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# Group preferences over social risk: does (group) size matter?

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**Abstract:** In this paper, we first replicated Harrison et al. (2012). Then, we studied if the group's size has an impact on group's risk aversion. In line with Harrison et al. (2012), our results confirm that no significant differences occur between individuals and groups risk aversion in three-person group. We also found that group size does not affect the level of risk aversion.

**Keywords:** Preferences; Group; Risk Attitude; Majority Rule; Laboratory.

**JEL classification:** C91; C92; D01.

## 1. Introduction

In the last decade, several scholars investigated groups' risk attitudes. However, they did not achieve a univocal position. Some of them reported that groups are more risk adverse than individuals (Ambrus et al., 2015; Baker et al., 2008; Bateman and Munro, 2005; Shupp and Williams, 2008; Masclet et al., 2009). Conversely, other studies show that groups tend to be less risk adverse (Rockenbach et al., 2001; Zhang and Casari, 2012). In a recent paper Harrison et al. (2012) studied preferences over social risk. Their main result was that individuals and groups risk attitude was not statistically different.

So far, most studies have tested three-person groups (Baker et al. 2008; Masclet et al., 2009; Harrison et al., 2012; Zhang and Casari, 2012; Brunette et al., 2015), but the size of the group could matter (Sutter, 2005; Charness and Sutter, 2012). Thus, in this work, on one hand, we replicate Harrison et al. (2012) in order to investigate the link between individual and group preferences towards risk; on the other hand we extend it in order to analyse the impact of the group size on preferences over social risk.

The remainder of this paper is organized as follows. We first present the experimental design in Section 2. Then, we report our results in Section 3. Finally, Section 4 concludes.

## 2. Experimental design

Our experiment was conducted on a heterogeneous sample of 300 students from Universitat Jaume I. Participants were presented with 10 binary lottery<sup>1</sup> choices (Table 1).

| Lottery A |        | Lottery B |          |
|-----------|--------|-----------|----------|
| 50 ECU    | 40 ECU | 96,25 ECU | 2.50 ECU |
| 10%       | 90%    | 10%       | 90%      |
| 20%       | 80%    | 20%       | 80%      |
| 30%       | 70%    | 30%       | 70%      |
| 40%       | 60%    | 40%       | 60%      |
| 50%       | 50%    | 50%       | 50%      |
| 60%       | 40%    | 60%       | 40%      |
| 70%       | 30%    | 70%       | 30%      |
| 80%       | 20%    | 80%       | 20%      |
| 90%       | 10%    | 90%       | 10%      |
| 100%      | 0%     | 100%      | 0%       |

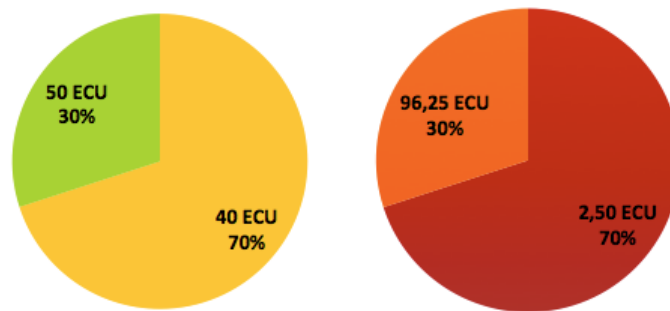
**TABLE 1** - The 10 binary lottery choices (Harrison et. al., 2012)

Payoffs were all converted in euros (Figure 1). We showed all the 10 pairs of lotteries one by

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<sup>1</sup> The same used in Harrison et al. (2012).

one, while participants took note of which one they preferred to play on booklet we provided in advance.



**FIGURE 1** - Example of Lotteries Presented

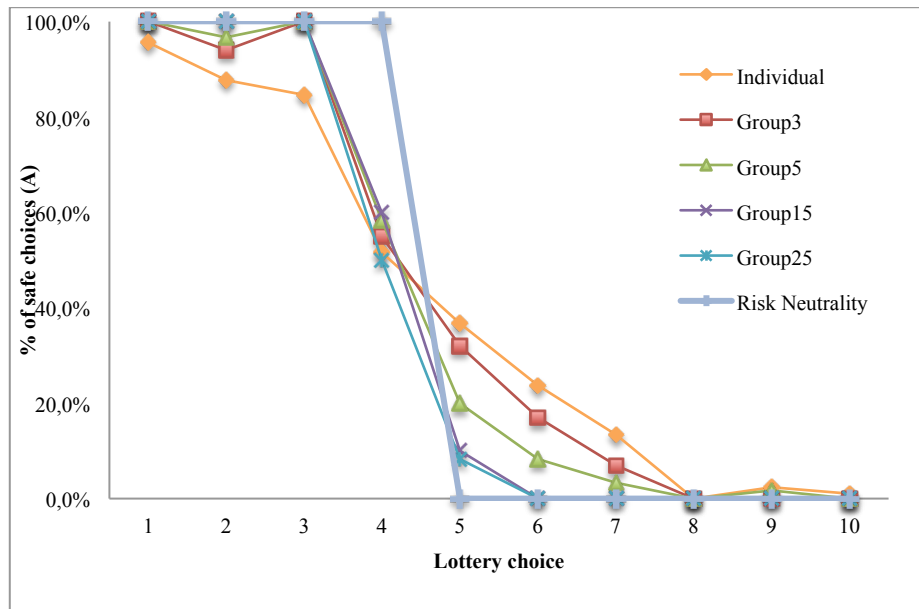
After collecting answers subject by subject, we merged them using the majority rule in order to bring out which would be the group choice when this rule is applied.

