JENA ECONOMIC RESEARCH PAPERS

2010 – 061

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www.jenecon.de

ISSN 1864-7057

The JENA ECONOMIC RESEARCH PAPERS is a joint publication of the Friedrich Schiller University and the Max Planck Institute of Economics, Jena, Germany. For editorial correspondence please contact markus.pasche@uni-jena.de.

Impressum:

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D-07743 Jena
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Jena Economic Research Papers 2010 - 061

Thinking in Chinese vs. Thinking in English: Social Preference and Risk Attitudes of Multicultural Minds

King King Li*

Revised April 2011

Abstract

This paper investigates whether language priming activates different cultural identities and norms associated with the language communicated with respect to social preference and risk attitudes. Our contribution is on identifying the conditions where there will be language priming effects. We conduct economic games with bilingual subjects using Chinese and English as instructions. It is found that language priming affects social preference, but only in context involving strategic interactions. In social preference games involving strategic interactions, e.g., the trust game, subjects in the Chinese treatment are more trusting and trustworthy. In individual choice games, such as the dictator game, there is no treatment difference. Further, we also find that language priming affects risk attitudes. Subjects in the Chinese treatment prefer to pick Chinese lucky numbers in Mark Six lottery. These findings suggest that the effect of language priming is context dependent.

Keywords: language, bilingual, biculture, social preference, risk attitudes

JEL classification: B40, C91, D03, D81, Z10

* I thank Werner Güth, James Konow, Chew Soo Hong, John List, Li-Jun Ji, and especially Robert Wyer for useful comments. I gratefully acknowledge research assistance by Zhu Xing Tian and financial support from the Max Planck Society. Strategic Interaction Group, Max Planck Institute of Economics, Kahlaische Straße 10 D-07745 Jena, Germany; Tel: +49 3641 686 631; Fax: +49 3641 686 667; Email: Kingli@econ.mpg.de

1. Introduction

Recent research in social psychology has shown that languages are associated with cultural frames (Michael H. Bond, 1983; Michael Ross et al., 2002; David Luna et al., 2008) and that communicating in a particular language may increase the cognitive accessibility of norms associated with that language (Michael Ross, W. Q. Elaine Xun and Anne E. Wilson, 2002).

The objective of this paper is to systematically investigate under what conditions there will be language priming effect, e.g., individual choice versus strategic interactions in social preference. We conduct 10 economics games experiments with subjects who are bilingual in Chinese and English. There are two treatments. In the Chinese treatment, subjects receive instructions in Chinese while in the English treatment, subjects receive instructions in English.

Three types of games are conducted, namely individual choice games involving social preference, strategic interaction games involving social preference, and games on risk attitudes.[1] We conjecture that in social preference games, the treatment difference will be stronger under strategic interactions. We hypothesize that language priming induces different expectations on the behavior of others only in the strategic games, and these differences in belief will in turn lead to differences in choices. The reason behind our conjecture is that under strategic interactions, such as the trust game (Joyce Berg et al., 1995), the players need to think more about who are they interacting with and what will be the response of the other player. While in individual choice context such as the dictator game (Daniel Kahneman et al., 1986), there are no such strategic considerations. To test this hypothesis, we collect data on subjects beliefs about what will others choose in the games.

This paper is the first to use economics games to investigate the effects of language priming on social preference and risk attitudes. The paper closest to ours is Wong and Hong (2005). They display Chinese cultural icons (e.g., a Chinese dragon) or American cultural icons (e.g., a scene showing an American football game) to the subjects (university students in Hong Kong) before

[1] In each social preference games, two players are randomly and anomalously matched. In individual choice games involving social preference, only one player in the matched pair makes the choice. In strategic interaction games, both players make choices.

they play the game.[2] They find that subjects who are exposed to Chinese cultural icons are more likely to choose a cooperative strategy in the prisoners' dilemma game when they play with friends (group-mates in a class project); with strangers this never happen.

In another study, Briley et al. (2005) find that manipulating the languages will induce bilingual subjects in Hong Kong to choose between different product options.[3] A similar effect of cultural priming has been found in other studies which use different bicultural subject pools, for example Dutch-Greek bicultural children (Maykel Verkuyten and Katerina Pouliasi, 2002), namely on attitudes such as family integrity and obedience, and with bilingual and bicultural Hispanic women (David Luna, Torsten Ringberg and Laura A. Peracchio, 2008) on concepts such as self-sufficiency and other dependence. However, all of these studies use questionnaires instead of incentivized experiments. More importantly, the present study uses economics games which cover a range of social preference and risk attitudes which have not been investigated by these studies.

Another contribution of this paper is on the methodological side. It calls into attention on the robustness from experiments conducted in English while some subjects are from different nationalities/cultures, e.g., Chinese. This will be especially relevant for studies focused on cross cultural differences, e.g., on social norms.

Our main findings are: (1) In social preference games involving strategic interactions, e.g., the trust game, subjects in the Chinese treatment are more trusting and trustworthy than in the English treatment. Consistent with our hypothesis, (2) in individual choice games about social preference, such as the dictator game, there is no treatment difference. In sum, the effect of language priming on social preference is stronger in strategic interactions than individual choice. Moreover, there are significant treatments differences on subjects' beliefs on the decisions of others in the strategic interaction games, but not in individual choice games. This supports our hypothesis that language priming induces different expectations on others only in the strategic

[2] See Shrum et al. (1998) for an introduction to the methodology of priming and its application in investigating the effects of television consumption on social perceptions.

[3] In their experiment, subjects were asked to choose between three product options. These options were ranked and described along two dimensions of attributes. There were two extreme options (i.e., high in one dimension but low in another dimension), and there was one option (called the compromised option in their terminology) which was moderate in both dimensions. They found that when Chinese was used, subjects were more likely to choose the compromised option.

games, and these differences then lead to different choices across treatments. Further, (3) language priming appears to affect risk attitudes as well. In the coin betting game, subjects expect others to be more risk taking in the Chinese treatment. In the Mark Six lottery game, subjects prefer to pick Chinese lucky numbers only in the Chinese treatment. Overall, these findings suggest that the effect of language priming is context dependent.

The rest of the paper is organized as follows: Section 2 discusses the experimental design, and section 3 reports the experimental results. We conclude in section 4.

2. Experimental Design

There are two treatments, the English treatment and the Chinese treatment. In the English treatment the experiment is conducted in English; in the Chinese treatment it is conducted in Chinese. Subjects participate only in one treatment. In each treatment, subjects play 10 games (see Table 1 for the list and summary statistics).

We now explain why these 10 games are chosen. In particular, what is the motivation of each individual game and how each game tests specific context where other games do not. The games about social preference can be broadly classified into two categories: those involving primarily individual choice and those involving strategic interactions. For the first category, it includes the dictator game (Daniel Kahneman, Jack L. Knetsch and Richard Thaler, 1986) and donation to charity (Hong Kong Red Cross) to measure altruism towards university students and other people in the society when it is costly (in a monetary sense) to do so. We also run the jealousy game (Gary Charness and Brit Grosskopf, 2001) to measure altruism when it is not costly to do so, i.e., quasi-maximin preference (Gary Charness and Matthew Rabin, 2002). The rules of the games are described in the experimental results section.

For the second category, we focused on measuring trust and trustworthiness by using the simultaneous and sequential prisoners' dilemma game (Albert W. Tucker, 1950), the trust game (Joyce Berg, John Dickhaut and Kevin McCabe, 1995), the trust game with reward and punishment, and the public goods game (Paul A. Samuelson, 1954; Peter Bohm, 1972; John O.

Ledyard, 1995). In the simultaneous prisoners' dilemma game, two players are anonymously and randomly matched and they make choices simultaneously. However, in the sequential prisoners' dilemma game, players make choices sequentially, and this game will be useful for studying trustworthiness of players. However, in the sequential prisoners' dilemma game, the second player cannot clearly infer the intention of the first player's between intention to trust and intention for personal monetary gain even when the first player chooses strategy 2 (see Figure 2, panel A). To solve this problem, we design the trust game with reward and punishment in a way to allow the second player to be sure that when the first player chooses a trusting strategy (i.e., A2, see Figure 1, panel A) his intention is only for helping the second player to obtain a higher payoff. Thus, we expect the treatment differences to be highest in this game among others in the second category. In the strategic interaction games discussed so far, players are constrained to choose between two strategies specified in the instructions. In the trust game (game no. 7), we relax this constraint and let the second player chooses the amount to send back rather than choosing between two choices. In the public goods game, we study the impact of language priming when more than two players make decisions simultaneously.

Two different games were conducted to measure risk attitudes. The first was the coin betting game, in which subjects needed to choose between receiving a sure payoff or taking a bet on a coin flip. In the second game, subjects needed to decide if they wanted to purchase Mark Six lottery tickets and pick the numbers for the tickets purchased. These two games allow us to compare the risk attitude, where culture-specific preference is less likely to be aroused (the coin toss lottery), to the case where it is more likely to play a role (Mark Six lottery).

