Trust：Decision under uncertainty

Abstract: This paper investigates individual's trust attitude towards human beings and machine. Based on previews study, this paper looked at how gender and risk attitude contribute to trust in strangers. Moreover, the new factor ambiguity attitude was also introduced. Besides, this paper tried to find out if there is an imparity in trustors' trust attitude between these two treatment groups. The result turns out, only gender and ambiguity attitude have effect on participants' trust attitude towards machine. And trustors trust machine more compared to a random stranger.

Key words: *trust; risk attitude; ambiguity attitude; gender*

1 Introduction

Uncertainty is a big problem that people always face. When individuals make decisions while interacting with others, the source of uncertainty comes from other people rather than nature. One of the most common issues is trust.

The earliest study on trust is Berg's "investment game" (Berg al., 1995) experiment. In this experiment, subjects are divided into two groups from the beginning; all of them are anonymous for others. Members in group A called giver have $10 while members in group B called receiver have $0 at first. The experiment includes two stages. In the first stage participants in group A give $X (0<=X<=10) to paired participants in group B, paired members in group B receive $3x while members in group A lost $x. In the second stage, members in group B can return $y (0<=Y<=3X) to paired members in group A. At last, members in group A have $10-x+y in total while paired members in group B have $3x-y in total. According to "Nash Equilibrium", the x should equal to 0. Yet, in Berg's experiment 30 of 32 givers gave more than $0 to their paired receivers. This result indicates that outcome is not the only thing people consider when make a choice. Reciprocity and trust to anonymous are uncertain factors that individual also focus on (Berg et al., 1995).

Though, from Berg's "investment game" (Berg al., 1995) which is called trust game nowadays, it can be easily concluded that "trust" is one of the reasons most of

the giver gave some money to receiver. The early study did not explain why trust exist in anonymous, more importantly, which factors affect participates' choice in trust game. To answer these questions, other economists carried out more investigations.

Gender differences in social interaction have been often investigated. Eckel and Grossman found that female giver give more money to the paired receiver than male (Eckel and Grossman, 1998) while the ultimatum game operated by the same authors proves that there is no significant difference in giver's decision among different gender (Eckel and Grossman, 1999). Croson and Buchan (1999) studied the gender difference in trust game decisions but found no difference in the amount sent by trustors across genders. These results suggest that when giver can make decision alone, different genders make different decisions. However, when giver and receiver both have decision power, gender difference did not cause any different in decision making. Therefore, the lack of a gender difference in the trustor decision might have been due to the difference in risk and ambiguity attitudes across genders.

The research on risk attitudes often use the method introduced by Holt and Laury in 2002. In this experiment participants are asked to make choices from option A and option B, the choice list has been shown under the table below (table 1). Each participate have to make choices in 10 different conditions. In all these 10 conditions, option B are always more risky than option A. So, if individual choose option A in all setting, it means he or she is an extreme risk-averse person. If individual choose option B in all setting, it means he or she is an extreme risk seeking person (Holt and Laury, 2002).

TABLE 1 – LOTTERY RISK PREFERENCE CHOICE LIST

Option A	Option B	Expected Payoff Difference
1/10 of $2.00, 9/10 of $1.60	1/10 of $3.85, 9/10 of $0.10	$1.17
2/10 of $2.00, 8/10 of $1.60	2/10 of $3.85, 8/10 of $0.10	$0.83
3/10 of $2.00, 7/10 of $1.60	3/10 of $3.85, 7/10 of $0.10	$0.50
4/10 of $2.00, 6/10 of $1.60	4/10 of $3.85, 6/10 of $0.10	$0.16
5/10 of $2.00, 5/10 of $1.60	5/10 of $3.85, 5/10 of $0.10	-$0.18
6/10 of $2.00, 4/10 of $1.60	6/10 of $3.85, 4/10 of $0.10	-$0.51
7/10 of $2.00, 3/10 of $1.60	7/10 of $3.85, 3/10 of $0.10	-$0.85
8/10 of $2.00, 2/10 of $1.60	8/10 of $3.85, 2/10 of $0.10	-$1.18
9/10 of $2.00, 1/10 of $1.60	9/10 of $3.85, 1/10 of $0.10	-$1.52
10/10 of $2.00, 0/10 of $1.60	10/10 of $3.85, 0/10 of $0.10	-$1.85

Besides Holt and Laury's (2002) measurement for risk attitude, Sapienza introduced another method to detect risk attitude as well. In Sapienza's research (2013), "subjects are asked to choose 15 times between two options: Option A and Option B. When choose option A, subjects can get a sure amount of money range from 50 to 120 in fifteenth evenly spaced. When choose option B, subjects have 50% chance get $200 and 50% chance get nothing". The choice list has been shown on the table below (table 2).

