Research question + design

In this paper, we use an online experiment to study whether the distribution of risks one faces influences their willingness to take risks. Participants can earn either a high or a low payoff by accepting a lottery, or a safe intermediary payoff by rejecting the lottery. We use a Becker–Degroot–Marschak mechanism and ask them for their minimum acceptable probability (MAP) of the lottery's high payoff p for preferring the lottery over the safe payoff.

Participants make three decisions in three different treatments. They state their MAP when p comes from a uniform distribution, a left-skewed distribution and a right-skewed distribution. We call the corresponding treatments 'the Uniform', 'the Good' and 'the Bad'. After they report their three MAPs, a distribution is drawn and a lottery is drawn at random from that distribution to determine payoff. Depending on how p in this lottery compares to MAP, their payoff is either the outcome of the lottery or the safe payoff. By construction, in some treatments it is more likely that a lottery with a high chance of a high payoff is drawn.

We present lotteries graphically via 32 wheels of fortune with 15 sectors each. Dark blue sectors symbolize the high payoff (£4), light blue sectors—the low payoff (£1). The sure payoff is £2. In each treatment, participants see the wheels sorted in ascending order by the probability of the favorable outcome p, with the 32 wheels equally distributed over four rows.

Figure 1 shows the distribution of lotteries for the Good treatment. The number in each wheel is the number of sectors yielding a high payoff (ranging from 0 to 15). The Uniform distribution has equal chances of occurrence for each of the possible wheels. The Bad distribution has an overall chance of a high payoff equal to 0.2895. The distribution in Good mirrors the one in Bad: its overall expected chance of a high payoff is one minus that in Bad (0.7105), it has the same variance and minus the skewness of the Bad distribution. Table 1 presents the distributions.

Table 1: The treatments: the distribution of chances of a high payoff p

	# of wheels			
# of high payoff sectors	The Good	The Bad	The Uniform	Probability of high payoff p
0	1	8	2	0
1	1	4	2	0.07
2	1	4	2	0.13
3	1	3	2	0.20
4	1	2	2	0.27
5	1	1	2	0.33
6	1	1	2	0.38
7	1	1	2	0.47
8	1	1	2	0.53
9	1	1	2	0.60
10	1	1	2	0.67
11	2	1	2	0.73
12	3	1	2	0.80
13	4	1	2	0.87
14	4	1	2	0.93
15	8	1	2	1
Total # of wheels	32	32	32	

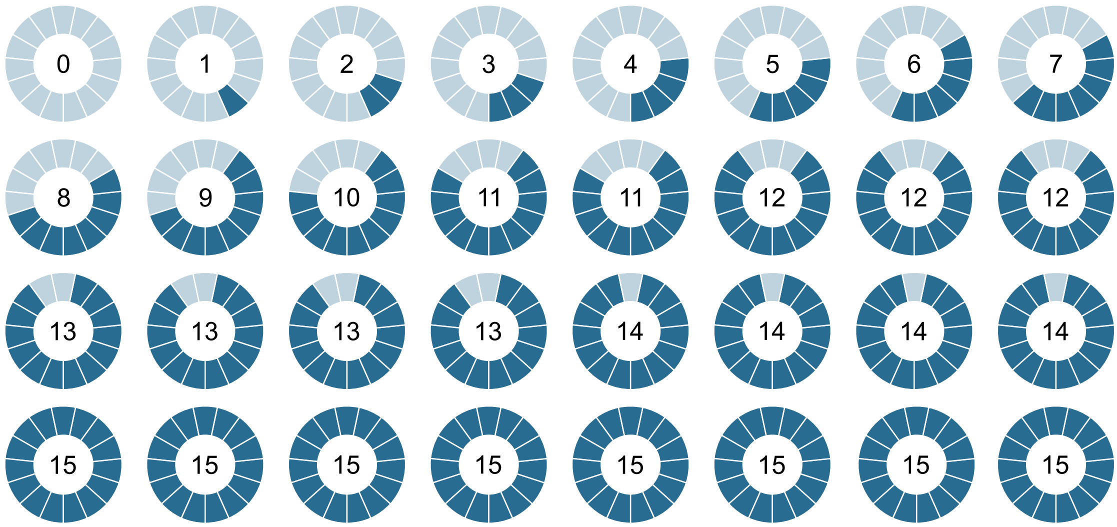

Figure 1: The Good distribution

Participants are told that one of the wheels will be drawn at random, with all wheels having an equal chance to be drawn. They are asked to state a *minimum acceptable frequency*: the lowest number of dark blue sectors in the randomly drawn wheel such that they prefer to spin the wheel instead of receiving the sure payoff.[1] Specifically, they have to answer: "Which wheels would you like to spin for your bonus?" by inserting an integer between 0 and 15 in the blank space: "I prefer to spin wheels which have at least ____ dark blue sectors."[2]

