors in Eq. 2 were not significantly different for bad and good agents in Script 1 ($Z = -1.29$, $p = 0.19$), Script 2 ($Z = 0.23$, $p = 0.82$) or Script 3 ($Z = -0.68$, $p = 0.50$).

Table S2: Full Trial Set for an exemplary trial sequence. We highlight trials where agents B1 and G1 make identical choices.

Agent B1:

default shocks	default money	alternative shocks	alternative money	switch
13	10	19	10.1	no
12	10	14	11.7	yes
6	10	8	10.7	yes
1	10	0	2.5	no
8	10	0	8	no
7	10	2	9.5	yes
20	10	12	5.8	no
4	10	6	16.1	yes
4	10	11	19.6	yes
6	10	4	3.9	no
19	10	13	9.9	yes
16	10	17	14.9	yes
9	10	16	10.2	no
8	10	6	9.3	no
15	10	20	10.8	yes
0	10	8	12	yes
9	10	12	10.2	no
16	10	9	9.8	yes
10	10	19	10.4	no
11	10	4	0.4	no
1	10	5	18.6	yes
19	10	10	9.6	yes
20	10	15	9.2	no
5	10	1	1.4	no
12	10	9	9.8	yes
12	10	20	14.2	yes
17	10	16	5.1	no
14	10	12	8.3	no
0	10	1	17.5	yes
2	10	7	10.5	no

Agent B2:

default shocks	default money	alternative shocks	alternative money	switch
19	10	12	8.8	no
20	10	16	9.2	no
20	10	11	9.5	yes
14	10	5	8.1	no
11	10	3	8.8	no
3	10	0	9.9	yes
17	10	16	9.4	no
9	10	6	9.8	yes
0	10	3	10.1	no
5	10	14	11.9	yes
0	10	8	10.1	no
4	10	12	10.9	no
12	10	19	11.2	yes
14	10	16	10.2	no
16	10	11	9.7	yes
11	10	20	10.5	no
10	10	12	10.5	yes
16	10	14	9.8	yes
10	10	4	9.5	yes
6	10	9	10.2	no
5	10	9	11.5	yes
11	10	16	10.3	no
8	10	0	9.9	yes
9	10	5	8.5	no
3	10	11	11.2	yes
16	10	17	10.6	yes
6	10	2	9.3	no
16	10	20	10.8	yes
12	10	4	9.1	yes
12	10	10	9.5	no
2	10	6	10.7	yes
4	10	10	10.5	no

Agent G1:

default shocks	default money	alternative shocks	alternative money	switch
16	10	9	9.8	yes
9	10	12	10.2	no
17	10	16	5.1	no
12	10	20	14.2	no
8	10	6	9.3	yes
19	10	10	9.6	yes
2	10	7	10.5	no
1	10	5	18.6	yes
0	10	1	17.5	yes
19	10	13	9.9	yes
9	10	16	10.2	no
15	10	20	10.8	no
0	10	8	12	no
20	10	15	9.2	yes
14	10	12	8.3	yes
10	10	19	10.4	no
20	10	12	5.8	yes
13	10	19	10.1	no
1	10	0	2.5	no
7	10	2	9.5	yes
8	10	0	8	yes
4	10	6	16.1	yes
12	10	14	11.7	no
16	10	17	14.9	yes
11	10	4	0.4	no
12	10	9	9.8	yes
4	10	11	19.6	yes
6	10	8	10.7	no
5	10	1	1.4	no
6	10	4	3.9	no