TABLE 2 – SAPIENZA'S RISK PREFERENCE CHOICE LIST

Option A	Option B
$50	1/2 of $200, 1/2 of $0
$55	1/2 of $200, 1/2 of $0
$60	1/2 of $200, 1/2 of $0
$65	1/2 of $200, 1/2 of $0
$70	1/2 of $200, 1/2 of $0
$75	1/2 of $200, 1/2 of $0
$80	1/2 of $200, 1/2 of $0
$85	1/2 of $200, 1/2 of $0
$90	1/2 of $200, 1/2 of $0
$95	1/2 of $200, 1/2 of $0
$100	1/2 of $200, 1/2 of $0
$105	1/2 of $200, 1/2 of $0
$110	1/2 of $200, 1/2 of $0
$115	1/2 of $200, 1/2 of $0
$120	1/2 of $200, 1/2 of $0

Based on “lottery risk preference” experiment (Holt and Laury, 2002), economists did some further investigation and attempted to find out the relationship between risk attitude and trust game. Eckel and Grossman’s research (2004) indicate that “no statistical relationship between the behavioral risk measures and the decision to trust”. However, in Sapienza’s study (2013), the conclusion turns out that “the giver’s behavior in a trust game is driven by it risk preferences”. The two disparate results caused a paradox. What is more, Fairley’s experiment (2014) verifies that “lottery risk preferences have no explanatory power to the transfers in the trust game”. Hence, using “lottery risk preference” (Holt and Laury, 2002) and “Sapienza’s risk preference” (Sapienza et al., 2013) to test individual’s risk attitude show totally different results, to seek the relationship between risk attitude and trust game still need further investigation and other approaches.

Ambiguity attitude is another factor that could have an impact on trust game. Sutter et al. (2011) introduced an ambiguity measurement. In their design, participates are asked to make a choice from two different options in 40 different conditions. The first option is to draw a ball from either bag A – the risky prospect or bag B – the ambiguous prospect. Participant could win 10 euro by betting on the color of their choice to be blindly drawn from a bag by him/her. The second option is to gain a sure amount of money, the sure amount increases as one move down the list, while the risky gamble remains the same. The choice list is shown in the table below (table 3). Use the collected data, both risk attitude and ambiguity attitude can be test (Sutter et al., 2011). But, the “two color test” (Sutter et al., 2011) has not been correlated with trust game’s research yet.

TABLE 3 – TWO COLOR TEST CHOICE LIST

Option A		Option B
Draw from bag A		0.5 euro for sure
Draw from bag A		1 euro for sure
Draw from bag A		1.5 euro for sure
	etc.	
Draw from bag A		10 euro for sure
Draw from bag B		0.5 euro for sure
Draw from bag B		1 euro for sure
Draw from bag B		1.5 euro for sure
	etc.	
Draw from bag B		10 euro for sure

Later economists did deeper researches about individual's decision in trust game. Not only focus on gender difference and risk attitude, but also concentrate on participants' different trust attitude toward human and machine.

Houser et al. (2010) developed a new experiment involving two different "trust treatments" and two different "risk treatments". In both trust treatments the trustees are human while in both risk treatments the trustees are computer. The new experiment has two important findings. First, the result of this experiment indicate that "risk attitude do not impact participants' decision in trust game". Second, the amount that trustors invested in risk treatment is significant different from the amount those trustors invested in trust treatment (Houser et al., 2010). Consequently, there is a difference between social uncertainty and mechanical uncertainty. In Houser's research (2010) trustors in "risk treatment" know the previews finding provided by Berg et al. (1995) and the distribution of trustees' reaction. Yet, in my new experiment, all the trustors have no idea about the trustees' potential choice distribution.

2. Experimental Design

Based on the finding of the past researches, I did a new experiment including variables trust attitude, gender, risky and ambiguity attitude, trying to find the

relationship between these variables. The experiment demands two treatment groups, with 63 participates in each group. Participates in each group were asked to answer questions about three main parts: a part with 20 questions measuring risk attitude; a part with 20 questions measuring ambiguity attitudes and a part with one question about trust game. All participates were required to answer the same questions about their risk attitude and ambiguity attitude, however, participates in different groups were asked different questions in trust game part. Participates in the first treatment group were requested to answer the question about their trust attitude towards human beings while participates in the second treatment group were requested to answer the question about their trust attitude towards machine.

Before the experiment start, subjects were informed that they are randomly paired with another participant. Out of all participants, 2 pairs would be paid according to their choices in experiment. Their payments were jointly determined by their and their partners' decisions in the experiment.

Subjects in these two groups were both presented with two bags at first, bag A and bag B. Bag A was used to test their risk attitude while bag B was used to test their ambiguity attitude. They were told that in both bags, there are twenty balls, which were either white or orange. In bag A, the risky bag, there were exactly ten white and ten orange balls, whereas in bag B, the ambiguous bag, the proportion of white and orange balls was unknown.

