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Group Decision Making Under Risk:
An Experiment with Student Couples[§]

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Abstract

In an experiment, we study risk-taking of cohabitating student couples, finding that couples' decisions are closer to risk-neutrality than single partners' decisions. This finding is similar to earlier experiments with randomly assigned groups, corroborating external validity of earlier results.

JEL Classification: C91; C92.

Key words: Risk experiment; Student couples; Group decision making.

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1. Introduction

Many important decisions in human life are made by groups rather than individuals. Think of families, executive boards, legislatures or committees. Even the main agents in introductory economic textbooks, e.g., households and firms, are typically not individuals, but groups of people with a joint stake in economic decisions. The range of decisions taken by teams is wide, including, for example, market entry decisions of companies or savings and investment decisions of households. Risk is necessarily an important dimension of such decisions. Therefore, the recent literature on group decision-making has put a strong emphasis on group decision-making under risk. Since observing and identifying the influence of group decision-making on risky choices is difficult with field data (see Prather and Middleton, 2002, for an exception using data from mutual fund management), most of this literature has used laboratory experiments to explore group decision-making under risk (e.g., Baker et al., 2008; Shupp and Williams, 2008; Masclet et al., 2009). In these experiments, subjects are randomly assigned to groups and are then requested to make a group decision (either by talking to each other or by voting within a group). Typically, groups are found to have a smaller variance in their risk preferences than individuals. Concerning the question of whether groups are more or less risk-averse than individuals, the general evidence seems to suggest that groups are more risk-averse in lotteries with low probabilities of winning the largest payoffs, but less risk-averse when these probabilities are high (e.g., Baker et al., 2008; Shupp and Williams, 2008; Masclet et al., 2009). This pattern is consistent with group choices being closer to what would be expected of rational, risk-neutral decisions in risk experiments. This matches the general finding from experimental research on group decision making that groups are more rational agents than single individuals (Cooper and Kagel, 2005; Kocher and Sutter, 2005).

One potential problem of group decision-making research concerns the formation of groups, though. In the studies referred to above, groups are formed by randomly assigning subjects who don't know each other to a specific group. This raises the question of whether more naturally occurring groups with a longer history behave in the same way as artificially created ad-hoc groups. In a nutshell, the question concerns the external validity of group research with randomly assigned groups. A recent strand of literature has tried to examine this

question by studying the decision-making of couples, some of them married for several decades, that are drawn from the general population (e.g., Bateman and Munro, 2005; Carlsson et al., 2009; de Palma et al., 2011). While this approach is highly welcome, it is difficult to compare the results from these latter studies with the controlled laboratory experiments with randomly assigned groups because two features have been simultaneously changed (the subject pool – students versus subjects from the general population – and the group formation – randomly assigned ad-hoc groups versus natural groups with a history), confounding attempts to draw inferences about the external validity of randomly assigned groups.

In this paper, we contribute to the literature on group decision-making by running an experiment with student couples. Thus, we keep the subject pool comparable to earlier studies with randomly assigned ad-hoc groups, but we investigate natural groups in the sense that we consider couples who have been cohabitating for 18.5 months on average. By taking this approach, we can check how these couples make risky choices and how their joint decisions relate to their individual decisions. Unfortunately, the previous experimental literature on ad-hoc groups and risky choices has used only three-person groups, nor has it controlled for the gender composition of groups in the analysis of differences between individuals and groups (Baker et al., 2008; Shupp and Williams, 2008; Masclet et al., 2009). Since group formation has been random in these earlier studies, however, the differences between individuals and groups have most probably not been influenced by the gender composition of groups. In our case, groups always consist of one woman and one man.

Section 2 introduces the experimental design. Section 3 presents the results, and section 4 concludes.

2. Experimental design

The experiment was conducted with university students in student residential areas around several universities in Guiyang, the capital of an inland province in southwest China. In the experiment, we used the design by Holt and Laury (2002), asking subjects to make 10

sequential choices between one "safe" option A (with payoffs of 16 or 20 Yuan) and one "risky" option B (with payoffs of 1 or 38.5 Yuan), with probabilities of higher payoffs increasing from 10% to 100%, as illustrated in Table 1.