We now provide details on how did we conduct the experiment. In the beginning of the experiment, each subject randomly drew a subject number which was only known to herself and served identification. Subjects were handed a guideline on rules of the experiment such as anonymity of decisions and payment procedure. The guideline was read aloud in Cantonese (in the Chinese treatment) and in English (in the English treatment).[4] The instructions can be found in the appendix. To check the equivalence of the instructions, the Chinese version has been

[4] Cantonese is a variety of the Chinese language spoken by the majority of the population in Hong Kong, Macau, and Guangdong province in Southern China.

translated to English, and the English version has been translated to Chinese. It was confirmed that the versions are consistent.

Subjects were informed that they would participate in 10 different games, and one of them would be randomly drawn to be implemented, and subjects would receive their payments according to the results of the game. More importantly, subjects were told that their decisions would be anonymous and kept confidential, and that they would be paid privately in cash at the end of the experiment.[5]

In the process of running the 10 games, we distributed the instructions of each game (but without reading them) and collected the decision sheets of that game before a new game was started. After the decision sheets were collected, subjects also needed to fill in a non-incentivized questionnaire which served to elicit their belief about the choices of other participants (except in the Mark Six lottery game and the donation game). They were informed that their responses to the questions would not influence the amount of money they would receive. All subjects made their decisions according to the same sequence. There was no feedback information on the choice of others. At the end of the experiment, each subject also needed to fill in a questionnaire which served to collect their demographic information. In games where matching of subjects into groups was required, subjects were informed that they would be randomly and anonymously matched and that they would not be matched with the same subject more than once. In these games we used the strategy method by asking players to specify their decisions under each role; their role would be randomly determined if the game was drawn to be implemented. At the end of the 10 games, one game was randomly drawn to be implemented, and subjects' payoffs were determined accordingly.

Subjects were undergraduate students at Hong Kong University of Science and Technology (HKUST). They were randomly recruited from a poll of subjects using an e-mail recruitment system. The subjects were randomly placed in either treatment. They on average earned HK$91 (approximately US$11.7), including the show-up fee of HK$50. Each session lasted about 50

[5] When handing in their decision sheets, subjects were told to cover them so that they would not be seen by the experimenter.

minutes. A total of 64 subjects (31 for the Chinese treatment and 33 for the English treatment) were recruited.

Demographic Description

Being a previous British colony, the population of Hong Kong has had substantial exposure to both Chinese and Western cultures. For example, both English and Chinese are official languages in Hong Kong; they are taught from early on and serve as a medium of instruction in the education system. Therefore, our subject pool could be reasonably assumed to be bicultural subjects, i.e., individuals who possess two cultural norms. [6,7]

Subjects filled in a post-experiment questionnaire, giving demographic information and indicating whether they were bilinguals. We needed to check this because in the recruitment process, we did not mention we were looking for bilingual subjects. However, it should be noted that before we conduct the experiment, we expect most subjects to be bilinguals who can master Chinese and English well as the admitted students (for local students in Hong Kong and students from the mainland China which are majority of the students population) of the university need to pass advanced public exams on Chinese and English language, and English is the medium of instruction for courses in the university. [8] This is confirmed in the questionnaire. All participants – except one – were fluent (speaking and writing) in both Chinese and English.[9] They had started learning their language, or languages, from early on: English from the age of 4 and Chinese from the age of 2.3. Participants were on average 20.9 years old, and 81 percent of them were born in Hong Kong.

3. Experimental Results

[6] However, it should be noted that bilingual does not necessarily imply bicultural even if the norms associated with the two languages do not differ much.

[7] For bicultural research using university students in Hong Kong as subjects, see Bond and Yang (1982), Bond (1983), Hong et al. (1997), Briley et al. (2000), Hong et al. (2000), Briley and Wyer (2002), Wong and Hong (2005), and Briley et al. (2005).

[8] The university is widely considered as one of top universities in Asia. It has been ranked quite high in different rankings on universities. For instance, it was ranked top 40 worldwide in the World University Ranking 2010 by QS.

[9] One subject in the English treatment turned out to be unable to read and write Chinese (as self-reported in the post-experiment questionnaire). This observation is not included in the data analysis as we are only interested in bilinguals. Hence, the total number of subjects (included for data analysis) in the English treatment is 32.

3.1 Social Preference: Strategic Interactions

Trust Game with Reward and Punishment

This game has three stages. In stage 1, player A chooses between A1 (i.e., no trust) and A2 (i.e., trust) (see Figure 2 Panel A). If player A chooses A2, the game proceeds to stage 2, where player B can either choose B1 (i.e., trustworthy), or B2 (i.e., betrayal). In stage 3, player A specifies how she would shrink (i.e., punish) or enlarge (i.e., reward) the payoff of player B up to 30 percent, contingent on B's choice. Note that the monetary benefit of betraying exceeds the cost.

One distinct feature of this design is that player B can clearly infer the intention of player A, in the sense that it is impossible for player A to obtain a higher monetary payoff by choosing A2, while he may obtain 0 if player B chooses B2.

Figure 1 presents the percentage of subjects who chose the trust strategy (panel A) and the betray strategy (panel B) in the Chinese treatment vs. the English treatment. It shows that subjects are more trusting and trustworthy in the Chinese treatment than in the English treatment. About 42 percent of subjects in the Chinese treatment chose A2, while only 3.13 percent (1 out of 32 subjects) did so in the English treatment (see Table 1). The difference is significant at 1 percent level. Seventy-five percent of subjects betrayed trust in the English treatment, which was higher than the 55 percent in the Chinese treatment. The difference is significant at 10 percent level.

Column 1 of Table 2 presents the marginal effects coefficients from regressing the choice of trust or not on the language treatment dummy controlling for expectations on the percentage of player B regarding betrayal, age, gender, and whether she was born in Hong Kong. The coefficient of the Chinese language dummy estimates the impact of Chinese language on the subject's choice to trust or not. The result shows that when the experiment is conducted in Chinese, the probability that player A will choose the trust strategy is significantly higher. The result is significant at the 1 percent level. Interestingly, the expectation on the percentage of other players choosing to trust is significantly higher in the Chinese treatment, as shown in the regression result reported in column 1 of Table 4. Players in the Chinese treatment also expect others to be less likely to betray, see Table 4 column 2. But the difference is not significant.

Column 2 of Table 2 presents the regression result for the marginal effects coefficients from regressing the choice of betrayal or not on the language treatment dummy controlling for

expectations on the percentage of player B regarding betrayal, age, gender, and whether he was born in Hong Kong. The coefficient of the Chinese language dummy estimates the impact of Chinese language on the subject's choice to betray or not. The coefficient is significantly negative (p-value equals 0.02), implying that subjects are less likely to choose the betray strategy when the experiment is conducted in Chinese.

Most subjects (74.2 percent in the Chinese treatment and 75 percent in the English treatment) chose to shrink player B's payoff when their trust was betrayed. Non-trustworthy player B's payoff was on average shrunk by 30 percent in the Chinese treatment, which was higher than the 27.5 percent in the English treatment, and the difference is significant with $p = 0.08$ (one-tailed). Most subjects (70 percent in the Chinese treatment and 71.8 percent in the English treatment) also chose to reward player B when their trust was not betrayed. Subjects in the Chinese treatment chose to increase player B's payoff by 28.6 percent, which was higher than the 25.96 percent in the English treatment, and the difference is not significant.

Regarding the belief on reward and punishment, subjects in the Chinese treatment on average believed that 84.9 percent of player A had chosen to shrink player B's payoff when his trust was betrayed, and this percentage was significantly higher than in the English treatment, $p = 0.09$ (one-tailed).

Further, 96.8 percent of subjects in the Chinese treatment believed that player B would expect player A to shrink his payoff if he betrayed player A's trust, which is higher than 78.1 percent in the English treatment. The difference is significant with a *p*-value equal to 0.03. This is further confirmed in the regression reported in Table 4, column 3. Finally, there is no treatment difference in terms of degree of punishment expected when B2 is chosen, i.e., about 28 percent for both treatments.

In sum, it appears that players in the Chinese treatment are more trusting because they expect others to be more trustworthy. It seems that they are more trustworthy in the Chinese treatment because they believe that if they betray others trust, they are more likely to be punished. It also suggests that people do not like to be punished, even when the benefits betraying exceeds the cost. Overall, it supports our hypothesis that different languages induce different expectations on the behaviors of others.

Trust Game and Seq. PD

Similar to the result observed before, we find that in these two games, subjects are more trusting and trustworthy in the Chinese treatment.

In the trust game, player A can either choose between receiving HK$20 for himself and HK$5 for player B, or let player B determine the allocation of HK$100 between the two players. If player A chooses to let player B decide, it implies he has trust in player B. The amount sent back by player B is a measure of his trustworthiness.

Column 3 of Table 2 presents the marginal effect coefficients from regressing the choice of trust or not on the language treatment dummy controlling for expectations of the amount sent by player B, risk attitude, age, gender, and whether she was born in Hong Kong. The coefficient of the Chinese language dummy is significantly positive at the 5 percent level, which implies that subjects are more likely to choose the trusting option in the Chinese treatment.

Column 4 of Table 2 presents the regression result obtained from regressing the amount sent by player B on the language treatment dummy controlling for expectations of the amount sent by other players B and other personal characteristics. The coefficient of the Chinese language dummy is significantly positive at the 5 percent level. This supports the hypothesis that subjects are more trustworthy in the Chinese treatment. Regarding the belief of players, it is found that players in the Chinese treatment expect a higher percentage of others to choose the trusting strategy. The result is significant at the 5 percent level.