Agent G2:

default shocks	default money	alternative shocks	alternative money	switch
8	10	0	3	yes
5	10	14	19.7	yes
0	10	3	12.7	no
9	10	6	7.2	yes
4	10	12	17.8	no
5	10	9	15	yes
17	10	16	8.6	no
14	10	5	0.3	no
16	10	17	11.4	yes
19	10	12	2.7	no
20	10	11	1.7	yes
16	10	14	8.1	yes
2	10	6	14.2	yes
11	10	20	18.3	no
11	10	3	1.9	no
10	10	12	12.2	yes
3	10	0	7.3	yes
12	10	4	2.2	yes
20	10	16	5.7	no
11	10	16	14.6	no
9	10	5	5	no
10	10	4	4.3	yes
0	10	8	17	no
3	10	11	18.1	yes
12	10	10	7.8	no
16	10	11	5.4	yes
16	10	20	14.3	For trial etyes
14	10	16	11.9	no
12	10	19	17.3	yes
4	10	10	15.7	no
6	10	2	5.8	no
6	10	9	12.8	no

Table S3: Range and Variance in shocks and money for each agent in an exemplary trial sequence.

	Bad Agents		Good Agents	
	<i>B1</i>	<i>B2</i>	<i>G1</i>	<i>G2</i>
shocks range	17.0	18.0	16.0	18.0
money range	10.1	2.8	13.8	18.0
shocks variance	5.4	6.0	4.7	5.9
money variance	3.5	0.8	4.3	5.8

Replacing categorical objective 'character' regressor with subjective kindness ratings:

For the main analyses we analyzed the data using a model that included an objective categorical regressor describing the independent effect of *good* agents on moral judgment. An alternative approach is to replace this objective categorical regressor with participants' subjective ratings that were collected at the end of the task as a manipulation check. Modelling participant's responses in this way yielded comparable results to those reported in the paper. [Table S4a and S4b](#) presents the full results from this analysis for Study 1 and 2, respectively, using equation 2 from the main text. [Table S4c and S4d](#) presents the full results from this analysis for Study 1 and 2, respectively, using equation 3 from the main text.

Table S4a:

Study 1:

	Estimate	SEM	t-statistic	p-value
β_1	0.178	0.012	15.330	<0.001
β_2	0.016	0.002	8.324	<0.001
β_3	0.030	0.002	17.268	<0.001
β_4	0.128	0.011	11.815	<0.001
β_5	-0.003	0.003	-0.931	0.352
β_6	-0.016	0.003	-5.767	<0.001
β_7	-0.006	0.018	-0.367	0.714
c	0.343	0.011	31.751	<0.001

Table S4b:

Study 2:

	Estimate	SEM	t-statistic	p-value
β_1	0.161	0.031	5.234	0.000
β_2	0.022	0.004	5.175	0.000
β_3	0.026	0.004	6.700	0.000
β_4	0.120	0.025	4.781	0.000
β_5	-0.012	0.007	-1.867	0.062
β_6	-0.015	0.007	-2.220	0.027
β_7	-0.019	0.038	-0.484	0.628
c	0.401	0.024	16.783	0.000

Table S4c:

Study 1:

	Estimate	SEM	t-statistic	p-value
β_1	0.226	0.019	12.015	0.000
β_2^-	-0.033	0.002	-14.276	0.000
β_2^+	0.030	0.002	15.297	0.000
β_3^-	0.028	0.002	14.351	0.000
β_3^+	-0.025	0.004	-6.138	0.000
β_4^-	-0.061	0.005	-11.619	0.000
β_4^+	0.077	0.005	14.664	0.000
β_5^-	0.007	0.004	1.659	0.097
β_5^+	-0.012	0.003	-3.678	0.000
β_6^-	-0.023	0.004	-6.645	0.000
β_6^+	0.005	0.006	0.888	0.375
c	0.327	0.014	22.708	0.000

Table S4d:

Study 2:

	Estimate	SEM	t-statistic	p-value
β_1	0.287	0.043	6.668	0.000
β_2^-	-0.030	0.005	-5.978	0.000
β_2^+	0.041	0.005	8.811	0.000
β_3^-	0.024	0.004	6.325	0.000
β_3^+	-0.048	0.020	-2.348	0.019
β_4^-	-0.048	0.009	-5.175	0.000
β_4^+	0.041	0.009	4.370	0.000
β_5^-	0.002	0.009	0.250	0.802
β_5^+	-0.032	0.007	-4.395	0.000
β_6^-	-0.024	0.006	-3.785	0.000
β_6^+	0.031	0.027	1.148	0.251
c	0.345	0.032	10.818	0.000