Table 1 about here

We recruited 100 cohabitant student couples (100 males and 100 females) by randomly knocking on doors in student residential areas. After obtaining agreement from both partners on a time to conduct the experiment, an experimenter arrived at their apartment and conducted the experiment. First, couples were asked to make 10 choices individually (in different corners of a room with their backs towards each other; they were not allowed to talk to each other in this part), and, second, they made the same choices jointly by talking to each other, and agreeing on each decision in the ten choices. The subjects were not made aware of the second part before they had completed their individual decisions.[1] At the end of the experiment, subjects were paid for both parts of the experiment by randomly picking one choice each from the individual part and one from the joint part. On average, subjects earned 49 Yuan plus a 10 Yuan participation fee (approximately 8.3 USD at the time of the experiment).

3. Experimental results

Figure 1 illustrates the fraction of subjects choosing the relatively safe option A in each choice situation.[2] Panel (a) distinguishes between the choices of males, females, and couples. The dashed line represents the prediction for a risk-neutral, payoff-maximizing decision maker. We see that females are clearly more risk averse than males ($p < 0.05$; two-sided

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[1] A similar sequential procedure was also used in Baker et al. (2008), where no order effects were found when the authors controlled for it. Hence, we have not varied the order of decisions in our experiment, meaning that individual decisions are always taken before the group decisions.

[2] We have excluded data from 8 households either because one of the partners or because the couple together made inconsistent choices (by switching back and forth between option A and option B). The following analysis is therefore based on data from 92 households (i.e., 184 subjects).

Mann-Whitney U-test), which is a fairly robust result in the literature (see e.g., Croson and Gneezy, 2009). The joint choices of couples are almost always in between the male and female frequencies of choosing option A, and they are significantly different both from male and female choices ($p < 0.05$; two-sided Wilcoxon signed ranks tests). Panel (b) indicates that the joint choices are practically indistinguishable from individual choices when male and female choices are pooled ($p = 0.92$; two-sided Wilcoxon U-test). These main findings are also supported by Table 2 that reports overall averages of safe choices and the corresponding standard deviations. It is worth noting that the variance of risk preferences is smaller for couples than for pooled individuals ($p < 0.01$; Levene F-test), probably because couples will average out the more risk-averse women and more-risk loving men.

Figure 1 and Table 2 about here

In the following, we present a random effects probit regression analyzing the probability of choosing the "safe choice" (i.e., option A). We present two models, one including only individual choices of males and females to examine gender differences, and one that compares the decisions of couples with individual choices. Model (1) shows that the "probability of winning the high payoff" has a significantly negative impact on the likelihood of choosing the safe option. Males are significantly less risk-averse than females. We also consider an interaction variable between the probability of winning the higher payoffs and male choices in order to see whether gender differences depend on the probability of winning the high payoffs. This, however, is shown not to be the case at conventional levels of significance. Model (2) adds the couple data to model (1). Again, the probability of winning the higher payoff is significantly negative. The dummy variable for "couple" has a significantly positive sign (with individual decisions of men and women as the benchmark), while the interaction term "Probability*couple" (which ranges from 0.1 to 1.0 for couples) is significantly negative. Taking both variables together, it follows that couples are more risk-averse than individuals when the probability of the higher payoffs is low, but less

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risk-averse when it is high. This implies that couples are closer to the prediction under risk-neutrality than individuals (see also Figure 1).

Table 3 about here

4. Conclusion

We have run an experiment on group decision-making by letting cohabitating student couples make risky choices. This has enabled us to study decision-making of long-standing groups with a history of cohabiting for 18 months on average. In line with previous findings (e.g., Masclet et al., 2009), we have found that both individuals and couples are, on average, risk-averse in their choices and that risk preferences are less diverse across groups (i.e., couples) than across individuals. Couples are generally more risk averse than individuals in lotteries with a low probability of winning, but less risk averse when the probability of winning higher payoffs is high. This is very similar to findings in Baker et al. (2008) who had used randomly assigned groups to study group decision-making under risk. Our paper has shown that naturally occurring groups with a joint history (i.e., student couples) show practically the same choice pattern, lending faith to the external validity of group decision-making research that relies on randomly assigned ad-hoc groups.