In the Sequential prisoners' dilemma game (Seq. PD), player A first chose between strategies 1 and 2, and conditional on the choice of player A, player B chose between strategies 1 and 2 (see Panel A, Figure 1). Choosing strategy 1, player A reflects an intention of trust. Player B is not trustworthy if he chooses strategy 2 conditional on player A having chosen strategy 1.

Column 6 of Table 2 presents the regression result obtained from regressing the choice of betrayal or not on the language treatment dummy controlling for expectations of the percentage of others having chosen to betray and other personal characteristics. Consistent with the findings in the trust game and the trust game with R&D, players are found to be less likely to betray in the Chinese treatment.

On the other hand, in both treatments, most players B (87. 5 percent in the English treatment and 90 percent in the Chinese treatment) chose strategy 1 given player A chose strategy 1.

Sim. PD

This game is similar to the Seq. PD except that players now move simultaneously. The payoff matrix is presented in Panel A, Figure 1. Strategy 1 is generally interpreted as a cooperative strategy, while strategy 2 is interpreted as a defect strategy.

It is found that the percentage of players choosing the cooperative strategy is 58.06 in the Chinese treatment and 37.5 in the English treatment. As expected, the difference in proportion is significant with a p-value equal to 0.05 (one-tailed). Further, the regression in Table 4, column 7, confirms that players in the Chinese treatment are less likely to defect. The result is significant at 1 percent level. In addition, we find that players in the Chinese treatment also expect others to be less likely to choose the defeat strategy, as shown in Table 4, column 8. The result is significant at 1 percent level.

Public Goods Game

In this game, four players are randomly matched to form a group. Each group member is given an endowment of HK$50 and then decides how much to contribute. The total contributions will be multiplied by 2 and distributed equally to each group member. Contributing zero is the dominant strategy if one wishes to maximize personal monetary payoff.

Players in the Chinese treatment on average contributed HK$26.13 which is not significant different from HK$27.66 in the English treatment. In addition, there are no treatment differences on the beliefs on the amount others contributed. Comparing the results of this game to the Sim. PD game, it seems that the language priming effect is less strong when the number of players increases.

3.2 Social Preference: Individual Choices

Dictator Game

In this game, two players are anonymously and randomly matched. The first player, also called the dictator, decides on the allocation of HK$100 between himself and the second player.

The dictator game has been run in many different countries, and a typical finding is that the amount offered is about 20 to 30 percent of the total pie (see Camerer (2003) for an extensive review).

It is found that the average amounts sent by dictators in the Chinese and English treatments are HK$23.40 and HK$23.03, respectively. There is no significant treatment difference under the two sample t-test. Table 3, column 1 reports the regression result, where the amount sent in the dictator game is the dependent variable, and independent variables include the language treatment dummy, belief on the expected amount sent by other dictators, belief on the amount others expected to receive, and personal characteristics including age, gender, and whether the subject was born in Hong Kong. The coefficient on the language treatment dummy is not significant. There is also no significant treatment difference in terms of beliefs on the amount sent and the amount others expected to receive (see column 9 in Table 4).

Donation Game

This game can be viewed as a dictator game, in which the recipients are benefiters of a charity organization, the Hong Kong Red Cross. Each player decides how much of out of HK$80 to donate to the Hong Kong Red Cross. The remainder will be kept by the player.

It is found that the average amount donated is HK$8.61 (10.76 percent) in the Chinese treatment and HK$13.62 (17.03 percent) in the English treatment. There is no significant treatment difference under the two sample t-test.

Jealousy Game

In this game, the first player decides how much the second player will receive out of HK$100 while he himself will receive HK$40 for sure.

Our game is similar to the experiment of Charness and Grosskopf (2001). In their experiment, each player chooses how much the other player should receive, in the range of 300 to 1,200 Spanish Pesetas (the currency of Spain between 1869 and 2002) while his own payoff is held

constant at 600 Pesetas. They found that 74 percent of subjects opted for 1,200 Pesetas; the average percentage chosen was 87.62. In another experiment with American university students by Charness and Rabin (2002), subjects had to make a binary choice between US$4 or US$7.5 for the other player while their own payoff was kept constant at US$4. They found that 69 percent of subjects chose the US$7.5 option. In another treatment, subjects had to choose between US$8 for the other player and US$2 for themselves, or both received 0. It was found that no subject chose the 0 option.

It is found that the average amounts chosen in the Chinese and English treatments are HK$79.03 and HK$80.00, respectively. There is no significant treatment difference under the two sample t-test. Only four subjects in each treatment chose to let the other receive less than HK$40. We also regress the amount chosen on the language treatment dummy, belief on expected amount chosen by others, the belief on the amount others expected to receive, and personal characteristics including age, gender, and whether the subject was born in Hong Kong (see column 2 in Table 3). The coefficient on the language treatment dummy is not significant. There is also no significant treatment difference in terms of beliefs on the amount chosen and the amount others expected to receive (see column 10 in Table 4).

3.3 Risk Attitudes

Mark Six Lottery

Each subject is endowed with HK$50 and can choose to purchase at most 10 Mark Six lottery tickets which cost HK$5 each for a draw scheduled on October 3, 2009. Mark Six is a very popular lottery game in Hong Kong. The first prize for the game usually amounts to multi-millions of Hong Kong dollars. In our experiment, if the subject decides to purchase Mark Six tickets, she needs to select 6 numbers out of 1 to 49 for each ticket. Subjects were informed that the experimenter would purchase the Mark Six tickets for them, according to their selected numbers, from the Hong Kong Jockey Club (the only official seller of the ticket).

The Mark Six lottery is useful for investigating if individuals are more likely to follow the norm of picking Chinese lucky numbers (8, 18, 28, 38, and 48) in the Chinese treatment than in the English treatment.

It is found that subjects exhibit a strong preference for picking the Chinese lucky numbers only in the Chinese treatment (see Figure 3).[10] In particular, 16.1 percent of numbers chosen in the Chinese treatment are Chinese lucky numbers. Compare this percentage to the null of 10.2 percent (5 numbers out of 49), which is the implied percentage if the subjects do not exhibit preference for particular numbers. The binomial test shows that it is significantly different from the null at the 1 percent level. On the other hand, the percentage of the same set of numbers chosen in the English treatment is 9.5 percent, which is not significantly different from the null. We also compare the proportion of lucky numbers chosen across treatments, and confirm that the proportion is significantly higher in the Chinese treatment, with a *p*-value equal to 0.02. Interestingly, subjects purchased significant more lottery tickets in the English treatment. The difference is significant at the 5 percent level.

The preference for Chinese lucky numbers is one distinct example of risk preference termed source preference (Craig R. Fox and Amos Tversky, 1995; Amos Tversky and Craig R. Fox, 1995; Soo Hong Chew and Jacob S. Sagi, 2008). A player is said to exhibit source preference if he has preference over identically distributed sources. This is distinct from the expected utility theory (J. von Neumann and O. Morgenstern, 1947) where individuals are assumed to be indifferent between identically distributed sources.

Coin Toss Lottery

In this game, subjects choose between a sure payoff of HK$30 and a risky bet on a coin toss which earns them HK$80 if tail is tossed and HK$0 if head is tossed. Choosing the sure payoff option is considered risk averse because the expected value of the bet, which equals HK$80 times the probability of winning (assumed to be 0.5), is higher than HK$30.

It is found that the percentage of subjects choosing the risky bet is similar across treatments, namely 68.75 percent in the English treatment and 70.97 percent in the Chinese treatment. There is no significant difference. However, the players in the Chinese treatment estimated that 43.39 percent of other players would choose the safe option which is lower than the 54.58 percent observed in the English option. The difference is significant at the 5 percent level. The finding is also significant after controlling for personal characteristics (see column 11 in Table 4).

[10] Interestingly, Chernoff (1980) finds that in the Massachusetts numbers game in the U.S., where players pick a number from 0000 to 99999, numbers containing the digits 8, 0, and 9 were unpopular.

In sum, the influence of language priming on risk attitudes appears to be context dependent. When the context is likely to evoke culture-specific concepts, such as which numbers to pick in the Mark Six lottery, subjects are more likely to pick Chinese lucky numbers in the Chinese treatment than in the English treatment. However, when the context does not imply a cultural frame explicitly, such as whether to take the coin toss lottery, the impact appears to be weaker.

4. Conclusion

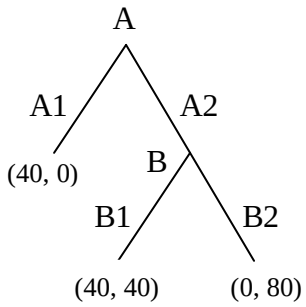
Language is an indispensable part of any communication and thinking process. We conducted 10 economics games with bilingual university subjects in Hong Kong; half the subjects received instructions in Chinese and the other half in English. The objective of the experiment is to identify conditions where language priming may lead to different behaviors. It is found that language priming affects social preference, but only in strategic interactions. In particular, in strategic interactions, subjects receiving Chinese instructions are more cooperative, trust more, and are more trustworthy than the group that received instructions in English. Consistent with our hypothesis, we do not observe treatment differences in individual choice games on social preference. We find that there are significant treatments differences on subjects' beliefs on the decisions of others in the strategic interaction games, but not in individual choice games. This supports our hypothesis that language priming induces different expectations on others only in the strategic games and these differences in expectations then lead to different choices across treatments. Finally, we also observe influence of language priming on risk attitudes. In the coin betting game, players expect others to be more risk taking in the Chinese treatment. In the Mark Six lottery game, subjects exhibit preference for Chinese lucky numbers only in the Chinese treatment.