For elicitation of their risk attitudes, subjects were offered a list of choices (table 3) between a bet on the color of the ball drawn from bag A and a sure amount of payoff. Subjects can choose either make a bet or get a sure amount of payment. If the subjects choose option A which is make a bet, they have to choose a winning color at first and the winning color are only be asked once at beginning. If they draw a ball of the color that they chose, they can win 10 euros; otherwise, they win nothing. If they choose option B, they can get the amount illustrate on the list. In total, there are 20 different conditions in this list, within it, the sure amount increases as one move down the list, while the risky gamble remains the same.

For elicitation of their ambiguity attitudes, subjects faced a similar choice list then (table 3). The only difference is that they would bet on the color of the ball drawn from bag B (the ambiguous bag) instead of bag A (the risky bag).

All the participants' risk and ambiguity attitude had to be tested. Option A is the same amount of payoffs in both lists while the option B in the list varied from 0.5 to 10 in twenty evenly spaced in the questionnaire.

After answering questions about risk prospect and ambiguity prospect, subjects were randomly assigned to play one of the two versions of trust game. The trust game prepared for the first treatment group is the trust game with human beings while the trust game prepared for the second treatment group is the trust game with machine.

In the trust game with human beings, subjects played the trust game as introduced by Berg et al. (1995) with one modification: the trustee had only two options: keep everything received, or send half back to the trustor. Since we are mostly interested in the trustor decision, most subjects were assigned the role of trustor and four subjects were assigned the role of trustee. Therefore, each trustor was randomly paired with one of the trustees, while one trustee could be paired with multiple trustors. All patriciate's identity would not be revealed to others during or after the experiment. Trustors would decide how much of their initial endowment of €10 to send to their trustee. After tripled what trustee have received, trustees would decide whether to keep everything or send half back.

In the trust game with machine, subjects were again paired with partners. "Trustors" could decide how much of their initial endowment of €10 to send to their "receivers". The key difference of this version lies in how the "trustee" decision was made. Unlike in the previous version where the trustee made the decision; in this version, computer is "trustee" and the trustors would be informed that. The computer would randomly decide whether the trustor would get 1.5 times what he sent back or nothing. Since in this treatment, receivers do not need to make any decisions, we pair trustors from this treatment to one of the four trustees described above. The receiver is selected to be paid for real, (s)he would be paid according to one randomly selected

trustor's decision among the ones paired with him/her.

Previous researches (Fairley et al., 2014) already tested the relationship between risk attitude and trust attitude, for further study, this paper include two more factors: gender and ambiguity attitude. So, besides asked participates questions about risk, ambiguity and trust attitude, participates' gender will also be recorded after they complete this experiment.

In total, this paper verifies five different hypothesizes. Firstly, this paper examines if the risk attitude and ambiguity attitude dissimilar among different gender. Secondly, which one or more element(s) of gender, risk attitude and ambiguity attitude can influence subjects trust attitude towards human beings. Thirdly, which one or more element(s) of gender, risk attitude and ambiguity attitude can influence subjects trust attitude towards machine. Lastly, if participates' trust attitude are imparity towards human beings and machine.

3 Data collection

3.1 Sample size

To find out the most optimal sample size for this research, here I apply the regular standard, level($\alpha = 0.5$), power of the test($1 - \beta = 0.8$), variance($\sigma = \sigma_0 = \sigma_1 = 1$) and one standard deviation change ($\delta = \frac{1}{2}$). According to the previous description, we can assume the prices of observations (p_0,p_1) and the variances (σ_0,σ_1) of the two treatments are both equal. According to the formula $\frac{n_0}{n_1} = \frac{\sigma_0}{\sigma_1}\sqrt{\frac{p_1}{p_0}}$, when$\sigma_0 = \sigma_1$, and $p_0 = p_1$, then $n_0 = n_1$. We already have $\alpha = 0.5$ and $1 - \beta = 0.8$. So, $t_{\alpha/2} = 1.96$ and $t_\beta = 0.84$. To calculate n, use the formula $n_0{}^* = n_1{}^* = n^* = 2(t_{\frac{\alpha}{2}} + t_\beta)^2(\frac{\sigma}{\delta})^2$. Then, we get $n_0 = n_1 = 63$, which means in this experiment every group should has 63 observations at least. In total this experiment has 126 observations.

In order to complete this experiment, I found 130 participates (126 participates play as trustors, the other 4 participates play as trustees in social uncertainty group and receiver in mechanical uncertainty group) who live or study in the Netherlands. The 126 trustors are randomly selected in two treatment groups and participants in different groups received different questionnaires. All of them are asked to complete the survey independently and told that their paired participate is a stranger.

3.2 Incentives

At the beginning of this experiment all the subjects were notified that they have (around) 2% chance to get the real incentive according to their choice in this experiment. Whether they can get real payment is decided by software called “lucky draw”, if the screen shows a specific number after they used the software, one of their three part’s choice would be real paid, the questionnaire is displayed on appendix. After a subject completed a questionnaire, (s)he would be required to choose a number in “lucky draw”. If it is a specific number, (s)he would get paid according to his/her previous decision.