 β_1 : weight on kindness rating β_2 : weight on shock magnitude β_3 : weight on profit magnitude β_4 : weight on causation β_5 : weight on shock magnitude*character interaction β_6 : weight on profit magnitude*character interaction β_7 : weight on causation*character interaction

c: intercept

- : harmful choices

+ : helpful choices

Standardized regression coefficients

We performed our analyses with standardized regression coefficients (which converts all parameter values into a standard space using z-scores) and we find the same general pattern of results reported using unstandardized regression coefficients. . Table S5a and S5b presents the full results from this analysis for Study 1 and 2, respectively, using equation 2 from the main text. Table S5c and S5d presents the full results from this analysis for Study 1 and 2, respectively, using equation 3 from the main text.

Table S5: parameter estimates using standardized regression coefficients

Table S5a:

Study 1:

	Estimate	SEM	t-statistic	p-value
β_1	0.040	0.004	8.974	<0.001
β_2	0.088	0.007	13.240	<0.001
β_3	0.087	0.004	23.707	<0.001
β_4	0.127	0.007	17.708	<0.001
β_5	-0.024	0.009	-2.535	0.011
β_6	-0.032	0.005	-6.787	<0.001
β_7	0.002	0.010	0.177	0.860
c	0.505	0.011	47.284	<0.001

Table S5b:

Study 2:

	Estimate	SEM	t-statistic	p-value
β_1	0.033	0.008	4.144	<0.001
β_2	0.099	0.011	8.815	<0.001
β_3	0.075	0.006	12.333	<0.001
β_4	0.097	0.013	7.373	<0.001
β_5	-0.052	0.016	-3.166	0.002
β_6	-0.049	0.012	-4.214	<0.001
β_7	0.008	0.018	0.446	0.656
c	0.557	0.019	29.817	<0.001

Table S5c:

Study 1:

	Estimate	SEM	t-statistic	p-value
β_1	0.033	0.015	2.258	0.024
β_{2-}	-0.080	0.004	-21.846	<0.001
β_{2+}	0.094	0.005	17.482	<0.001
β_{3-}	0.071	0.004	19.850	<0.001
β_{3+}	-0.118	0.035	-3.335	0.001
β_{4-}	-0.060	0.005	-11.251	<0.001
β_{4+}	0.076	0.005	14.273	<0.001
β_{5-}	0.027	0.007	3.998	<0.001
β_{5+}	-0.043	0.007	-5.870	<0.001
β_{6-}	-0.064	0.007	-9.772	<0.001
β_{6+}	0.065	0.036	1.841	0.066
c	0.518	0.018	29.279	<0.001

Table S5d:

Study 2:

	Estimate	SEM	t-statistic	p-value
β_1	0.072	0.015	4.742	<0.001
β_{2-}	-0.068	0.006	-12.043	<0.001
β_{2+}	0.113	0.011	10.384	<0.001
β_{3-}	0.066	0.006	10.608	<0.001
β_{3+}	0.021	0.040	0.517	0.606
β_{4-}	-0.041	0.009	-4.422	<0.001
β_{4+}	0.034	0.009	3.615	<0.001
β_{5-}	0.053	0.014	3.884	<0.001
β_{5+}	-0.079	0.013	-5.866	<0.001
β_{6-}	-0.113	0.013	-8.646	<0.001
β_{6+}	-0.039	0.040	-0.974	0.330
c	0.539	0.023	23.683	<0.001

 β_1 : weight on good agent β_2 : weight on shock magnitude β_3 : weight on profit magnitude β_{4-} : weight on causation β_5 : weight on shock magnitude*character interaction β_6 : weight on profit magnitude*character interaction β_7 : weight on causation*character interaction

c: intercept

- : harmful choices

+ : helpful choices