These findings are the first in the literature that identify the effect of language priming using economics games. They support the hypothesis that the language communicated increases the cognitive accessibility of the norms associated with that language. Our contribution is on showing that the effect of language priming is, in fact, context dependent.

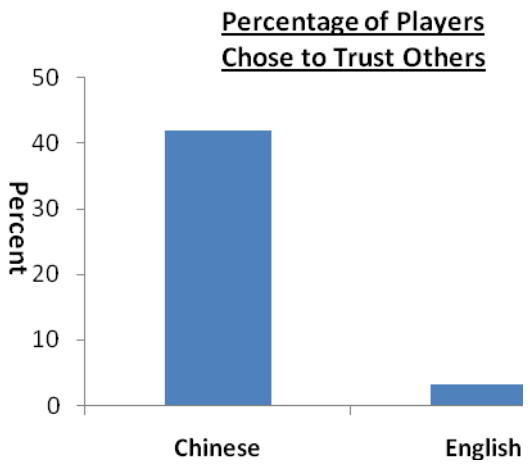
Increasing numbers of people in the world can now speak two languages or even more. According to Crystal (1997), two thirds of the world's children grow up in a bilingual

environment, and 235 million people are bilingual in English and one or more other languages. With the pace of globalization accelerating, the number of bilinguals or even multilinguals is expected to increase. The fact that language will trigger particular social norms may be relevant for business practices such as conducting trade, formulating marketing strategy, or managing employees between two different cultures. We hope these results will inspire continued work on the topic.

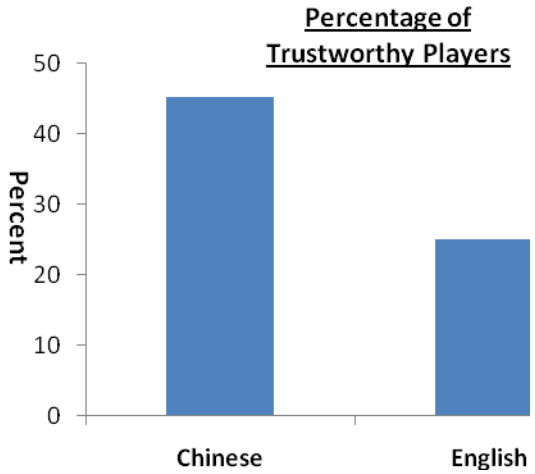
Figure 1
Trust Game with Reward and Punishment



Panel A. Game Tree



Panel B. Mean Percentage of Player A Choosing Strategy A2



Panel C. Mean Percentage of Player B Choosing Strategy B1

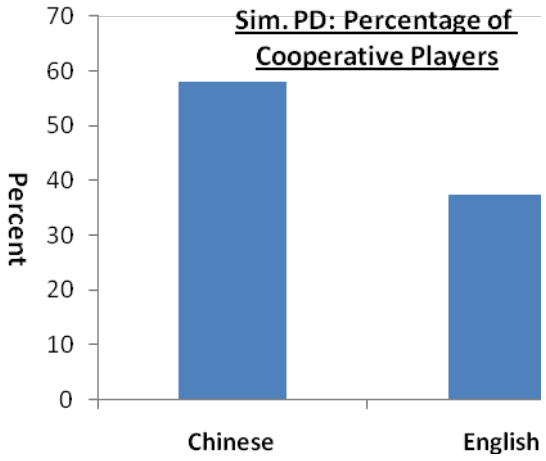
Notes: In panel A, A denotes for player A, and B denotes for player B. Payoffs are presented in the form of (*x*,*y*), where *x* denotes the payoff, in Hong Kong dollars, for player A, and *y* denotes the payoff for player B.

Figure 2

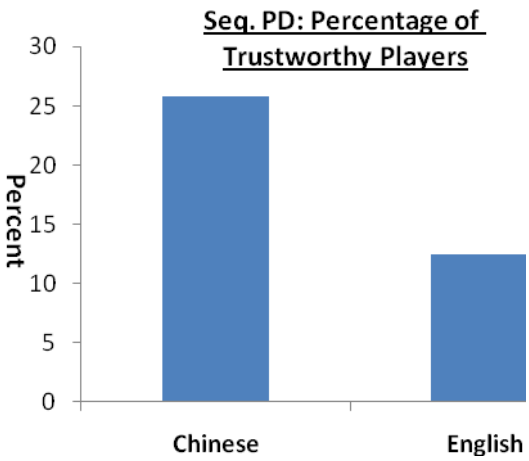
Simultaneous and Sequential Prisoners' Dilemma Game

	B Chooses 1	B Chooses 2
A Chooses 1	A gets HK$40 B gets HK$40	A gets HK$0 B gets HK$70
A Chooses 2	A gets HK$70 B gets HK$0	A gets HK$10 B gets HK$10

Panel A. Payoff Matrix of Simultaneous and Sequential Prisoners' Dilemma Game

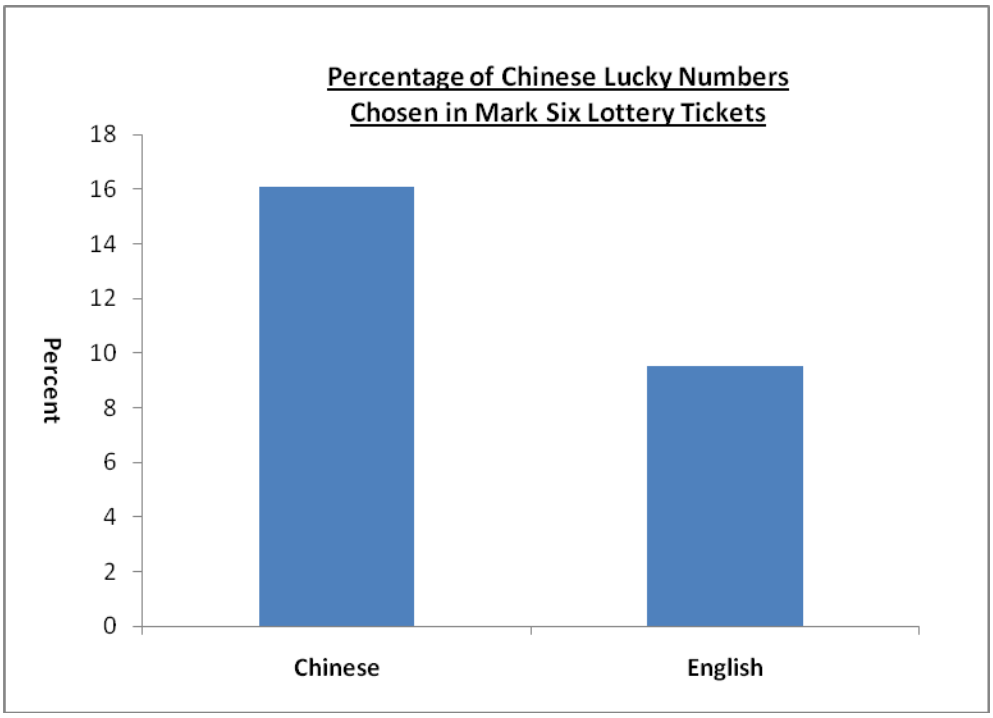


Panel B. Mean percentage of Players Choosing Strategy 1 in Simultaneous Prisoners' Dilemma Game.



Panel C. Mean percentage of Player B Choosing Strategy 1 in Sequential Prisoners' Dilemma Game Conditioned on Player A has Chosen Strategy 1.

Figure 3
The Influence of Language on Preference for Source of Uncertainty



Notes: Chinese lucky numbers include 8, 18, 28, 38, and 48.