Subjects participate in social uncertainty group would be randomly paired with one of the four trustees, they would only get the response from the paired trustee when (s)he choose the specific number for part three’s decision. In this case, both trustor and trustee can get the incentive according their choice on part three, otherwise not. Subjects participate in mechanical uncertainty group would also be randomly paired with one of the four receivers. However, the receiver can only share the incentive, (s)he does not have power to decide the final incentive, the software “draw lots” is the substitution for decision making. The rule is the same as social uncertainty group, trustor would only get the respond from the software when (s)he choose the specific number for part three’s decision. In this case, both trustor and receiver can get the real payment.

4 Measurements

4.1 Hypothesis

After collection, 2 groups of unbiased data can be getting. Use these 2 groups of data, we can test the following five hypothesizes in order to find out the further reason that dominate individuals' decision in trust game.

H1 Female and male have the same risk attitudes.

H2 Female and male have the same ambiguity attitudes.

H3 Risk attitude, ambiguity attitude elicited in the two-color choice task survey and gender has impact on individual's attitude towards trust game with human.

H4 Risk attitude, ambiguity attitude elicited in the two-color choice task survey and gender has impact on individual's attitude towards trust game with machine.

H5 Trust attitudes elicited in the trust game same as those elicited from the mechanical trust game.

4.2 Measuring Risk and Ambiguity Attitudes

To verify these five hypothesizes, variable – gender, trust attitude, risk attitude and ambiguity attitude are needed. In data collection process, it is easily to get the participant's demographic feature and trust attitude; yet, the other two variables require to be calculated before the formal test. Based on Sutter's (2011) previews research, "individuals' risk attitude r can be calculated by the following equation

(1) $$r = 1 - CE_R/\pi,$$

where $\mathrm{CE_R}$ denotes the certainty equivalent of the risky prospect, and $\pi = 10$ is the payoff if the subject wins. When r larger (smaller) than 0.5 indicate subject is risk aversion (risk seeking) and r = 0.5 indicate subject is risk neutrality. As a measure of ambiguity attitude value a has been introduced

(2) $$a = (CE_R - CE_A)/(CE_R + CE_A).$$

This measure ranges from –1 (extreme ambiguity seeking) to 1 (extreme ambiguity aversion) and 0 indicate subject is ambiguity neutrality" (Sutter et al., 2011).

According to the formulas and the collected data, the risk attitude and ambiguity attitude can be calculated then. So, in total four variables can be used to test the above five hypothesizes.

5 Results

The experiment includes 130 subjects in total, 4 of them are trustees and receivers, and others are trustors. The trustors are divided into two treatment groups, each group has 63 subjects. All subjects are either live or study in the Netherlands and recruited from Rotterdam. 55 participants (1 trustee and 54 trustors) are male and 75 participants (3 trustees and 72 trustors) are female. Their age distribute from 14 to 57.

5.1 Data description

In total, we have 126 observations. Their risk attitude and ambiguity attitude is measured according to Sutter's (2011) provided formula. Figure 1 and figure 2 illustrate the histograms of them, respectively. As we can see from figures, most of the participants are risk neutral (48 observations). Risk seeking and risk averse individuals are evenly distributed. 42 over 126 observations are ambiguity neutral, and most of the rest participants are ambiguity aversion.

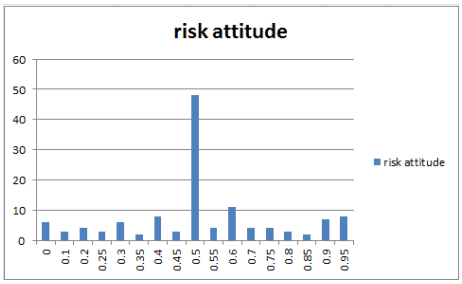

FIGURE 1.TRUSTORS RISK ATTITUDE DISTRIBUTION

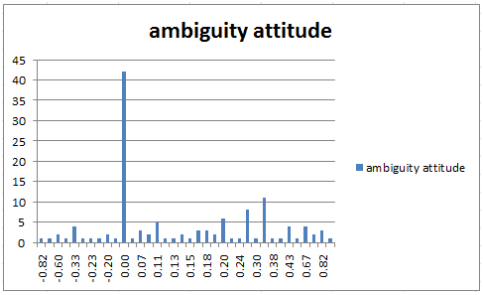

FIGURE 2.TRUSTORS AMBIGUITY ATTITUDE DISTRIBUTION

Figure 3 and figure 4 show the different trust attitudes among different groups. These two groups illustrate several similarities, such as: most of the participants chose to give trustees either half (5 euros) or all (10 euros) the money they have. And they have the same trend in the distribution. However, these two groups still have some differences. More participants decided to give nothing or 10 euros to their partner in human uncertainty group while less give 5 euros compared with mechanical uncertainty group.