Predictions according to KR

First, a short summary of our results: we find that $MAP^*_{Good} > MAP^*_{Uni} > MAP^*_{Bad}$. This is true for between-individual comparisons, where differences are highly significant. Figure 2 shows that this is true regardless of the order in which the participants went through When looking at within-individual comparisons, 44% report the same MAP in all treatments, while for 42% at least one of the inequalities holds (for 38%, two of the three MAPs are tied, while the third one

[1]We decided to use frequencies instead of probabilities because there is evidence that participants have an easier time expressing choice this way (Quercia, 2016).

[2]We chose the setup with wheels of fortune as we wanted to make the task easy to understand. Despite our approach being discrete, we will interpret the frequencies (x out of 15) as minimum acceptable probabilities.

follows the same ordering as for the between-individuals comparisons e.g. $MAP*_{Good} > MAP*_{Uni} = MAP*_{Bad}$.

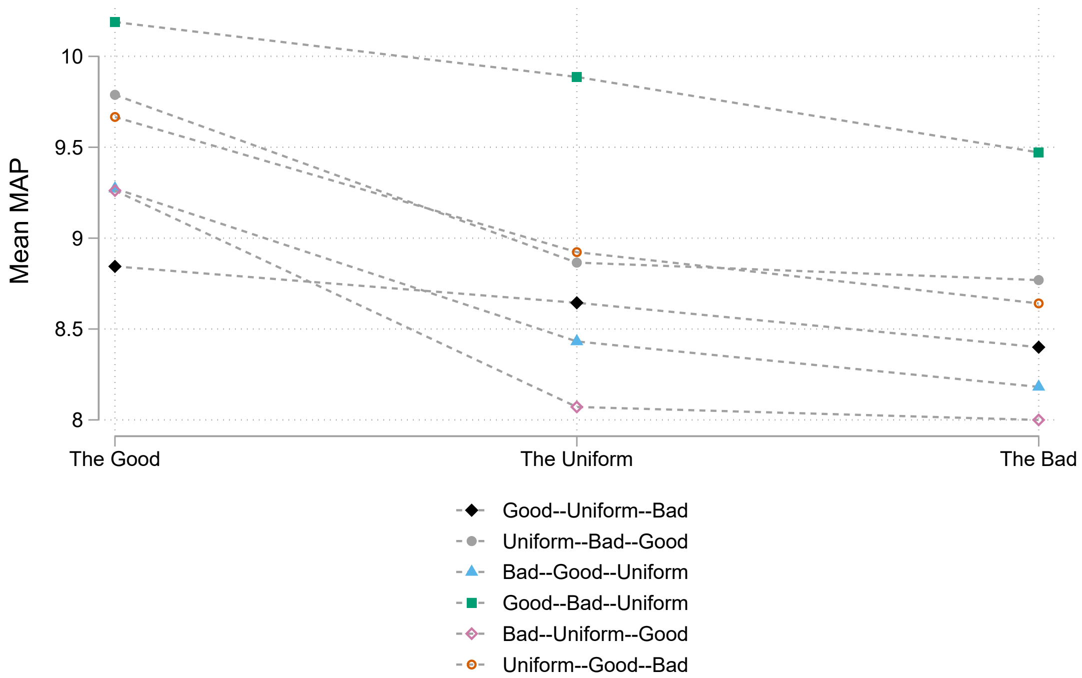

Figure 2: Mean MAPs by treatment and decision sequence

We were suggested to use a reference-dependence model by referees to check whether it would explain our findings.

References

Quercia, S. (2016). Eliciting and measuring betrayal aversion using the BDM mechanism. *Journal of the Economic Science Association*, 2(1):48–59.