Table 1

Games and Summary Statistics

No.	Games	Measuring What?	Decisions	Summary Statistics		Test of Difference (English – Chinese)
	Social Preference			Chinese *Mean (Std)*	English *Mean (Std)*	
	Individual Choice					
1	Dictator Game	Altruism	Amount Gave	23.4 (21.70)	22.03 (24.72)	-0.24
2	Jealousy Game	Envy	Amount Chose	79.03 (30.91)	80.00 (30.37)	0.97
10	Donation to Charity	Altruism	Amount Donated	8.61 (13.00)	13.62 (20.47)	1.16
	Strategic Interactions					
4	Sim. PD Game	Trust and Reciprocity	% Cooperate	58.06	37.5	-1.63*a
5	Seq. PD Game	Trust and Reciprocity	% Trust	41.94	34.38	-0.62
			% Betray	74.19	87.5	1.34*a
6	Public Goods Game	Attitude towards Public Goods	Amount Contributed	26.13 (21.00)	27.66 (22.54)	0.28
7	Trust Game	Trust and Reciprocity	% Trust	67.74	53.1	-1.19#
			Amount Send back	20.97 (21.50)	15.78 (3.60)	-0.98
8	Trust Game with Reward and Punishment	Trust and Reciprocity; Reward and Punishment	% Trust	41.93	3.13	-3.70***
			% Betray	54.8	75	1.67*
	Risk Attitudes					
3	Coin Betting	Risk Attitudes	% Risky Bet	70.97	68.75	-0.19
9	Mark Six	Risk Attitudes	No. of Tickets Purchased	0.97 (1.43)	2.5 (2.98)	2.61**
			% of Chinese Lucky Numbers Chosen	16.11	9.54	-2.39**

Notes: Sim. PD and Seq. PD denotes for simultaneous and sequential prisoners' dilemma game respectively. No. denotes the sequence of the game in the experiment. % denotes the percentage of subjects who chose the corresponding decision. The test of difference in game 1,2,10, 6, 7, 9 (no. of tickets purchased) are two sample t-test, and the other tests are two sample test of proportion. a denoates one-tailed statistics. #:p-value = 0.118. .*,**,** represents significance at the 10, 5, and 1 percent level (two-tailed).

Table 2
Determinants of Decision in Trust Game with Reward and Punishment, Trust Game, Seq. PD, and Sim. PD

	Dependent Variables:							
	Trust Game with Reward and Punishment		Trust Game		Seq. PD		Sim. PD	
	Probability of Trust	Probability of Betray	Probability of Trust	Amount Sent	Probability of Not Trust	Probability of Betray	Probability of Defect	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chinese	0.42***	-0.35**	0.29**	8.72**	-0.12	-0.19*	-0.21*	-0.01
	(0.11)	(0.14)	(0.14)	(3.86)	(0.14)	(0.10)	(0.13)	(0.16)
Belief on % of other players chose to betray	-0.01***	0.01***			0.01***	0.01***		
	(0.002)	(0.003)			(0.004)	(0.005)		
Belief on amount sent by other players			0.01**	0.73***				
			(0.003)	(0.10)				
Belief on % of other players chose to defect								0.01***
								(0.003)
Risk Taking			0.22					
			(0.15)					
Born-in-HK	-0.01	0.34**	-0.02	3.28	0.12	0.08	0.02	-0.18
	(0.097)	(0.11)	(0.20)	(5.14)	(0.17)	(0.06)	(0.16)	(0.20)
Age	0.04	-0.14**	0.10	1.18	-0.08	0.09		-0.03
	(0.04)	(0.07)	(0.07)	(1.70)	(0.06)	(0.04)		(0.07)
Female	-0.05	0.03	-0.11	-4.17	0.15	0.09	-0.09	-0.15
	(0.08)	(0.16)	(0.15)	(4.13)	(0.14)	(0.07)	(0.14)	(0.14)
Constant				-26.18				
				(35.79)				
R^2 / Pseudo R^2	0.48	0.34	0.19	0.54	0.20	0.55	0.39	0.2
# of Obs.	63	63	63	63	63	63	63	63

Notes: Column 1-3 and 5-8 report the marginal effect of the Probit regression, while column 4 reports the regression based on Ordinary Least Square. Chinese is a dummy which equals to 1 if the experiment is conducted in Chinese, and zero if in English. Risk Taking is a dummy which equals to 1 if the subjects chose to take the lottery in the coin toss lottery, zero otherwise. Born-in-HK is a dummy which equals to 1 if the subject is born in Hong Kong, zero otherwise. Female is a dummy which equals to 1 if the subject is female, zero otherwise. Standard errors are in parentheses. *.**, and *** represents significance at 10, 5, and 1 percent level (two-tailed).

Table 3

Determinants of Decisions in Dictator and Jealousy Game

	Dependent Variables:	
	Dictator Game	**Jealousy Game**
	Amount Gave	**Amount Chosen**
	(1)	(2)
Chinese	-4.08	0.64
	(5.03)	(5.71)
Belief on amount others gave	0.32***	
	(0.10)	
Belief on amount others expect to receive	0.32***	0.16
	(0.10)	(0.12)
Belief on amount others Chose		0.70***
		(0.14)
Born-in-HK	7.88	7.88
	(6.74)	(6.74)
Age	-0.02	-0.02
	(2.24)	(2.24)
Female	-1.21	-1.21
	(5.37)	(5.37)
Constant	4.58	4.58
	(47.68)	(47.68)
R^2	0.38	0.53
# of Obs.	63	63

Notes: Chinese is a dummy which equals to 1 if the experiment is conducted in Chinese, and zero if in English. Born-in-HK is a dummy which equals to 1 if the subject is born in Hong Kong, 0 otherwise. Female is a dummy which equals to 1 if the subject is female, zero otherwise. Standard errors are in parentheses. *.**, and *** represents significance at 10, 5, and 1 percent level (two-tailed).

Table 4

Determinants of Beliefs on Social Preference and Risk Attitudes

	Dependent Variables: Belief on Decisions of Others										
	Trust Game with Reward and Punishment			Trust Game		Seq. PD		Sim. PD	Dictator Game	Jealousy Game	Coin Toss Lottery
	% Not Trust	% Betray	Probability of Being Revenged	% Not Trust	Amount Sent	% Not Trust	% Betray	% Defect	Amount Gave	Amount Chosen	% Safe Option
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Chinese	-14.92*	-3.27	0.19**	-18.5**	-5.65	-9.1	-1.61	-18.2***	2.27	-2.15	-10.99*
	(7.83)	(7.69)	(0.08)	(9.06)	(5.23)	(7.93)	(5.54)	(7.67)	(6.96)	(6.94)	(5.8)
Born-in-HK	2.31	1.34		2.58	6.77	10.49	-4.03	11.37	10.87	0.91	-5.25
	(10.45)	(10.26)		(12.10)	(6.99)	(10.59)	(7.39)	(10.23)	(9.29)	(9.27)	(7.58)
Age	-1.07	-5.83*	0.01	-1.52	1.59	-1.56	-0.84	4.06	1.75	2.95	-0.37
	(3.47)	(3.41)	(0.03)	(4.02)	(2.32)	(3.52)	(2.45)	(3.40)	(-3.08)	(-3.08)	(-2.56)
Female	8.01	3.95	0.04	9.48	2.9	7.41	0.83	3.81	0.12	-2	-7.8
	(-8.44)	(-8.29)	(0.07)	(-9.77)	(-5.65)	(-8.56)	(-5.97)	(-8.27)	(-7.50)	(-7.49)	(-6.20)
Constant	95.61	194.19***		80.33	-10.54	100.32	105.63***	-25.25	-11.10	1.38	65.71
	(-73.25)	(-71.94)		(-84.81)	(-49.00)	(-74.25)	(-51.82)	(-71.76)	(-65.12)	(-64.70)	(-54.26)
R^2	0.08	0.06		0.09	0.05	0.05	0.01	0.14	0.04	0.02	0.10
Pseudo R^2			0.12								
# of Obs.	63	63	63	63	63	63	63	63	63	63	63

Notes: Chinese is a dummy which equals to 1 if the experiment is conducted in Chinese, and zero if in English. Born-in-HK is a dummy which equals to 1 if the subject is born in Hong Kong, 0 otherwise. Female is a dummy which equals to 1 if the subject is female, zero otherwise. Column 3 reports the marginal effect of the probit regression, all other columns report the result of regressions using Ordinary Least Square. Standard errors are in parentheses. *.**, and *** represents significance at 10, 5, and 1 percent level (two-tailed).

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Appendix (not for publication): Experimental Instructions for the English Treatment

Instructions

Welcome to our experimental study on decision-making. You will receive a show-up fee of HK$50. In addition, you will have chance to get more money as a result of decisions made in the experiment.

Your identity

You will be given a subject ID number. Please keep it confidentially. In each game, you will write down your subject ID instead of your name. Your decisions will be anonymous and kept confidential. Thus, other participants won't be able to link your decisions with your identity. You will be paid in private, using your subject ID, and in cash at the end of the experiment in another room where no other participants will be present.

The games

You will make decisions in 10 different games. In the end of the experiment, we will randomly draw one game to implement and pay you according to the result of the game.

In some games, you will be anonymously and randomly paired with one (or more) other participant. For games involving pairing, each time (new game) you will be paired with a new person(s). More specifically, you won't be paired with the same person for more than once.

If the game involves more than one person in each group (e.g., player A, player B), we will ask you to specify your decision(s) under each role. If the game is drawn to implement, the computer will randomly determine your role, and your decisions will be implemented accordingly.

In some games, we will need your help to fill-in a short questionnaire after your decisions in the game have been made. Please answer them carefully. Your answers will not influence your final payoff.

When you have any questions, please feel free to ask by raising your hand, one of our assistant will come to answer your questions. Please DO NOT attempt to communicate with any other participants.

Subject ID:

Game 1

You will be randomly and anonymously paired with another participant to play the following game. In this game, there are two players, player A and player B. The computer will randomly determine whether you are player A or player B.

The experimenter has provided HK$100 for allocation between player A and B. Player A has been randomly selected to determine the allocation. Player A can choose any amount from zero to HK$100 for player B.

We now ask for your decision
If I am player A, I will allocate HK$_____ to player B, and HK$_____to myself.