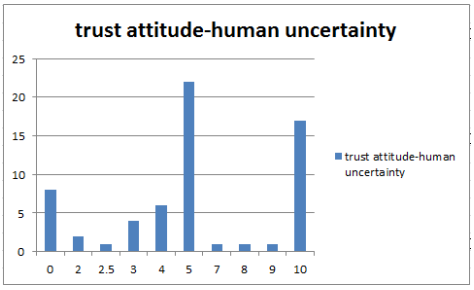

FIGURE 3.TRUST ATTITUDE in SOCIAL UNCERTAINTY GROUP

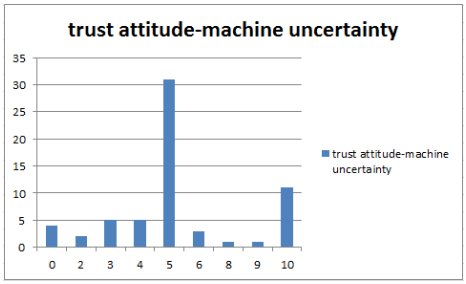

FIGURE 4.TRUST ATTITUDE in MECHINICAL UNCERTAINTY GROUP

5.2 Analysis

The collected data includes participants' demographic features and other attitudes. Apply these data and stata the four hypothesizes can be tested. In this paper, I introduce Mann-Whitney U test to verify the hypothesis 1, 2 and 5 while OLS (ordinary least squares) and GLS (generalized linear square) to verify hypothesis 3 and 4 (McCrum-Gardner, 2008).

Table 4 presents the test results. It is easy to find out that p value > 0.05 for risk attitude test, we can conclude that the null hypothesis of hypothesis 1 which is different gender have same risk attitude cannot be rejected. This finding indicates risk attitudes among female and male are not different. In the comparison of ambiguity attitudes in different gender, it gets p value >0.05 as well. Therefore, there is no gender difference in ambiguity attitude either.

TABLE 4 – RISK ATTITUDE and AMBIGUITY ATTITUDE COMPARASION between DIFFERENT GENDERS

	Gender	Obs	Rank sum	z	Prob > |z|
Risk attitude	Male	54	3555	0.621	0.5345
	Female	72	4446		
Ambiguity attitude	Male	54	3506	0.380	0.7042
	Female	72	4495		

In order to test hypothesis 3 and 4, two OLS (ordinary least squares) models are estimated respectively. Table 5 shows the test result of regression model in social uncertainty group. All independent variables' coefficient are insignificant at 10 percent significant level which means risk attitude, ambiguity attitude elicited in the "two-color choice task" (Sutter et al., 2011) survey and gender does not have impact on individual's attitude towards trust game with human. The test results of mechanical uncertainty group, however, differ from the social uncertainty group. Variables such as: gender and ambiguity attitude have effect on individual's different decision on trust game at 10 percent significant level while risk attitude does not have in mechanical uncertainty group at 10 percent significant level (table 5). From the output, we can conclude that, compared to female, male are more generous, in general their partner receive more money than those whose trustor is female, ceteris paribus. Besides, the more the participants trend to be ambiguity seeking, the more amount of money (s)he willing to give to his/her paired partner, ceteris paribus.

To exclude undesirable effect caused by heteroscedasticity, GLS (generalized linear square) model has also been used in this paper. The results of two GLS models

illustrate on columns (2) and (4), almost the same as OLS models. All the coefficients are identical, only robust standard error has a little imparity. It is clear that the two OLS models are homoscedasticity, the conclusions still are risk attitude, ambiguity attitude elicited in the “two-color choice task” (Sutter et al., 2011) survey and gender does not have impact on individual’s attitude towards trust game with human. In the meantime, gender and ambiguity attitude can influence individual’s trust attitude towards machine.

TABLE 5 – INFORMATIONS of VARIABLES in DIFFERENT GROUPS, REGRESSION ANALSIS

Dependent variable:	Amount Sent	Amount Sent	Amount Sent	Amount Sent
Sample:	Human uncertainty group		Mechanical uncertainty group	
	(1)	(2)	(3)	(4)
Female	-1.278	-1.278	-1.397*	-1.397*
	(-1.48)	(-1.42)	(-2.17)	(-2.17)
Risk attitude	-1.318	-1.318	-1.305	-1.305
	(-0.75)	(-0.69)	(-0.74)	(-0.65)
Ambiguity attitude	-0.890	-0.890	-2.734*	-2.734*
	(-0.61)	(-0.49)	(-2.07)	(-2.51)
_cons	7.039***	7.039***	7.218***	7.218***
	(6.05)	(5.77)	(6.19)	(5.60)
Observations	63	63	63	63

Notes: OLS in columns (1) and (3). GLS in columns (2) and (4). Robust standard errors in parentheses. Columns (1) and (2) are results for hypothesis three. Columns (3) and (4) are results for hypothesis four.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table 6 summarized the difference between two treatment groups. Compared with mechanical uncertainty group, human uncertainty group has more female

participants. Moreover, mechanical uncertainty group is more risk seeking and ambiguity averse by contrast. In total, two groups' demographic feature, risk attitude and ambiguity attitude are not exactly identical. However, they still have some common ground. For example, both groups have more female participants than male participants. Their risk attitudes are close to neutral and ambiguity attitudes are both ambiguity seeking. On this condition, this paper use Mann-Whitney U test to compare the trust attitude difference in these two groups, try to verify hypothesis five.