In doing so, we randomly formed groups of three persons (100 groups), five persons (60 groups), ten persons (30 groups), fifteen persons (20 groups) and 25 persons (12 groups).

Overall, we run the experiment in 10 occasions. No person took part in the experiment in more than one occasion. The whole session took on average 20 minutes.

### **3. Results**

First, we processed data from individuals. Then, we carried out the analysis on groups' decision. The graph below (Figure 2) reports the percentage of choices for A (the safe option). It compares individual choices (rhombus line), and group choices elicited with majority rule for different group sizes. The line labelled "Risk Neutrality" represents the choice of a risk neutral decision maker (subject or group). A risk-neutral subject (group) should switch from A to B at the 5th decision problem. A switch in later decisions reveals risk aversion, while a switch in earlier decisions reveals risk-seeking behaviour.



**FIGURE 2** – Distribution of safe choices (A) per individual and group size

It is useful to clarify that a rational subject (group) with monotonic preferences should switch from the safer to the riskier option just once and never switch back. Instead, some subjects (group) switched from A to B and *vice versa* more than once. This behaviour can be due to several reasons: either these subjects are genuinely indifferent towards different lotteries, or they are irrational (do not respect monotonicity), or it is just a mistake. For our purpose, we consider this behaviour a “mistake” when only one switchback occurred. In these cases, we fixed the error and included that subject into the computation, since the real intention was clear. On the contrary, we labelled as “irrational” those participants who showed multiple switches, and we did not consider them in the calculation, because their intentions were not so clear<sup>2</sup>. Number of observations with multiple switches is shown in Table 2 as well as the average CRRA coefficient for individual and different group sizes.

|             | Observations with multiple switch | Average CRRA <sup>3</sup> | Std. Dev. CRRA |
|-------------|-----------------------------------|---------------------------|----------------|
| Individuals | 24                                | -0.0410                   | 0.5041         |
| Group3      | 0                                 | -0.0035                   | 0.3358         |
| Group5      | 1                                 | -0.0008                   | 0.3258         |
| Group15     | 0                                 | -0.0980                   | 0.1782         |
| Group25     | 0                                 | -0.1333                   | 0.1648         |

**TABLE 2** – Descriptive statistics of CRRA distributions

Looking at Table 2 we can state our **first result**: groups respect monotonicity more than the

<sup>2</sup> On this procedure, see Jacobson and Petrie (2009)

<sup>3</sup> For this evaluation, we took into account 276 individuals, all the groups of three members, 59 groups of five members and all the groups with fifteen and twenty-five members.

individuals that compose them.

As we can notice from figure 2, we observe a *risk shift* for both individuals and groups. Indeed, the switching point occurs at lottery number 4. However, individuals and small groups seem to be the more distant from the risk neutrality than larger groups. Results from two-sample Kolmogorov-Smirnov tests on distributions of switching points, and risk neutrality across different group size show that distributions of switching points are statistically different from risk neutral distribution for individuals, three-member groups, and five-member groups. Instead, there is not a statistically difference for fifteen-member groups and twenty-five-member groups (Table 3). This brings us to our **second result**: risk shift is more severe for individuals and small groups (3, 5 person groups) than large groups.

Ten two-sample Kolmogorov-Smirnov tests were carried, in order to compare individuals' and groups' distributions of switching points. Comparing individuals and three-member groups we cannot reject the null hypothesis of equality; we can, now, state our **third result**: no significant differences occur between individuals and groups risk aversion in three-person group.

| <b>K-S (<i>p-value</i>)</b> | <b>Group3</b> | <b>Group5</b> | <b>Group15</b> | <b>Group25</b> | <b>Risk Neutrality</b> |
|-----------------------------|---------------|---------------|----------------|----------------|------------------------|
| <b>Individual</b>           | 0.142         | 0.399         | 0.230          | 0.286          | 0.000                  |
| <b>Group3</b>               | -             | 0.721         | 0.341          | 0.370          | 0.000                  |
| <b>Group5</b>               | -             | -             | 0.987          | 0.944          | 0.001                  |
| <b>Group15</b>              | -             | -             | -              | 1.00           | 0.172                  |
| <b>Group25</b>              | -             | -             | -              | -              | 0.249                  |

**TABLE 3** – Results from two-sample Kolmogorov-Smirnov test on distributions of switching points

In addition to this, the same analysis on distributions of switching points and CRRA coefficients across groups of different size did not yield any significant difference (Table 3). Hence we can state our **fourth result**: group size has no impact on risk aversion.

#### 4. Conclusions

In this research, we first replicate Harrison et al. (2012). Then, we study if the group's size has an impact on group's risk aversion when a majority aggregation rule is applied. In line with Harrison et al. (2012), our results confirm that no significant differences occur between individuals and group risk aversion in three-person groups. Furthermore, this result is also confirmed in case of larger groups. Indeed, our follow-up analysis on groups of three, five, fifteen and twenty-five members showed that distributions of switching point were not statistically different across larger and smaller groups.

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