Subject ID:

Questionnaire

Now we have two questions for you. Please answer them carefully. Your answer will **not** influence your final payoff.

1. In your estimation, what is the average amount (out of HK$100) chosen for player B by other participants (player A)?
HK$_____

2. How much (out of HK$100) do you think other participants (player B) expect to receive from this game?
HK$_____

Subject ID:

Game 2

You will be randomly and anonymously paired with another participant to play the following game. In this game, there are two players, player A and player B. The computer will randomly determine whether you are player A or player B.

In this game, Player B chooses how much player A will get from HK$20 to HK$100. Player B receives HK$40 no matter what is his/her decision.

We now ask for your decision.
If I am player B, I will choose to let player A to receive HK$_____.

Subject ID:

Questionnaire

Now we have two questions for you. Please answer them carefully. Your answers will **not** influence your final payoff.

1. In your estimation, what is the average amount (from HK$20 to HK$100) chosen for player A by other participants (player B)?
HK$_____

2. How much (from HK$20 to HK$100) do you think other participants (player A) expect to receive from this game?
HK$_____

Subject ID:

Game 3

In this game, you are asked to choose between:

A. Receiving HK$30 for sure.
B. The experimenter will flip a coin in front of you. If it is tail, you receive HK$80. If it is head, you receive HK$0.

We now ask for your decision

I choose (please circle) A B.

Subject ID:

Questionnaire

Now we have a question for you. Please answer it carefully. Your answer will **not** influence your final payoff.

1. In your estimation, how many percent of other participants have chosen option A (i.e., Receiving HK$30 for sure)?
_____%

Subject ID:

Game 4

You will be randomly and anonymously paired with another participant to play the following game. In this game, there are two players, player A and player B. The computer will randomly determine whether you are player A or player B.

In this game, Player A and B makes decision **simultaneously**, choosing between 1 and 2. The payoff is determined by the following table.

	B Chooses 1	B Chooses 2
A Chooses 1	A gets HK$40 B gets HK$40	A gets HK$0 B gets HK$70
A Chooses 2	A gets HK$70 B gets HK$0	A gets HK$10 B gets HK$10

If A chooses 1 and B chooses 1, then both players will get HK$40.
If A chooses 1 and B chooses 2, then A will get HK$0 and B will get HK$70.
If A chooses 2 and B chooses 1, then A will get HK$70 and B will get HK$0.
If A chooses 2 and B chooses 2, then both players will get HK$10.

We now ask for your decision
I will choose (please circle) 1 2.

Subject ID:

Questionnaire

Now we have a question for you. Please answer it carefully. Your answer will **not** influence your final payoff.

1. In your estimation, how many percent of other participants have chosen 2?
_____%

	B Chooses 1	B Chooses 2
A Chooses 1	A gets HK$40 B gets HK$40	A gets HK$0 B gets HK$70
A Chooses 2	A gets HK$70 B gets HK$0	A gets HK$10 B gets HK$10

Subject ID:

Game 5

You will be randomly and anonymously paired with another participant to play the following game. In this game, there are two players, player A and player B. The computer will randomly determine whether you are player A or player B.

The game has two stages. Player A and B make decision **sequentially**, choosing between 1 and 2. The payoff is determined by the following table.

Stage 1
In stages 1, player A chooses between 1 or 2.

Stage 2
In stage 2, player B specifies his choices in the following contingencies.

If player A chooses 1, I will choose (please circle) 1 2.
If player A chooses 2, I will choose (please circle) 1 2.

	B Chooses 1	B Chooses 2
A Chooses 1	A gets HK$40 B gets HK$40	A gets HK$0 B gets HK$70
A Chooses 2	A gets HK$70 B gets HK$0	A gets HK$10 B gets HK$10

If A chooses 1 and B chooses 1, then both players will get HK$40.
If A chooses 1 and B chooses 2, then A will get HK$0 and B will get HK$70.
If A chooses 2 and B chooses 1, then A will get HK$70 and B will get HK$0.
If A chooses 2 and B chooses 2, then both players will get HK$10.

We now ask for your decision.
If you are player A
If I am player A, I will choose (please circle) 1 2.

If you are player B
If player A chooses 1, I will choose (please circle) 1 2.
If player A chooses 2, I will choose (please circle) 1 2.

Subject ID:

Questionnaire

Now we have two more questions for you. Please answer them carefully. Your answers will **not** influence your final payoff.

1. In your estimation, how many percent of other participants (player A) have chosen 2?
_____%

2. In your estimation, how many percent of other participants (player B) have chosen "If player A chooses 1, I will choose 2"?
_____%

	B Chooses 1	B Chooses 2
A Chooses 1	A gets HK$40 B gets HK$40	A gets HK$0 B gets HK$70
A Chooses 2	A gets HK$70 B gets HK$0	A gets HK$10 B gets HK$10

Subject ID:

Game 6

In this game, you will be randomly matched with three other players to form a group of four. Each of you will be given an endowment of HK$50. Each group member can contribute any amount of the endowment. Then the total contributions of the group members will be multiplied by 2 and distribute equally to each group member.

Your payoff will be determined by the following formula:

HK$50 – your contribution + 2x(sum of contributions from all group members)/4

We now ask for your decision

I choose to contribute HK$_____.

Subject ID:

Questionnaire

Now we have one more question for you. Please answer it carefully. Your answers will **not** influence your final payoff.

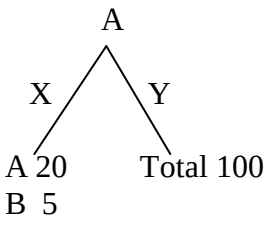
1. How much do you think, on average, other participants have chosen to contribute to the group?
HK$_____

Subject ID:

Game 7

You will be randomly and anonymously paired with another participant to play the following game. In this game, there are two players, player A and player B. The computer will randomly determine whether you are player A or player B.

The game has two stages.



Stage 1

Player A chooses between X and Y. If he chooses X, player A will receive HK$20, player B will receive HK$5, and then the game ends. If player A chooses Y, the game proceeds to stage 2.

Stage 2

There is a sum of HK$100 available for allocation between player A and B. Player B will determine how much to allocate to himself/herself and how much to player A.

We now ask for your decision

If you are player A

If I am player A, I will choose (please circle) X Y.

If you are player B and when Y was chosen player A

If I am player B, I will allocate HK$_____ to player A, and HK$_____to myself.

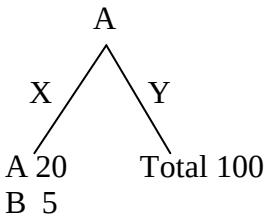
Subject ID:

Questionnaire

Now we have two more questions for you. Please answer them carefully. Your answers will **not** influence your final payoff.

1. In your estimation, how many percent of other participants (player A) have chosen X?
_____%

2. How much do you think, on average, other participants (player B) have chosen to allocate to player A when Y was chosen?
HK$_____

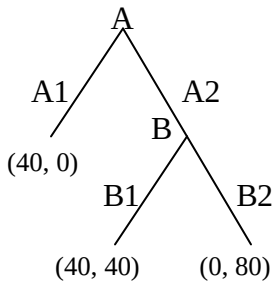


Subject ID:

Game 8

You will be randomly and anonymously paired with another participant to play the following game. In this game, there are two players, player A and player B. The computer will randomly determine whether you are player A or player B.

The game has three stages.



Note: (payoff of A, payoff of B)

Stage 1

Player A chooses between A1 and A2. If player A chooses A1, player B will receive 0, player A will receive HK$40, and the game ends. If Player A chooses A2, the game proceeds to stage 2.

Stage 2

Player B chooses between B1 and B2. If player B chooses B1, both players will receive HK$40. If Player B chooses B2, player B will receive HK$80 and player A will receive 0.

Stage 3

Player A has the option to **shrink or enlarge** player B's payoff up to 30%.

We now ask for your decision.

If you are player A

If I am player A, I will choose (please circle) A1 A2.

If you are player B

If I am player B, I will choose (please circle) B1 B2.

If you are player A and Player B chooses B1

I will shrink enlarge (please circle) player B's payoff by _____%.

If you are player A and Player B chooses B2

I will shrink enlarge (please circle) player B's payoff by _____%.

Subject ID:

Questionnaire

Now we have some questions for you. Please answer them carefully. Your answers will **not** influence your final payoff.

1. In your estimation, how many percent of other participants (player A) have chosen A1?
_____%

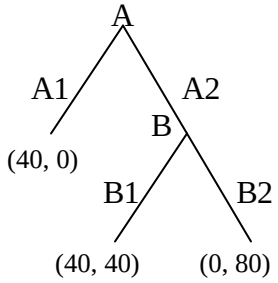
2. In your estimation, how many percent of other participants (player B) have chosen B2 given player A chose A2?
_____%

3. In your estimation, how many percent of other participants (player A) have chosen to shrink player B's payoff when B2 was chosen?
_____%

4. Do you think player B will expect player A to shrink his/her payoff when B2 was chosen?

Yes No (please circle)

If yes, by how many percent?
_____%



Subject ID:

Game 9

Do you want to try your luck?