TABLE 6 – BASIC-INDEX SPREADS

		Gender	Risk attitude	Ambiguity attitude
Human uncertainty group	Mean	0.62	0.50	0.10
	Std	0.49	0.25	0.30
	Max	1	0.95	0.82
	Min	0	0	-0.82
Mechanical uncertainty group	Mean	0.52	0.54	0.15
	Std	0.50	0.21	0.28
	Max	1	0.95	0.83
	Min	0	0	-0.71

Notes: In column gender, 0 represent male participants while 1 represent female participants. In column risk attitude, the larger a number is, the more (s)he is risk seeking. In column ambiguity attitude, the larger a number is, the more (s)he is ambiguity averse.

For the output of hypothesis 5, p value <0.05(table 7), it can be concluded that null hypothesis should be rejected. Participants' trust attitudes elicited in the trust game differ from those elicited from the mechanical trust game in this experiment. Subjects in mechanical uncertainty group trend to share more amount of money with their partner compared to subjects in social uncertainty group.

TABLE 7 – TRUST ATTITUDE COMPARASION between TWO GROUPS

	Obs	Rank sum	z	Prob > |z|
Trust game with human beings	63	3507	-2.408	0.0160
Trust game with machines	63	4494		

6. Conclusion

In summary, hypothesis 1, hypothesis 2 and part of hypothesis 4 can be verify based on the interpretation illustrates from stata output. In another word, hypothesis 3 and hypothesis 5 have been rejected.

Gender difference did not affect participants' risk attitude, ambiguity attitude and trust attitude in human uncertainty group. It only influences participants' trust attitude in mechanical uncertainty group. The finding about trust attitude in human uncertainty group is the same as Croson and Buchan's research result in 1999. According to James and Cary's study in 2006, "women tend to be more generous than men when: (1) the social distance is low, (2) the total monetary cost of generosity is low, and/or (3) there is an absence of reciprocal motivation" (James C & Cary A, 2006). In the new experiment, the social distance between trustors and trustees are low while cost

of generosity is low. Moreover reciprocal motivation is existent. The findings of this new experiment and previous study are inconsistent entirely, the reason of which is still undefined. It can only be explained after further study.

Risk attitude and ambiguity attitude do not influence participants' trust attitude in human uncertainty group. It supports Eckel and Grossman's (2004) and Daniel Houser's (2010) point of view in their research. Moreover, risk attitude does not related to individual's trust attitude while ambiguity attitude related in mechanical uncertainty group. The biological evidence about the disconnected between trust and risk already been given in Houser's (2010) research which is "trusting decisions are implemented differently by the brain than risky decisions" (Houser et al., 2010).

Rejection of hypothesis 5 shows that trustors have dissimilar attitude towards human beings and machine. Individual willing to give more amount of money to their paired partner when trustee is software compare to trustee is human beings.

In conclusion, this experiment did not find out any strong relationship among individual's risk attitude, ambiguity attitude and trust attitude. However, we still cannot simply conclude that individual's risk attitude and ambiguity attitude do not have impact on individual's trust attitude. Maybe the relationship among these three factors can be verified when we increase the incentive percentage or increase the amount of "show-up" fee.

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Appendix

Questionnaire for social uncertainty group

You have been asked to participate in an economics experiment. Throughout the experiment, you will be randomly paired with another participant – your partner. In some of the questions, your payoffs depend on both your and your partner's choices. In order to thanks for your participation, you and your paired participant will have 2% (around) chances to get real paid. Weather you can be paid or not is decided by software called "lucky draw". After you complete the entire experiment, you get a chance to draw lots by this software. The number will roll from 1 to 100, if you press stop when the screen shows "1" ,"2" or "3", you will get real paid according to you and your partner's decision otherwise you and your partner get nothing. If the screen illustrates "1", you can get paid according to your decision on questionnaire part one. If the screen illustrates "2", you can get paid according to your decision on questionnaire part two. If the screen illustrates "3", you can get paid according to your decision on questionnaire part three.

Part 1

If you are randomly be selected by the software "lucky draw" (screen shows "1")and can get real payment, one of your choices in this choice list will be used to determine your final payment.

In each line of the list below, you can either choose to get a sure amount of money (option B) or make a bet (option A). If you choose option A, you will draw a ball from bag A which contains 20 balls, where 10 balls are white and 10 are orange. You can choose a color first (white or orange), and you will get 10 euros if the ball randomly drawn has the color that you chose. Within the list, the sure amount increases as one move down the list, while the gamble remains the same. In each line, please tick the option you want to choose. For example: if you want to choose make a

bet, tick option A. If you want to get a sure amount of money, tick option B.

Your winning ball's color is _____.