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Tables and Figures

Table 1. The ten paired lottery-choice decisions.

	Option A				Option B				Expected payoff
Choice	Prob.	Payoff	Prob.	Payoff	Prob.	Payoff	Prob.	Payoff	difference
	(p)	(yuan)	(1-p)	(yuan)	(p)	(yuan)	(1-p)	(yuan)	(A - B)
1	1/10	20	9/10	16	1/10	38.5	9/10	1	11.7
2	2/10	20	8/10	16	2/10	38.5	8/10	1	8.3
3	3/10	20	7/10	16	3/10	38.5	7/10	1	5
4	4/10	20	6/10	16	4/10	38.5	6/10	1	1.6
5	5/10	20	5/10	16	5/10	38.5	5/10	1	-1.8
6	6/10	20	4/10	16	6/10	38.5	4/10	1	-5.1
7	7/10	20	3/10	16	7/10	38.5	3/10	1	-8.5
8	8/10	20	2/10	16	8/10	38.5	2/10	1	-11.8
9	9/10	20	1/10	16	9/10	38.5	1/10	1	-15.2
10	10/10	20	0/10	16	10/10	38.5	0/10	1	-18.5

Note: One USD was equal to 7.1 Yuan at the time of the experiment.

Table 2. Descriptive statistics.

Number of safe choices (Option A)	Male	Female	Individual pooled	Group
Mean	4.48	5.25	4.86	4.84
Median	4	5	5	5
Std. Dev.	1.90	1.69	1.83	1.56

Table 3. Random effects probit regression results for probability of safe choice

Variables	Model (1)	Model (2)
Probability of winning the high payoff	-44.251***	-46.069***
	(10.000)	(4.058)
Male	-6.301*	
	(3.445)	
Probability*male	5.653	
	(5.113)	
Couple		4.442*
		(2.666)
Probability*couple		-8.553*
		(4.708)
Constant	25.438***	24.684***
	(5.827)	(2.082)
Rho (Corr. Coeff.)	0.982	0.986
	(0.008)	(0.003)
Observations	1,840	2,760
Number of decision makers	184	276

Note: The table shows the regression coefficients. *** denotes significance at the 1% level, ** at the 5% significance level, and * at 10% significance level
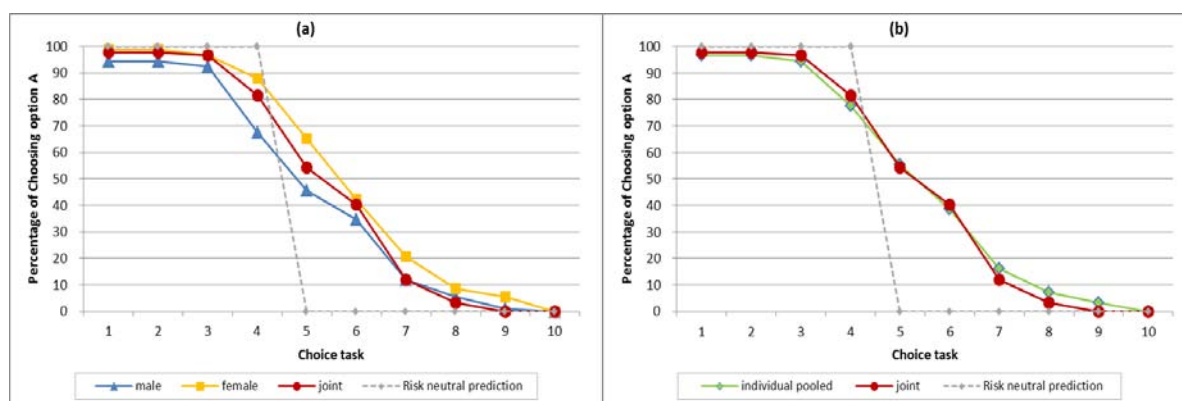

Figure 1. The cumulative distribution of safe choices (of option A).

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