You are now endowed with HK$50 and can spend any part of it to purchase at most 10 mark six tickets, each ticket costs HK$5, for the draw scheduled on 3-Oct-2009. If you decide to purchase, you will be asked to select 6 numbers out of 1 to 49 for each ticket. We will then purchase the tickets for you, according to the numbers selected, and of course, we will inform you if you win!

We now ask for your decision.

How many tickets do you want to purchase?
I decide to purchase 0 1 2 3 4 5 6 7 8 9 10 tickets (please circle).

Ticket 1

Choose 6 different numbers from 1 to 49.

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49

Ticket 2

Choose 6 different numbers from 1 to 49.

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49

Ticket 3

Choose 6 different numbers from 1 to 49.

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49

Ticket 4

Choose 6 different numbers from 1 to 49.

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49

Ticket 5

Choose 6 different numbers from 1 to 49.

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49

Ticket 6

Choose 6 different numbers from 1 to 49.

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49

Ticket 7

Choose 6 different numbers from 1 to 49.

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49

Ticket 8

Choose 6 different numbers from 1 to 49.

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49

Ticket 9

Choose 6 different numbers from 1 to 49.

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49

Ticket 10

Choose 6 different numbers from 1 to 49.

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49

Subject ID:

Game 10

You are endowed with HK$80. You can choose to donate any amount from HK$0 to HK$80 to the Hong Kong Red Cross. You will keep the remaining amount. If you choose to donate any amount, we will help you to donate the money to the Hong Kong Red Cross anonymously.

We now ask you to indicate your decision
I decide to donate HK$_____to the Hong Kong Red Cross.

Subject ID:

Questionnaire

Now we have more questions for you. Please answer them carefully. Your answers will **not** influence your final payoff.

Q1. Are you born in Hong Kong?
Yes No

Q2. How old are you?
_____years old

Q3. Can you read and write both English and Chinese?
Yes No (I can't read and write Chinese / English (please circle))

Q4. When did you start learning English?
Since_____years old

Q5. When did you start learning Chinese?
Since_____years old

Q6. How long have you been living in Hong Kong?

A. Since I was born.
B. More than 10 years.
C. More than 7 years.
D. More than 1 year.

Q7. Do you speak Cantonese?
Yes No

Q8. Do you speak Putonghua?
Yes No

Q9. Where did you receive your secondary school education?

A. Hong Kong
B. Mainland China
C. U.S or Canada
D. U.K
E. Others

Q10. What is your gender?
Male Female

Experimental instructions for the Chinese Treatment

規則

歡迎參加本次關於決策的實驗。你會得到港幣 50 元參加費, 另外根據實驗中的決策,你還有機會得到更多的金額。

你的身份

我們會提供一個參加者編號給你, 請保密你的編號。在每個遊戲中, 你需要寫上你的編號而不是你的名字。你的決策會是匿名和保密的, 因此，其他與參加者將無法知道誰(你的名字)做了甚麼決定。在實驗結束後, 我們將在另外一個房間用現金支付你在實驗中獲得的金額, 每次只會有一位參加者進入該房間, 因此, 整個支付過程是保密的。

遊戲

你需要參加十個遊戲。在實驗結束後, 我們會隨機抽取其中一個遊戲, 然後按照該遊戲的結果支付金額給你。

在一些遊戲中我們會將你和另外一個（或多個）其他參與者隨機(和匿名的)配對成一組, 在每個需要進行配對的遊戲, 我們都會重新進行配對, 所以你不會超過一次和同一個人配對成一組。

如果該遊戲需要進行配對, 每組有兩位或以上參與者(例如, 甲、乙), 我們將要求您根據每個角色指定您的決定, 換而言之, 您需要指定如果你是甲, 你會做甚麼選擇, 同時, 您也需要指定如果你是乙, 你會做甚麼選擇。如果在實驗結束後, 我們抽中該遊戲, 電腦會隨機決定你的角色, 然後執行你在該角色下指定的決策。

在一些遊戲後我們需要你幫忙填寫一份簡短的問卷, 請認真回答, 你的答案並不會影響你在實驗中得到金額。

當你有任何問題的時候, 請舉手我們的助理會到你面前來回答你的問題。請不要嘗試和其他參加者進行任何形式的溝通。

參加者編號:

遊戲一

在這個遊戲中你會與另外一位參加者隨機(和匿名的)配對成一組, 其中一位是甲, 另一位是乙,電腦會隨機決定你是甲或乙。

實驗者提供了港幣 100 元給甲和乙, 甲已被隨機選擇來決定這 100 元如何分配, 甲可以從零到港幣 100 元中選擇任何金額分配給乙。

你的決策

如果我是甲, 我會分配港幣_____元給乙, 和分配港幣_____元給自己 。

參加者編號:

問卷

我們需要你回答兩條問題, 請認真回答, 你的答案並不會影響你在實驗得到金額。

1. 請問你估計其他的參加者(甲)平均從港幣 100 元中分配多少金額給乙?
港幣_____元

2. 請問你估計其他的參加者(乙)會預期從港幣 100 元中拿到多少金額?
港幣_____元

參加者編號:

遊戲二

在這個遊戲中你會與另外一位參加者隨機(和匿名的)配對成一組, 其中一位是甲, 另一位是乙,電腦會隨機決定你是甲或乙。

在這個遊戲中, 乙需要決定甲可以從港幣 20 元到 港幣 100 元 中拿到多少錢, 無論乙的決定是甚麼, 他(她)都會得到港幣 40 元。

你的決策
如果我是乙, 我會選擇讓甲拿到港幣_____元。

參加者編號:

問卷

我們需要你回答兩條問題, 請認真回答, 你的答案並不會影響你在實驗得到金額。

1. 請問你估計其他的參加者(乙)平均選擇讓甲從港幣 20 元 到 港幣 100 元中拿到多少錢?
港幣_____元

2. 請問你估計其他的參加者(甲)會預期從港幣 20 元 到 港幣 100 元中拿到多少錢?
港幣_____元

參加者編號:

遊戲三

在這個遊戲中, 你需要從以下兩項中選一項:

一. 一定得到港幣 30 元
二. 實驗者會在你面前拋一個硬幣, 如果是正面, 你會得到港幣 80 元, 如果是反面, 你會得到港幣 0 元

你的決策
我會選 (請打圈)　一　　二。

參加者編號:

問卷

我們需要你回答一條問題, 請認真回答, 你的答案並不會影響你在實驗得到金額。

1. 請問你估計百分幾的其他參加者選擇了選項一(一定得到港幣 30 元?)
百分之_____

參加者編號:

遊戲四

在這個遊戲中你會與另外一位參加者隨機(和匿名的)配對成一組, 其中一位是甲, 另一位是乙,電腦會隨機決定你是甲或乙。

在這個遊戲中, 甲乙需要同時作出決定, 選 1 或 2, 當他們選擇的時候, 他們並不知道對方的選擇。他們在遊戲中的所得由以下的列表決定。

	乙 選 1	乙選 2
甲選 1	甲得 港幣 40 元 乙得 港幣 40 元	甲得港幣 0 元 乙得港幣 70 元
甲選 2	甲得港幣 70 元 乙得港幣 0 元	甲得港幣 10 元 乙得港幣 10 元

如果甲和乙分別選 1, 雙方會各自得到港幣 40 元。
如果甲選 1, 乙選 2 ,甲會得到港幣 0 元, 乙會得到港幣 70 元。
如果甲選 2, 乙選 1 ,甲會得到港幣 0 元, 乙會得到港幣 70 元。
如果甲和乙分別選 2, 雙方會各自得到港幣 10 元。

你的決策
我會選 (請打圈)　1　　2。

參加者編號:

問卷

我們需要你回答一條問題, 請認真回答, 你的答案並不會影響你在實驗得到金額。

請問你估計有百分之幾的參加者選 2?

_____%

	乙 選 1	乙選 2
甲選 1	甲得 港幣 40 元 乙得 港幣 40 元	甲得港幣 0 元 乙得港幣 70 元
甲選 2	甲得港幣 70 元 乙得港幣 0 元	甲得港幣 10 元 乙得港幣 10 元

參加者編號:

遊戲五

在這個遊戲中你會與另外一位參加者隨機(和匿名的)配對成一組, 其中一位是甲, 另一位是乙,電腦會隨機決定你是甲或乙。

這個遊戲有兩個步驟。甲乙需要先後作出決定, 他們在遊戲中的所得由以下的列表決定。

步驟 1
甲決定選 1 或 2。

步驟 2
乙決定在以下的情況中選 1 或 2。
如果甲選 1, 我會選 (請打圈)　1　　2。
如果甲選 2, 我會選 (請打圈)　1　　2。

	乙 選 1	乙選 2
甲選 1	甲得 港幣 40 元 乙得 港幣 40 元	甲得港幣 0 元 乙得港幣 70 元
甲選 2	甲得港幣 70 元 乙得港幣 0 元	甲得港幣 10 元 乙得港幣 10 元

如果甲和乙分別選 1, 雙方會各自得到港幣 40 元。
如果甲選 1, 乙選 2 ,甲會得到港幣 0 元, 乙會得到港幣 70 元。
如果甲選 2, 乙選 1 ,甲會得到港幣 0 元, 乙會得到港幣 70 元。
如果甲和乙分別選 2, 雙方會各自得到港幣 10 元。