1	Option A: Draw from bag A	Option B: 0.50 euro for sure
2	Option A: Draw from bag A	Option B: 1 euro for sure
3	Option A: Draw from bag A	Option B: 1.5 euro for sure
4	Option A: Draw from bag A	Option B: 2 euro for sure
5	Option A: Draw from bag A	Option B: 2.5 euro for sure
6	Option A: Draw from bag A	Option B: 3 euro for sure
7	Option A: Draw from bag A	Option B: 3.5 euro for sure
8	Option A: Draw from bag A	Option B: 4 euro for sure
9	Option A: Draw from bag A	Option B: 4.5 euro for sure
10	Option A: Draw from bag A	Option B: 5 euro for sure
11	Option A: Draw from bag A	Option B: 5.5 euro for sure
12	Option A: Draw from bag A	Option B: 6 euro for sure
13	Option A: Draw from bag A	Option B: 6.5 euro for sure
14	Option A: Draw from bag A	Option B: 7 euro for sure
15	Option A: Draw from bag A	Option B: 7.5 euro for sure
16	Option A: Draw from bag A	Option B: 8 euro for sure
17	Option A: Draw from bag A	Option B: 8.5 euro for sure

18	Option A: Draw from bag A	Option B: 9 euro for sure
19	Option A: Draw from bag A	Option B: 9.5 euro for sure
20	Option A: Draw from bag A	Option B: 10 euro for sure

Part 2

If you are randomly be selected by the software “lucky draw” (screen shows “2”) and can get real payment, one of your choices in this choice list will be used to determine your final payment.

In each line of the list below, you can either choose to get a sure amount of money (option B) or make a bet (option A). If you choose option A, you will draw a ball from bag A which contains 20 balls, where part of the balls are white and other balls are orange. However, you do not know the distribution of the color of these 20 balls. You can choose a color first (white or orange), and you will get 10 euros if the ball randomly drawn has the color that you chose. Within the list, the sure amount increases as one move down the list, while the gamble remains the same. In each line, please tick the option you want to choose. For example: if you want to choose make a bet, tick option A. If you want to get a sure amount of money, tick option B.

Your winning ball’s color is _____.

1	Option A: Draw from bag B	Option B: 0.50 euro for sure
2	Option A: Draw from bag B	Option B: 1 euro for sure
3	Option A: Draw from bag B	Option B: 1.5 euro for sure
4	Option A: Draw from bag B	Option B: 2 euro for sure
5	Option A: Draw from bag B	Option B: 2.5 euro for sure

6	Option A: Draw from bag B	Option B: 3 euro for sure
7	Option A: Draw from bag B	Option B: 3.5 euro for sure
8	Option A: Draw from bag B	Option B: 4 euro for sure
9	Option A: Draw from bag B	Option B: 4.5 euro for sure
10	Option A: Draw from bag B	Option B: 5 euro for sure
11	Option A: Draw from bag B	Option B: 5.5 euro for sure
12	Option A: Draw from bag B	Option B: 6 euro for sure
13	Option A: Draw from bag B	Option B: 6.5 euro for sure
14	Option A: Draw from bag B	Option B: 7 euro for sure
15	Option A: Draw from bag B	Option B: 7.5 euro for sure
16	Option A: Draw from bag B	Option B: 8 euro for sure
17	Option A: Draw from bag B	Option B: 8.5 euro for sure
18	Option A: Draw from bag B	Option B: 9 euro for sure
19	Option A: Draw from bag B	Option B: 9.5 euro for sure
20	Option A: Draw from bag B	Option B: 10 euro for sure

Part 3

If you are randomly be selected by the software “lucky draw”(screen shows “3”) and can get real payment, your choice and your partner’s choice in the choice question will be used to determine your and your partner’s final payment.

You are randomly paired with another participant. Your partner's identity will not be revealed to you during or after the experiment. You and your partner will receive €10 in total as show-up fee. You can choose to send to part of the €10 to your partner, and each euro you send will be tripled. Your partner will then decide either to give you half of the money that s/he receives or nothing to you.

For example, suppose you send €X. Your partner will receive €3X. Your partner will then decide either to give you €1.5X or €0. Your final payoff will then be either €10+€0.5X or €10-€X, depending on your partner's choice.

How much are you willing to give to your partner? €____.

Questionnaire for mechanical uncertainty group

You have been asked to participate in an economics experiment. Throughout the experiment, you will be randomly paired with another participant – your partner. In some of the questions, your payoffs depend on both your and your partner's choices. In order to thanks for your participation, you and your paired participant will have 2% (around) chances to get real paid. Weather you can be paid or not is decided by software called "lucky draw". After you complete the entire experiment, you get a chance to draw lots by this software. The number will roll from 1 to 100, if you press stop when the screen shows "1" ,"2" or "3", you will get real paid according to you and your partner's decision otherwise you and your partner get nothing. If the screen illustrates "1", you can get paid according to your decision on questionnaire part one. If the screen illustrates "2", you can get paid according to your decision on questionnaire part two. If the screen illustrates "3", you can get paid according to your decision on questionnaire part three.

Part 1

If you are randomly be selected by the software "lucky draw" (screen shows "1")and

can get real payment, one of your choices in this choice list will be used to determine your final payment.

In each line of the list below, you can either choose to get a sure amount of money (option B) or make a bet (option A). If you choose option A, you will draw a ball from bag A which contains 20 balls, where 10 balls are white and 10 are orange. You can choose a color first (white or orange), and you will get 10 euros if the ball randomly drawn has the color that you chose. Within the list, the sure amount increases as one move down the list, while the gamble remains the same. In each line, please tick the option you want to choose. For example: if you want to choose make a bet, tick option A. If you want to get a sure amount of money, tick option B.

Your winning ball's color is _____.

1	Option A: Draw from bag A	Option B: 0.50 euro for sure
2	Option A: Draw from bag A	Option B: 1 euro for sure
3	Option A: Draw from bag A	Option B: 1.5 euro for sure
4	Option A: Draw from bag A	Option B: 2 euro for sure
5	Option A: Draw from bag A	Option B: 2.5 euro for sure
6	Option A: Draw from bag A	Option B: 3 euro for sure
7	Option A: Draw from bag A	Option B: 3.5 euro for sure
8	Option A: Draw from bag A	Option B: 4 euro for sure
9	Option A: Draw from bag A	Option B: 4.5 euro for sure
10	Option A: Draw from bag A	Option B: 5 euro for sure
11	Option A: Draw from bag A	Option B: 5.5 euro for sure

12	Option A: Draw from bag A	Option B: 6 euro for sure
13	Option A: Draw from bag A	Option B: 6.5 euro for sure
14	Option A: Draw from bag A	Option B: 7 euro for sure
15	Option A: Draw from bag A	Option B: 7.5 euro for sure
16	Option A: Draw from bag A	Option B: 8 euro for sure
17	Option A: Draw from bag A	Option B: 8.5 euro for sure
18	Option A: Draw from bag A	Option B: 9 euro for sure
19	Option A: Draw from bag A	Option B: 9.5 euro for sure
20	Option A: Draw from bag A	Option B: 10 euro for sure

Part 2

If you are randomly be selected by the software “lucky draw” (screen shows “2”) and can get real payment, one of your choices in this choice list will be used to determine your final payment.

In each line of the list below, you can either choose to get a sure amount of money (option B) or make a bet (option A). If you choose option A, you will draw a ball from bag A which contains 20 balls, where part of the balls are white and other balls are orange. However, you do not know the distribution of the color of these 20 balls. You can choose a color first (white or orange), and you will get 10 euros if the ball randomly drawn has the color that you chose. Within the list, the sure amount increases as one move down the list, while the gamble remains the same. In each line, please tick the option you want to choose. For example: if you want to choose make a bet, tick option A. If you want to get a sure amount of money, tick option B.

Your winning ball's color is _____.

1	Option A: Draw from bag B	Option B: 0.50 euro for sure
2	Option A: Draw from bag B	Option B: 1 euro for sure
3	Option A: Draw from bag B	Option B: 1.5 euro for sure
4	Option A: Draw from bag B	Option B: 2 euro for sure
5	Option A: Draw from bag B	Option B: 2.5 euro for sure
6	Option A: Draw from bag B	Option B: 3 euro for sure
7	Option A: Draw from bag B	Option B: 3.5 euro for sure
8	Option A: Draw from bag B	Option B: 4 euro for sure
9	Option A: Draw from bag B	Option B: 4.5 euro for sure
10	Option A: Draw from bag B	Option B: 5 euro for sure
11	Option A: Draw from bag B	Option B: 5.5 euro for sure
12	Option A: Draw from bag B	Option B: 6 euro for sure
13	Option A: Draw from bag B	Option B: 6.5 euro for sure
14	Option A: Draw from bag B	Option B: 7 euro for sure
15	Option A: Draw from bag B	Option B: 7.5 euro for sure
16	Option A: Draw from bag B	Option B: 8 euro for sure
17	Option A: Draw from bag B	Option B: 8.5 euro for sure
18	Option A: Draw from bag B	Option B: 9 euro for sure

19	Option A: Draw from bag B	Option B: 9.5 euro for sure
20	Option A: Draw from bag B	Option B: 10 euro for sure

Part 3

If you are randomly be selected by the software "lucky draw" (screen shows "3") and can get real payment, your choice and your partner's choice in the choice question will be used to determine your and your partner's final payment.

You are randomly paired with another participant. Your partner's identity will not be revealed to you during or after the experiment. You and your partner will receive €10 in total as show-up fee. You can choose to send to part of the €10 to your partner, and each euro you send will be tripled. Software "draw lots" will then decide either to give you half of the money or nothing to you, the rest part of the money will be given to your paired participate.

For example, suppose you send €X. Your partner will receive €3X. The software will then decide either to give you €1.5X or €0. Your final payoff will then be either €10+€0.5X or €10-€X, depending on software's choice.

How much are you willing to give to your partner? €____.