<u>你的決策</u>
如果你是甲
如果我是甲, 我會選 (請打圈)　1　　2。

如果你是乙
如果甲選 1, 我會選 (請打圈)　1　　2。
如果甲選 2, 我會選 (請打圈)　1　　2。

參加者編號:

問卷

我們需要你回答兩條問題, 請認真回答, 你的答案並不會影響你在實驗得到金額。

1. 請問你估計有百分之幾的其他的參加者(甲)選了 2?
百分之_____

2. 請問你估計有百分之幾的其他的參加者(乙)選了“如果甲選 1, 我會選 2”?
百分之_____

	乙 選 1	乙選 2
甲選 1	甲得 港幣 40 元 乙得 港幣 40 元	甲得港幣 0 元 乙得港幣 70 元
甲選 2	甲得港幣 70 元 乙得港幣 0 元	甲得港幣 10 元 乙得港幣 10 元

參加者編號:

遊戲六

在這個遊戲中你會與另外三位參加者隨機(和匿名的)配對成一組。
每位都會收到港幣 50 元, 每位組員可以貢獻其中任何金額出來, 所有組員總共貢獻出來的金額會乘以二然後平均分配給每位組員。

你在本遊戲中得到的金額會由以下的方程來決定:

港幣 50 元- 你貢獻的金額 + 2x(所有組員貢獻出來的金額)/4

你的決策
我選擇貢獻港幣_____元。

參加者編號:

問卷

我們需要你回答一條問題, 請認真回答, 你的答案並不會影響你在實驗得到金額。

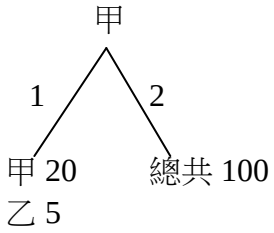
1. 請問你估計其他的參加者平均會選擇選擇貢獻多少錢?
港幣_____元

參加者編號:

遊戲七

在這個遊戲中你會與另外一位參加者隨機(和匿名的)配對成一組, 其中一位是甲, 另一位是乙,電腦會隨機決定你是甲或乙。

這個遊戲有兩個步驟。



步驟 1
甲決定選 1 或 2。如果甲選 1, 甲會得到港幣 20 元, 乙會得到港幣 5 元, 同時這個遊戲會中止。如果甲選 2, 遊戲會進入步驟 2。

步驟 2
總共有港幣 100 元可以分配給甲和乙。乙會決定分配多少給自己和分配多少給甲。

你的決策
如果你是甲
如果我是甲, 我會選 (請打圈)　1　　2。

如果你是乙
如果我是乙, 我會分配港幣_____元給乙, 和分配港幣_____元給自己 。

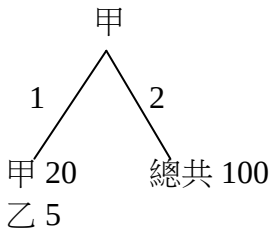
參加者編號:

問卷

我們需要你回答兩條問題, 請認真回答, 你的答案並不會影響你在實驗得到金額。

1. 請問你估計有百分之幾的其他的參加者(甲)選 1?
百分之_____

2. 如果甲選 2, 請問你估計其他的參加者(乙)平均選擇分配多少錢給甲?
港幣_____元

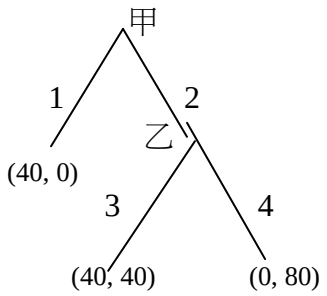


參加者編號:

遊戲八

在這個遊戲中你會與另外一位參加者隨機(和匿名的)配對成一組, 其中一位是甲, 另一位是乙,電腦會隨機決定你是甲或乙。

這個遊戲有三個步驟。



注: (甲得到的金額 , 乙得到的金額)

步驟 1
甲決定選 1 或 2。如果甲選 1, 甲會得到港幣 40 元, 乙則得港幣 0 元, 同時本遊戲會終止。如果甲選 2, 遊戲會進入步驟 2。

步驟 2
乙決定選 3 或 4。如果乙選 3, 甲乙會分別得到港幣 40 元。如果乙選 4, 乙會得到港幣 80 元, 而甲則得港幣 0 元。

步驟 3
甲可以減少或增加乙在本遊戲的所得金額最多達百分之三十。

<u>你的決策</u>
如果你是甲
如果我是甲, 我會選 (請打圈)　1　　2。

如果你是乙
如果我是乙, 我會選 (請打圈)　3　　4。

如果你是甲,同時乙選 3
我會　減少　增加　(請打圈)　　乙的所得金額 百分之_____。

如果你是甲,同時乙選 4
我會　減少　增加　(請打圈)　　乙的所得金額 百分之_____。

參加者編號:

問卷

我們需要你回答幾條問題, 請認真回答, 你的答案並不會影響你在實驗得到金額。

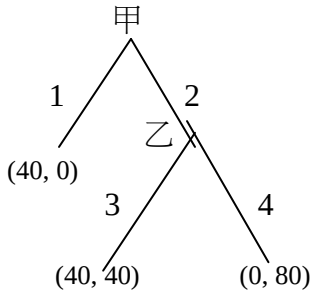
1. 請問你估計有百分之幾的其他的參加者(甲)選 1?
百分之_____

2. 如果甲選 2, 請問你估計有百分之幾的其他的參加者(乙)選 4?
百分之_____

3. 如果乙選 4, 請問你估計有百分之幾的其他的參加者(甲)選擇減少乙的所得金額?
百分之_____

4. 如果乙選 4, 請問你估計乙會預期甲會減少他/她的所得金額嗎?
會　　不會 (請打圈)

如果會, 請問是減少百分之幾?
百分之_____



參加者編號:

遊戲九

想不想試一下你的運氣?

你會收到港幣 50 元, 你可以用其中任何金額來買六合彩彩票(最多十張, 每張港幣 5 元, 在 3/10/2009 攪珠)。如果你決定購買, 在每張彩票中你必須從 1 到 49 中選取 6 個號碼, 我們會按照你選的號碼幫你購買彩票, 當然如果你中獎, 我們會通知你。

你的決策
請問你決定買多少張?
我決定買 0 1 2 3 4 5 6 7 8 9 10 張。

第一張
從 1 到 49 中選 6 個號碼

1	□	3	4	□	6	□
8	9	10	1□	12	13	14
15	16	17	18	19	20	21
22	23	24	□5	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49

第二張
從 1 到 49 中選 6 個號碼

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
3□	37	38	39	40	4□	42
43	44	45	46	47	48	49

第三張
從 1 到 49 中選 6 個號碼

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
3□	37	38	39	40	41	42
43	44	45	46	47	48	49

第四張
從 1 到 49 中選 6 個號碼

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	1□	20	21
22	23	24	25	26	27	28
29	30	31	32	□3	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49

第五張
從 1 到 49 中選 6 個號碼

1	2	3	4	5	6	7
8	9	10	11	1□	13	14
15	16	17	18	19	20	21

第六張
從 1 到 49 中選 6 個號碼

1	2	3	4	□	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21

22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	□8	39	□0	41	□2
□3	44	45	46	47	48	49

22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	□0	41	42
43	44	45	46	47	48	49

第七張

從 1 到 49 中選 6 個號碼

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	1□	17	18	19	20	2□
22	23	24	25	26	27	28
29	30	31	32	33	34	□5
36	37	38	39	40	41	42
43	44	45	46	47	48	49

第八張

從 1 到 49 中選 6 個號碼

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	1□	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	4□
43	□4	45	□6	4□	48	49

第九張

從 1 到 49 中選 6 個號碼

1	2	3	4	5	6	7
8	□	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	□6	47	48	49

第十張

從 1 到 49 中選 6 個號碼

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	2□	21
□2	23	□4	2□	26	27	28
29	30	31	32	33	34	35
36	37	38	3□	40	41	42
43	44	45	46	47	48	49

參加者編號:

遊戲十

你會收到港幣 80 元, 你可以捐贈其中的任何金額給香港紅十字會, 剩下的金額由你保留。
如果你選擇捐贈任何金額, 我們會幫你用無名氏的名義捐贈給香港紅十字會。

你的決策
我決定捐贈港幣_____元給香港紅十字會。

參加者編號:

問卷

我們需要你回答幾條問題, 請認真回答, 你的答案並不會影響你在實驗得到金額。

1. 請問你是否在香港出生?
是　　否

2. 請問你今年幾歲?
_____歲

3. 請問你可以讀和寫中文和英文嗎?
可以　不可以 (我不可以 讀和寫 中文 / 英文 (請打圈))

4. 請問你幾歲起開始學習英文?
從_____歲起

5. 請問你幾歲起開始學習中文?
從_____歲起

6. 請問你在香港居住了多長時間?

1. 從出生起
2. 超過 10 年
3. 超過 7 年
4. 超過 1 年

7. 請問你會講廣東話嗎?
會　　不會

8.請問你會講普通話嗎?
會　　不會

9. 請問你在那裡讀中學?
1. 香港
2. 中國大陸
3. 美國或加拿大
4. 英國
5. 其他

10. 請問你的性別是?
男　　女